

The Impact of Corporate Social Responsibility on the Corporate Image of Sanitation Service Providers: A Management Perspective within the Framework of Stakeholder Theory

By xxx

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Contents

1. Introduction	3
2. Underpinning Literature Review: What is the challenge?	4
<i>2.1 CSR in Sanitation Services</i>	<i>4</i>
<i>2.2 Challenges in implementing CSR in Sanitation Services</i>	<i>5</i>
<i>a. Resource Constraint</i>	<i>6</i>
<i>b. Stakeholder Complexity</i>	<i>6</i>
<i>c. Public Perception</i>	<i>6</i>
<i>d. Regulatory Pressure</i>	<i>7</i>
<i>2.3 Corporate Image – Key Transformation</i>	<i>7</i>
<i>2.4 Theoretical framework</i>	<i>8</i>
<i>a. Stakeholder Theory</i>	<i>8</i>
3. Application to the Sanitary Industry in XX XX	9
<i>3.1 CSR in XX xx</i>	<i>9</i>
<i>3.2 Role of Sanitation Providers in CSR</i>	<i>11</i>
<i>3.3 Current CSR Practices in XX XX's Sanitation Industry</i>	<i>12</i>
<i>a. Community Engagement</i>	<i>12</i>
<i>b. Environmental Responsibility</i>	<i>13</i>
<i>c. Employee Welfare</i>	<i>13</i>
<i>3.4 Critical analysis of CSR Practices in XX XX's Sanitation Industry</i>	<i>14</i>
<i>a. Argument on Tokenism</i>	<i>14</i>
<i>b. Digital innovations in waste management</i>	<i>15</i>
<i>c. Collaborations with NGOs and local governments</i>	<i>16</i>
4. Deriving Innovative Solutions to the Challenge	16
<i>4.1 Recommended solution: Integrated Smart Sanitation Ecosystem</i>	<i>16</i>
<i>a. AI-driven waste management and sorting</i>	<i>17</i>
<i>b. Blockchain technology for accountability and transparency</i>	<i>17</i>
<i>c. Interactive digital platforms</i>	<i>18</i>
<i>d. Employee-centric innovations</i>	<i>19</i>
<i>4.2 Implementation Strategies</i>	<i>20</i>
<i>a. Pilot testing in Urban Centers</i>	<i>20</i>

<i>b. Collaborative partnerships</i>	20
<i>c. Funding and allocating resources</i>	20
<i>d. Phased scaling</i>	21
4.3 Evaluation Metrics	21
<i>a. Environmental Impact</i>	21
<i>b. Community engagement</i>	22
<i>c. Employee welfare</i>	22
References	23

1. Introduction

Corporate Social Responsibility (CSR) has become a strategic component of most business organizations, and it refers to a set of processes that are intended to reduce negative social impacts and enhance the quality of life of affected stakeholder groups (Figuerola, Lee & Jepson, 2022). CSR seems relevant where the products or services of a company have an evident link to issues of social importance like health (López-Ruiz et al., 2023; Zhu, Hui, & Gong, 2023). To sanitation service providers, CSR activities help them to build up the general image of their companies as socially responsible companies by developing trust, loyalty and goodwill among the public. Management, being the driving force for the organization strategy, plays an important role in advancing the stakeholder interests and aligning the CSR goals with this strategy. In this report, the focus is to assess the effect of CSR implementation in the XX XX's sanitation service providers on the corporate image, which is guided by stakeholder theory.

The key transformation assessed is the corporate image with the implementation CSR initiatives positively influencing the corporate image and enhancing the competitive edge of the sanitation service providers. In the stakeholder theory, the assignment focuses only on the management, as they are tasked with implementing CSR policies towards realizing positive corporate reputation and image. In improving its corporate image, the sanitation service providers need to transform theory management practices – implementing proactive value creation and engagement with all the stakeholders. With such transformation, it not only facilitates environmental and social responsibilities, but ensures that it enhances the organization's corporate image, reputation, and foster trust.

As such, the study objectives explored include:

- 1) To determine the role of CSR initiatives in improving sanitation service providers' corporate image in XX XX.
- 2) To assess the challenges faced by management in implementing CSR initiatives focusing on the expectations of stakeholders.
- 3) To recommend the CSR strategies that the management of sanitation service providers in XX Acan undertake to improve its corporate image.

2. Underpinning Literature Review: What is the challenge?

2.1 CSR in Sanitation Services

Human sanitation agencies, which may include waste disposal companies or sewage treatment firms, usually play a great part in the well-being of a society. It can range from issues such as cleaning the environment, minimizing pollution, contributing to the enhancement of nearby communities, and practicing sustainable business practices. However, CSR activities are relevant to the corporate image of a service provider— a concept E. S. Fombrun (1996) described as the beliefs that stakeholders have about a company, which stem from its behaviour, principles, and messages.

The stakeholders in sanitation services are the residents, the government, environmental non-governmental organisations and the public at large. The role of the management of the sanitation services is to ensure that they implement CSR policies that aligns with the interests of the stakeholders. Examples of CSR include using environmentally advanced technology in the disposal of wastes or supporting the hygiene programmes of the local community are perceived to make the company to be ethical, responsible and environmentally sensitive (Laureti et al., 2024). The findings of several authors show that stakeholders are more likely to have positive perception towards the company and this is because CSR if aligned with the interest of the stakeholders strengthens the corporate image and the relationship with the company (Sun et al., 2023; Laureti et al., 2024).

However, CSR practice in sanitation companies is widely regarded as a public relations strategy, and not as a value-driven approach to social concerns. A few studies indicate that CSR initiatives are sometimes seen as an attempt by organizations to camouflage or deflect focus from various aspects of environmental or health concern (Lee et al., 2024; Lu et al., 2023). For instance, when a sanitation provider persists with the negative impacts on the environment like inadequate disposal of wastes during the same time that it propagates minor cleanliness within the community, stakeholders may just see through the CSR efforts as mere green washing (Feng et al., 2022). Hence, the level and the degree of honesty regarding CSR initiatives cannot be overestimated as its measure is instrumental in building and improving the corporate image.

Environmental management is a key aspect of CSR based sanitation service delivery. Most sanitation companies participate in activities aimed at conserving resources such as waste, recycling and defending against pollution (Morales-Raya & Muñoz, 2024). With awareness of environmental hazards at the global level growing, firms in this industry are now increasingly

pressured to engage in sustainable activities (Khalid, 2024). Research by Sojamo & Rudebeck (2024) illustrate how sanitation companies' attempts at environmentally friendly technologies, for instance, waste-to-energy plants or zero waste management systems significantly enhance their corporate image amongst the stakeholders with concern for the environment.

However, CSR for environmental concerns appears to directly influence the perceived corporate image in a positive manner, it can produce mixed effects. For instance, some customers may be interested in recycling programs offered by a sanitation provider while others may be interested more in the nature, range and cost of services offered. As a result, the CSR programs must be blended with environmental goals, and essential services that sanitation organizations ideally provide (Mishra & Rath, 2023). Perhaps overemphasising on environmental CSR could pose challenges when customers are not comfortable with the organisations environmental CSR as opposed to quality service delivery of personal sanitation.

Another significant component of CSR that sanitation providers have to consider entails engaging their communities. Sanitation companies can also work with local schools to educate children and their families on issues related to hygiene or can contribute to construction of more social and affordable toilets or partnering with NGOs operating in the region to facilitate the availability of sanitation. Mwandu, Kihanga & Komba (2024) opined that the exercise deepens the firm's social capital and helped in communicating its reputation to the public.

The opinion of the community can be used by sanitation providers to make them well accepted in areas that may not be well served or in the developing world. In these contexts, CSR activities that address public health or basic needs such as, watering or sanitation can also do much to fit the organisation into the image of a responsible corporate organisation. Inadequate CSR or poorly disposed CSR on the other hand brings out more negative reception from the public since it might ruin the image of the company and contributes to poor sanitation in societies.

2.2 Challenges in implementing CSR in Sanitation Services

However, CSR has several implications to corporate image formation and sanitation service providers encounter the following challenges when implementing CSR initiatives. These challenges include resource constraint, stakeholder complexity, public perception, and regulatory pressure.

a. Resource Constraint

Most sanitation service providers, particularly in the developing world, have limited budget and work within stringent funding model. CSR initiatives are usually costly, especially when it concerns the adoption of technology, infrastructure or community engagement. While some sanitation companies might do well to identify CSR activities that are vital to their sustainability, others may find it difficult to justify the costs of implementing CSR activities with the primary aim of offering cheap sanitation services (Khalid et al., 2024). With lack of funding, the sanitation service providers might not address the CSR initiatives, as they are balancing between commercialization of the operations and conducting CSR activities. Where the companies do not have enough funds, the long-term sustainable strategies cannot be fully implemented.

b. Stakeholder Complexity

Sanitation service providers have to meet the demands of multiple shareholder's interests, which are more often than not, mutually exclusive. For instance, customers may want service fees to be as low as possible while on the other end, regulatory bodies may want extra formulations in respect to environmental conservation thus, creating conflict in determining amount of fund to be utilized on CSR activities. In such situations, CSR endeavours may look less relevant or even non-effective influencing the corporate reputation of the company (Fombrun, 1996). In this case, sanitation providers have to pay particular attention to the management of stakeholder expectations especially concerning their CSR initiatives so that, CSR is perceived in a positive light, and as being beneficial to all the stakeholders involved. The existence of stakeholder's conflict of interest complicates the situation and it is hard for sanitation providers to please all parties involved when addressing the organization's CSR initiatives. Therefore, the communication process of stakeholder expectations is an essential factor of strategic management since organizational management of change and alignment of organizational objectives with social and environmental demands.

c. Public Perception

The perception of the public with respect to the sanitation industry is normally negative more so due to pollution, waste, and environmental degradation. This perception stems from some general problems previously associated with the sector, including hygiene and methods of handling wastes. For sanitation companies, this is a major obstacle, as it affects the success of the CSR plan formulation, as the public can fail to embrace sanitation organizations as being socially responsible despite implementing strategic CSR practices. To counter this challenge,

companies need to put in a lot of efforts in reconstructing the public perception. This can be done consistently with the CSR practices that show that the firm is actively involved in creating value for the environment, the community, and people's health (Chen et al., 2021). In addition, there is need to adopt good communication trend to change the perception of the public and in turn improve the image of the company and consumer satisfaction.

d. Regulatory Pressure

The process of waste disposal, its management, and environmental or health consequences creates numerous legal constraints for sanitation firms. The CSR activities may be limited by the regulations or long processes to attain permits for new technologies (Agrawal et al., 2024). In other circumstances it might result in the oversights of CSR programmes by the sanitation providers contractors due to legal standard compliance. However, when CSR activities are in sync with regulatory requirements for instance on environmental issues improved corporate image is a result through showing that the company is compliant and has an ethical thread (Sheoran & Das Gupta, 2024).

2.3 Corporate Image – Key Transformation

Corporate image is significant to organization, as it affects perception of stakeholders including customers, employees, local communities and governments (Smith, Wang & Zhang, 2020). It defines organizational image in relation to customers' trust, brand image and organizational image from the perspective of the society (Le et al., 2023). In the case of sanitation providers, it is a major issue, as such companies are associated with pollution of the environment. It has been extremely hard for businesses in the industry to effectively create a good image for the corporations. However, CSR has come into light as a valid instrument that enables them to change this negative perception, especially sanitation sector in XX XX.

Sanitation service providers in XX Ahave remained simple service providers whose options where mainly limited to collection and disposal. Traditionally, sanitation companies have been viewed as purely functional in the area without any concern for any value creation. Most of these organizations were considered as pollutive, and the services they offered were regarded as emitting pollutants, negatively affecting the environment and people's health (Chen et al., 2021). These factors had a negative public image as it was seen as having a limited measure of sustainability and community involvement.

For example, the sanitation firms that operate locally offered general service delivery to meet the set legal compliance instead of offering extra social and environmental responsibilities. The

public and many stakeholders considered these companies as agents who make conditions worse rather than better. Thus, the social status of sanitation companies has traditionally been considered as a set of unavoidable and hardly desirable services of significantly low social utility.

Strategic CSR initiatives have influenced the change of image and brand reputation of sanitation companies. Such measures include emphasis on the environmental responsibility of their company and creating links with the communities (Raj, 2022). They have also been tasked with implementing positive changes to the community, and the perspectives of the employees and customers have significantly transformed. Among the CSR initiatives implemented by sanitation companies in XX XX, the use of eco-friendly technologies has often been adopted. For instance, Beijing Environmental Sanitation Engineering Group Co. Ltd has specialized in many environmental related waste management issues like recycling and energy production from waste. Thus, this transformation has enabled these firms to portray themselves as protectors of the environment instead of promoting pollution (Kumari, Abbas & Rashid, 2021).

Another critical CSR measure is the public awareness campaigns, focusing on proper waste management including recycling and waste minimization. Different sanitation firms have embraced collaborations with schools, clubs and other government agencies for creating awareness and environmental enlightenment. Through such involvement in the local communities, it has demonstrated companies' willingness and efforts to protect the environment.

2.4 Theoretical framework

a. Stakeholder Theory

Stakeholder Theory was pioneered in the 1990 by Edward Freeman and forms the basis of the business to map the stakeholders. According to Freeman (1984), this policy opened the way for shareholder orientation while negating the importance of the stakeholders. For Mintzberg (1984), it was a departure from previous managerialist theories which maintained that the business organisation's job was to create profits for its shareholders. In this regard, stakeholders include internal organizational members, including employees, managers as well as external groups including customers, suppliers, political authorities, and community members

(Reynolds, Schultz & Hekman, 2021; Goyal, 2022). Stakeholder Theory also provides knowledge about the requirements to regard all these various groups as critical for organizations' sustainable development and success.

Stakeholder Theory is especially applicable to the sanitation services sector since it means recognizing the interests of different parties (Brenner, 2023). For instance, clients expect cost-effective and efficient sewage services, while nongovernmental agencies expect cost efficient services meeting environmental and health criteria. In any locality, people anticipate firms to engage themselves in issues affecting the society at large, and employees look forward to being in an organization that will enhance them socially. According to Freeman, the stakeholder theory postulates that a company can meet all the different expectations of the stakeholders in some ways and affects its reputation and corporate image (Friedman, 1970; Freeman, 1984). This presents a strategic issue to providers of sanitation services as they need to harness the existing CSR practice to balance the multiple stakeholder interests.

Although the theory is popular and applied, it has not avoided criticism including the inability to provide precise categorization of stakeholders (Shah & Guild, 2022). An important issue that sanitation companies face is to define and prioritize the stakeholders whose interests may be divergent. For example, a conflict of interest may arise, for instance, when fulfilling the environmental expectations of the regulatory authorities while catering to the costs-conscious customers who would rather have their services cheaper despite having adverse effects on the environment (Fares, Chung & Abbasi, 2021). Furthermore, the existing organisational conditions of sanitation providers, especially those located in developing nations, can hamper their capacity to satisfy all these stakeholders.

Nevertheless, the theory is a useful framework for analyzing the CSR processes of sanitation services. Practical CSR strategies can then be developed when sanitation providers realize that all members of the society have a stake in the company's operations and its social, economic, and environmental responsibility to the community.

3. Application to the Sanitary Industry in XX XX

3.1 CSR in XX XX

The socio-economic and environmental problems are key features of the XXern region of XX, which includes the Liaoning, Jilin, and Heilongjiang provinces and involve pollution of industrial waste, waste management and public health. With the deindustrialization and

subsequent changes in economy in the recent decades, the facet of CSR has emerged to be more important. XX Ais one Region where sanitation providers are on the frontline dealing with these challenges especially in waste management and pollution. Yet, CSR activities in this sector are the core of stability and development, and their importance is not always appreciated; moreover, CSR endeavours are frequently not very noticeable. The leadership of the sanitary company determines the operational efficiency, public reputation, and strategic direction.

3.2 Managerial role in stakeholder theory

Sanitation industry managers are tasked with the responsibility of establishing and executing CSR initiatives that meet stakeholders' needs as well as the company's interests (Marcon et al., 2023). Environmental and public health issues are at the center of stakeholder concerns in XX XX; hence, the managers have implemented potent schemes like waste to energy projects, and recycling. For instance, Tus Environmental Technology Development Co., Ltd. started, with the approval of its senior management, a landfill gas-to-energy program. The initiative aligned with regulatory demands and with concerns expressed by the company's communities and placed the company at the forefront of revolutionary environmental stewardship.

Managers are also tasked with ensuring that all the stakeholders needs and interests are met. For the shareholders, they are often profit-oriented motivated to increase revenue through measures that reduce expenses. For the government, they make regulations for the company to be sustainable, and conduct their activities without polluting the environment, which implies that it is costly (Dmytriiev, Freeman & Hörisch, 2021). Managers manage these conflicts through implementing policies prioritizing on sustainable projects. In XX XX's sanitation industry, many firms have integrated efficient sorting technologies involved in lowering costs and meet requirements of shareholders and regulators.

Managers are tasked with addressing the changing needs and interests of the employees within the organizations. In XX XX's sanitation sector, working environment, and employee support were traditionally poor; organizational morale and the public's image suffered as a result. Managers have developed elaborate welfare programs that seek to improve workplace welfare. For instance, at Dongbei Sanitation Services, the managerial staff brought the changes into the company including security measures, medical insurance, and skill enhancement. These reforms not only raised the employees' satisfaction levels but also changed them into real promoters of the company. This positive internal morale in addition to positive organizational image shows how efforts initiated by the management can target both internal and external

aspects of organizational functioning. Consequently, through promoting the well-being of the employees, managers can provide the company with the motivated staff which will be able to deliver the higher level of services, whereas all these goals will strengthen the company's overall CSR strategy.

Having an influential managerial leadership in an organization is often most beneficial and effective when the organization pursues CSR activities, especially if the field is as critical as sanitation. The virtue of CSR as a management tool is critical in managing stakeholder issues and improve organizational image. The measures developed the public workshops where the community is taught on how to recycle wastes, which inspired trust among the public. Furthermore, managers have also engaged in public participation with the local governments in the provision of environmentally friendly infrastructure projects. These actions demonstrate the role of managerial leadership in promoting CSR, and it is an opportunity to shift the company from a polluter perspective into an environmental guardian. By so doing, managers ensure that organizational objectives are in congruence with stakeholder demands while creating lasting, positive impressions of organizational responsibility.

3.2 Role of Sanitation Providers in CSR

The sanitation service providers are considered key actors that are contributing to tackling waste management and pollution issues in XX XX, however, their perspectives on CSR are overlooked. These companies help enhance forms of waste collection, recycling, and disposing systems, also enhance the quality of life among the population through public health an environmental protection. Nevertheless, CSR in sanitation sector hence remains largely invisible and eliciting low participation from the firms.

The CSR strategies implemented by sanitation companies concerns the community by addressing environmental concerns and social well-being. A good example is the use and advocacy for adoption of Waste to Energy (WTE) technologies as well as green sanitation systems. For instance, Harbin has started to develop waste disposal plants that will curb the use of landfills while generating electricity from waste (Li et al., 2019). Not only does it deal with the problem of waste on the environment but also helps to locally generate some form of energy for the people's benefit.

Furthermore, it must be understood that sanitation providers are also able to hold community programs informing citizenry on best practices to reduce on waste disposal and embrace recycling. Such efforts would be particularly important in XX XX, as the public is rather

inexperienced in the field of recycling. To be specific, research conducted by AUrban Planning and Design Institute in 2019 showed that 60% urban users in large cities such as Shenyang and Harbin indicated interest in recycling, but only 15% participated in official recycling (CUW, 2019). Since sanitation firms will be constantly in touch with the public and will ensure that suitable facilities for recycling are available, recycling percentages can increase, and the environment can benefit.

3.3 Current CSR Practices in XX XX's Sanitation Industry

Sanitation companies in XX Aare gradually awakening to the responsibility of CSR as a more comprehensive and voluntary activity than simple compliance with the government standards of the country. The elements that have emerged as crucial aspects of their CSR initiatives include the social issues, the concern with the environment, and the health of the employees.

a. Community Engagement

The most implemented CSR strategy by the sanitation companies in XX Ais community engagement. Community sensitization programs are usually conducted to educate the community on the right way to dispose of their wastes, how to sort their wastes and even learn more about recycling. Such initiatives are important; particularly in the growth regions such as Shenyang and Harbin which generate more waste and handle them inefficiently.

For instance, the waste management company from Shenyang has implemented one of the most notable CSR practices in the year, which was a set of educational workshops and community programs to increase awareness of recycling. The company and the community sourced the environmental effects on pollution by joining different schools within the region to educate the young generation on effects of pollution through improper disposal of wastes and availing easily accessible and convenient waste segregation bins for use by different households. Thus, issues related to collecting recyclable waste gained popularity in Shenyang, and within two years, the rates of recycling were raised by 15%; these activities show the effectiveness of similar programmes (Geng et al., 2023).

Furthermore, most of the sanitation firms are adopting digital technologies and mobile application to enhance community participation. These tools offer the residents actual-time information in relation to waste collection routes, instructions on how to recycle and the environmental awareness events happening around the area. For instance, Harbin's sanitation department has developed a mobile application through which the people can report an issue

on waste including dumped items or over-flowing bins; thereby encouraging public participation in waste management (Asian Development Bank, 2024).

b. Environmental Responsibility

Another area in transformation of CSR for sanitation industry in XX Ais environmental sustainability. Since there has been an increase in air pollution and poor waste management in this region, firms have been using green technology to minimize their effects on the surrounding environment. An example of such a technology is waste-to-energy systems where waste is converted to useful energy thereby decreasing on the use of dump sites and emission of carbon.

For instance, in Harbin, the local sanitation company has established a waste-to-energy plant through which more than 1,000 tonnes of municipal waste are converted into electricity and disposed into the power grid daily. Still, this initiative does not only cut down on the adverse effects arising from disposal of this waste but also assists in the meeting of energy demand in this region. Such initiatives have been accepted in several cities in XX Aas they support the national and the regional policies targeting environmental conservation and sustainable development (Wang, Xie & Liu, 2022).

Also, recycling programmes have also been realised in industries and by customers. Most sanitation businesses in this region have introduced programs, which promote the segregation of other waste from recyclables at home (Liu, Zhang & Chen, 2020). For instance, Shenyang's sanitation department has immensely worked on improving the rate of recycling in the city through putting bins for recycled materials for the residents. However, there are issues to do with actual engagement of the public in the process of recycling as there are cultural and logistical barriers that may not have been addressed (Lei et al., 2023).

c. Employee Welfare

Apart from environment concern, many organizations in the logistic and delivery industry are also focusing more on employee satisfaction as a part of their CSR programs. Employees that are engaged in delivery services are the main beneficiaries when the welfare of such employees is promoted especially through health and safety and job satisfaction measures.

For example, SF Express Company which operates as one of the top players in XX's logistics sector, has recently implemented a strong employee benefit system as a way of ensuring that its workers are protected (Huang, Shi & Song, 2024). The offered benefits and welfare are health insurance, health check-ups for both physical and mental health, and ergonomic training

to decrease physical injuries at work such as backache and tiredness. Reflective vests, gloves, and hard helmets for protection or safeguard during transport or delivery particularly during severely adverse conditions are also afforded to delivery employees.

Apart from compliance with health & safety, the company also emphasizes employee training & development. It also provides training sessions in the areas of digital delivery systems, GPS optimization, and modern inventory Management technologies among others. These opportunities not only help them to perform well within their job duties but also help them to build long career in the field of logistics and supply chain (Chen et al., 2024).

These welfare initiatives are intended to offset some of the major problems that plague the delivery workforce like, high turnover and low job satisfaction. In enhancing working conditions and promoting growth chances, SF Express Company expresses compliance with the TBL model on the social aspect of the organization's economic success on social responsibility. Such programs also fit into Stakeholder Theory since they recognize employees as key stakeholders whose welfare has to be supported to enable the firm to achieve its objectives.

3.4 Critical analysis of CSR Practices in XX XX's Sanitation Industry

Nonetheless, several controversies and trends have arisen in CSR practices in the sanitation industry in XX XX, which are considered appropriate responses to the unclear and elusive concept of CSR:

a. Argument on Tokenism

The debate on the authenticity of CSR practices in relation to the sanitation companies in XX Ahas been ongoing in the recent past. The argument is on whether CSR efforts are indeed tokenistic in nature in which companies engage in CSR activities only to positively improve their image while possibly having little overall impact in social and environmental areas. Critics argue that such companies use CSR as mere campaigns as opposed to genuine solutions to complex problems such as addressing environmental degradation.

For example, whilst some sanitation companies offer elaborate activities such as Clean up the Community campaign or Planting of trees campaign, these are usually one-off exercises, and their impact is not sustainable. López-Ruiz et al. (2023) conducted the study showing that most of the CSR initiatives are short-term and contain mainly image-oriented initiatives, while core issues, like old waste management infrastructure or lack of safety standards at workplaces, remain unaddressed.

One example includes a sanitation company in Harbin that created a large-scale recycling awareness drive but did not have lasting systems for the sorting and disposal of wastes during the event. Some people advocated that similar actions, which might be perceived as noble, were nothing more than an attempt to manipulate public awareness rather than a true attempt at becoming environmentally friendly. Additionally, only 60% of the sanitation companies' CSR activities had positive environmental or social impacts for XX XX, and many of these CSR practices were not fully transparent on delivering on CSR promises (Liu & Chen, 2020).

b. Digital innovations in waste management

Currently, the use of digital technologies is a new phenomenon in the sanitation sector in XX Ato enhance efficiency and engagement. Mobile applications, sensors, online tracking systems have become an important part of new innovative technologies that help to improve waste management and increase public engagement in such programs. For example, the Harbin Sanitation Department has installed smart waste management system that has various IoT sensors. These sensors track waste load in bins all over Painesville for instant monitoring for effectiveness of waste collection routines. When the bins are emptied before they get filled, operation costs are minimized, and the systems acts as a check against pollution in terms of littering and stench. This innovation supports the TBL concept of efficiency improvement both in terms of cost and environment impacts (Sun et al., 2023).

Moreover, its themes such as mobile applications have also been noted to be contributing to creating awareness in involving the community. Residents can use apps, and they are able to report matters pertaining to waste, for instance, cases of people dumping waste in the wrong places, or broken bins among others to the sanitation bodies (Feng et al., 2022). For instance, in Shenyang, a mobile application in the sanitation service allows the citizens to report cases and follow up on the status of the complaints in the society. It also promotes the accountability and shows the successful relationship between sanitation companies and the public, which is the main point in the Stakeholder Theory because this theory focuses on communicating with the external stakeholders such as local communities.

Digital waste management also provides significant data as it can be used to tell authorities details about the patterns or volume of waste production and use these details in the creation of effective recycling campaigns. Nevertheless, there are still obstacles: the financial aspect of these technologies' implementation and the digital awareness of its residents. The identified challenges indicate that the integration of digital innovations in waste management in the

context of the study is a positive indication towards changing the practice of waste management and improving urban sanitation in XX XX.

c. Collaborations with NGOs and local governments

Working with the local governments and Non-Governmental Organizations (NGO) has become a strategic approach towards the provision of quality CSR solutions in sanitation. These partnerships consolidate the resource, knowledge and expertise to solve multifaceted environmental and social problems that can only be solved through collaboration.

For example, Liaoning Provincial Government has approached many sanitation companies to start a recycling and waste reduction campaign of the Liangning Province. This program enables local communities, businesses, and non-profit organisations to encourage the proper sorting of waste to recycle, as well as the use of appropriate means of disposal of waste (Lee et al., 2024). NGOs are involved in fundraising for awareness creation with the help of members of the public on proper ways of disposing recyclable material, while local governments are involved in the provision of policies and funding. This collaboration can also be supported by Institutional Theory, as this decision shows how organizations adapt to the requirements of the society and strive to appear legitimate (Robayo-Avenidaño & Prato-García, 2024).

These sanitation companies in Aprovide NGOs such as Green Earth Alliance to arrange workshops for educating people on practical ways on how to minimize generation of household waste and encouraging proper recycling. In this way sanitation companies provide operational support through collection and processing systems of waste. The partnerships are also based on Stakeholder Theory as external stakeholders like local governments, NGOs, and community members. Although, these partnerships have indicated certain prospects, issues including challenges with funding and variation in organisational goals have been observed. Partnerships provide a coherent and efficient solution for implementing CSR, helping sanitation firms increase their footprint and positively affect their reputation and a variety of other environmental and social objectives.

4. Deriving Innovative Solutions to the Challenge

4.1 Recommended solution: Integrated Smart Sanitation Ecosystem

The recommended solution for the current challenges is the Integrated Smart Sanitation Ecosystem (ISSE). This is explained based on the four innovative components:

a. AI-driven waste management and sorting

Poor waste management practices make recycling rates low, and pollution rates high thus presenting numerous environment and economic problems. As such, the Integrated Smart Sorting Environment (ISSE) presents the possibility of implementing AI for waste sorting that will help sort waste into different recyclable materials, organic waste, and dangerous substances. Such systems, placed at collection centers, use intelligent and automated data analysis in decision making on sorting of waste to help enhance efficiency and devoid of human influence (Wang, Park & Xu, 2024). Choosing refinement as the degree of sorting, AI technology increases the efficiency of recycling substantially, and the amount of waste that goes to landfill and results in environmental problems is reduced.

Managers play an important role in aligning the implementation of the AI-driven waste management. They direct the implementation of IoT-enabled sensors to be installed in waste bins to track the fill level thereof in real-time fashion. These sensors offer practical information to enhance soil collection paths and, subsequently, make economical savings and carbon footprint on fuel, workforce, and capital outlay. For instance, intelligent waste management systems put in place in Shenzhen's environment led to 30% enhanced collection cost efficiencies, though enhancing the percentage efficiency of recycling (Zhou, 2020). They also help to reduce operational costs and play a part in the environmentally friendly growth of urban settings by reducing unnecessary vehicle exhaust emissions.

b. Blockchain technology for accountability and transparency

A common complaint of CSR campaigns in sanitation projects across XX Ais that they are often unaccountable and do not deliver on important goals such as improving stakeholders' trust and non-compliance with the laws (Sriyono & Aziz, 2020). As a solution to the above, the ISSE employs and integrates blockchain that is characterized by consensus ledger which ensures that the data generated throughout the process of waste management and CSR are recorded in the chain as they are unalterable. Blockchain also provides accountable data on the entire waste life cycle from collection to disposal, or recycling, as a result of an immutable record. This transparency is highly useful for holding the waste management organizations and their stakeholders to account.

The blockchain systems provide regulatory bodies, local governments and the public with timely and reliable data to monitor and improve CSR performance. For instance, Robayo-Avenidaño & Prato-García (2024) revealed that there is evidence of the effectiveness of IBM's

blockchain in the supply chain management interface in the reduction of fraud by promoting the provision of information that cannot be altered. As with CSR, the adoption of blockchain in waste management can help to address challenges of data falsification and mere window dressing with positive impacts to the environment.

In the current study, the ISSE corresponds with eminent theoretical frameworks associated with its adoption. From the lens of the Institutional Theory, technology makes it easy to adhere to the laws because the blockchain creates a record of the waste disposal exercise to conform with the legal provisions. This creates legitimacy because organizations show that they support sustainability as well as conforming to environmental laws.

As per the Stakeholder Theory, blockchain provides trust between the stakeholders like regulators, local communities, and corporate partners by presenting the verified CSR outcomes (Mwandu, Kihanga & Komba, 2024). It helps stakeholders of the organization to be aware and convinced that the organization is committed to producing optimum environmental and social improvements. In this way, the improved accountability created by blockchain enables organisations to build upon CSR strategies, adhere to institutional expectations, and foster sustainable performance over the longer term.

c. Interactive digital platforms

Stakeholder engagement is important in implementing CSR programs in waste management since the community requires to be engaged to maximize both environmental and impact. The Integrated Smart Sorting Environment (ISSE) is adding the use of mobile application and website with pages for the sanitation companies and the respective members of the community. These platforms share and address the gap between the various stakeholders creating a room for cooperation and reasonable accountability. The platforms include three key features: are issue reporting, educational content and incentives. People can alert the authorities if their bins overflow or if there has been some dumping or if there is pollution, this will help the authorities respond faster and thus increase service delivery quality. The content is presented in game-like learning sessions for which the user acquires knowledge of waste sorting, recycling, and sustainable living. These modules turn education into an educational and entertaining concept to promote environmentally responsible behaviours. Also, coupons, eco-points, or public acknowledgement encourage the households to be fully involved in matters regarding reduction of wastes, recycle systems and reporting of issues.

The role of such platforms has been proven in Hangzhou where the launch of a similar app led to the enhanced citizen reporting of wastes by 25% and greatly enhanced people's participation (Sarker et al., 2024). Again, this approach aligns with Stakeholder Theory since it promotes the development of trust and gets the population to be more involved in the waste management programs. From the TBL standpoint, it reaches across the facet of socially empowering communities with the knowledge and resources for the furtherance of sustainability, thereby providing the environmentalist facet with less waste and greater recycling results. The ISSE optimizes the changes in transparency and accountability and as well as active participation of the population in making a cleaner and sustainable environment a long-term goal rather than a short-term initiative.

d. Employee-centric innovations

Garbage collectors work under dangerous conditions whereby they are exposed to dangerous materials, extreme temperatures and physical dangers. In view of enhancing employee quality of life and performance and reducing risks at the workplace, the ISSE prioritizes innovations that focus on health, safety, and career development of the employees. However, one of the important components and with extensive application of wearable IoT devices is to track or prevent the possible exposure of workers to dangerous gases, fluctuations in heart rate, or elevated body temperature. These devices warn supervisors in case there is something hazardous that can be prevented by coming in to address it which makes these devices essential (Zou et al., 2023). Using IoT, organizations can reduce health risks and incidence of accidents in workplace.

Besides, the means of addressing the problem at the ISSE include technology-supported ways enhanced by an array of health programs that also comprise medical check-ups, required safety trainings, and mental health support. Such programs are rather important for maintaining the health of workers and in response to debates regarding the stressful nature of sanitation jobs. Moreover, the ISSE employs artificial intelligence in active teaching to encourage skill improvement. These modules empower the workers by endowing them with further knowledge about the new technology being employed in waste management thus improving their employment destiny and satisfaction.

4.2 Implementation Strategies

a. Pilot testing in Urban Centers

ISSE will be pilot tested in major metropolitan poles like Shenyang and Harbin due to their stable conditions and opportunities to interact with various stakeholders. The pilot phase will thus incorporate key components of the ISSE to test the feasibility of its components and their efficacy. These are ways such as the use of artificial intelligence in waste sorting especially in large traffic centers for sorting waste for efficient grouping. Moreover, IoT sensor will be placed in waste bins in selected neighbourhoods to detect the degree of fill up in real time to enhance on the efficiency of collection. The waste management activities will be monitored using a blockchain system that will be instituted to oversee the core activities of the system. Community engagement will be encouraged through the establishment of web-based interfaces and informative education campaigns which seek to popularize the usage of the developed apps as well as encourage people to adopt sustainable measures. The pilot testing will help in gathering important information to assess the possibilities of replicating the ISSE in the future.

b. Collaborative partnerships

The development of the ISSE would require cooperation and support from various relevant parties such as local governments and technology vendors, and NGOs. Public-Private Partnerships (PPPs) will be required to mobilise funding and technical support and to pool resources and activities. Local governments shall assist by invoking regulations, implementing policies and offering infrastructure which enhances implementation. Logistics suppliers will add value by including the best tools to support operation such as AI systems, IoT sensors, and blockchain platforms, among others. On the other hand, NGOs will involve themselves in public sensitization and awareness programmes as well as involving communities in environmental management and disposal of wastes. Compared to other actors, NGOs can use their influence within the communities to create positive behavioural shift among the residents. The involvement of these players will foster a coherent approach for handling inefficiencies within waste collection and disposal systems distinctively, transparently, and at a large scale. A collaborative model will improve the understanding of the key stakeholders and consequently contribute to the sustainability of the ISSE.

c. Funding and allocating resources

Allocating resources and funding are vital in supporting the ISSE. Funding will be in the form of grants from the government, budgets allocated for Corporate Social Responsibility from various companies, and technology partners. Government grants will set the overall funding

base to cover infrastructure and launching, and companies' CSR budgets will correlate funding sources and targets with sustainability strategies. Collaboration agreements with tech suppliers can also drive down the initial cost by providing services in-kind, for example, providing AI platforms, IoT devices, blockchain solutions or even other hardware devices at favourable rates.

This is to encourage more companies to come in since there will be refund on tax or subsidy to any company that adopts green technologies or practices. These incentives will help recover the implementation charges and further will go on to foster innovation idea in different field crossing different segments. Through resource optimization and multi-stakeholder funding, the ISSE guarantees sustainability, affordability and safety in the management of waste.

d. Phased scaling

Subsequently, the ISSE will be gradually expanded to cover the non-urban areas and such cities after the first pilot implementation is designed and accomplished. This gradual approach will clear the way for fine-tuning of technologies and processes based on lesson learnt from the pilot phase. These shortcomings complement the communication strategies or approaches to each part of the world since ISSE can adapt suitable ways of Disposing wastes depending on the kind of infrastructure or the level of awareness of the society.

To ensure proper scaling, consultations will be conducted every so often by involving the local government parastatals and technology firms and with the aim of partnering with all relevant community-based organizations and government institutions. The prospective meetings will distinguish what problems for every area remain unresolved, whether there are restrictions on resources, shipping, or other aspects, or whether there are cultural differences, and the ways to address these problems. The phased approach minimizes disruption to the ISSE strategy, allowing it to remain adaptable and viable, and supports the transition to further integration throughout the three domains to enhance efficiency in waste management while promoting community trust.

4.3 Evaluation Metrics

a. Environmental Impact

- Reduction in landfill waste: The effectiveness of the ISSE scheme is expected to contribute to the reduction of waste end up in landfills through increased sorting precision and recycling. With smart sorting plants and focused community initiatives through awareness programmes, the overall recycling rate is expected to go up to 40%

in the next three years. Outcomes will be measured through tangible data that will be captured through the block chain systems.

- Reduction in Carbon emission: Efficient collection routes of waste by using IoT sensors and data interfaces will decrease fuel consumption and emissions at fewer than necessary routes.

b. Community engagement

- App usage metrics: To measure community engagement, app download statistics, the number of issues identified and reported to the company, and recycling programme attendance levels. The evaluation of these metrics shall be useful in measuring user interactions which can show how well the app actively contributes to enhancing waste management.
- Awareness levels: From time to time, perception surveys will be undertaken in order to assess the level of consciousness change with regard to the handling of waste and other sustainable measures . These surveys will help establish to which extent the residents are aware of recycling norms, segregation of waste and their part in the preservation of the environment to evaluate the engagement of the application in dissemination of information.

c. Employee welfare

- Workplace safety: Measures of Organizational work-related safety performance indicators will also be used to assess and report on any changes in Employee welfare in terms of lowered work-related injuries and illnesses. Wearable electronic devices will record exposure to dangerous states and allow for immediate intervention as well as general safety results enhancement.
- Employee satisfaction: Morale, job satisfaction and turnover rates will be used to monitor the level of satisfaction of employees at an organized and regular basis. There will be feedback to know the aspects of working conditions, training, and support services that need to be enhanced to make worker's conditions better and curb job turnover rates.

References

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