

Waste Management Businesses and Sustainable Development Goals - Exploring Linkages

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(Received 1 October, 2020; Accepted 12 November, 2020)

ABSTRACT

This study attempts to map the linkages between Sustainable Development Goals (SDGs) and waste management businesses. It also tries to understand the role that waste management businesses can play in achieving the common goals through the case of a waste management firm in Mumbai (India). Interviews with the firm's key personnel are used for data collection in addition to other external sources. Using content analysis, we find that the firm's presence can be seen on all the 17 SDGs. While 12 out of the 17 SDGs are impacted due to the business operations, the remaining five SDGs are affected due to the societal orientation of the firm. These impacts are weak, moderate or strong in nature. The findings of this study can be useful to policymakers in framing policies that can help businesses in this area and achieve SDGs at the same time. JEL Classification codes: L31; Q53; Q56; Q58

Key words : *Sustainable development goals (SDG), Waste management, Triple bottom line, Environmental policy, Sustainable growth.*

Introduction

Sustainable development depends on the interrelationship between economic progress, environmental management and individual well being. Sustainability initiatives involve substantial interaction among stakeholders and concerted involvement of participatory agencies (Andersen and Ratiu, 2019; Fiorini and Hoekman, 2018). In September 2015; over 150 world leaders decided to adopt the agenda for sustainable development in the form of Sustainable Development Goals (SDGs). The SDGs consist of 17 specific goals and 169 targets embedded within these goals, which could help nations and stakeholders worldwide align their actions with the urgent need for improving the condition of society, environment and the economy. There is an inbuilt interlinking and interdependence among the

SDGs which can be useful to policy makers in setting policies which could affect a larger number of stakeholders (Biggeri *et al.*, 2019; Le Blanc, 2015). Entrepreneurs and public-private partnerships have the capacity to drive the push towards sustainability using SDGs (Majukwa *et al.*, 2020; Andersen and Ratiu, 2019). However, there is scope for competition among these goals whereby the achievement of some goals can be at cross purposes with the achievement of some others (Campagnolo and Davide, 2019).

Waste management businesses have the inherent advantage of helping to improve the environment, create employment opportunities and create profits for the entrepreneurs. This study considers a waste management social entrepreneurial firm in Mumbai, India as a case study to map its overall impact on the SDGs, and thereby, on environment,

society and economy. This impact is tried to be understood by using qualitative methods including in depth interviews of key personnel in the firm and by collating data from external sources. The findings are that all SDGs can be linked with the outcomes of the firm in weak, moderate or strong forms. This study tries to contribute to the literature on development-oriented entrepreneurships and SDGs.

Literature Review

In India, solid waste in the urban areas is managed mainly by the urban local bodies, also called municipal corporations. The Central Pollution Control Board (CPCB) of India in 2016-17 reported that municipal solid waste of about 49 million tons per annum or 135,000 tons per day was generated (CBCP, 2017). By 2041, the generation of municipal solid waste can potentially reach 160.5 million tons per annum or 440,000 tons per day.

For developing countries waste management is the major focus in environmental management (Simatele *et al.*, 2017). Almost 80% of municipal solid waste management budgets in India relate to waste collection and waste transportation activities. Studies on waste collection and storage in urban areas show that there are not enough segregated waste collection bins for appropriate segregation and storage (Sharholy *et al.*, 2008; Zhu *et al.*, 2008). The subsequent waste disposal processes are also seen as unscientific and the residents near the waste dumping yards continuously face a potential health hazard.

An understanding of the waste management system, drivers and stakeholders can help the linking of waste management with SDGs. Wilson (2007) identified six major factors that could drive the role of waste management: public health, environmental awareness, resource value of waste, holistic resource management, institutional support, and public involvement. This shows that, as in any sustainability initiative, the composite waste management cycle involves multiple stakeholders. Individuals, entrepreneurships, corporate bodies and governmental agencies are considered equally responsible in the drive to achieve environmental balance (Guerrero *et al.*, 2007). Government intervention and policies can play a strong role in improving the quality of waste management and the productivity of waste pickers (Balasubramanian,

2015) by encouraging participation of small and medium enterprises. Policies specific to waste management entrepreneurs can be more effective than common policies, which can benefit all industries irrespective of their degree of pollution (Shah, 2014).

While waste management can be an effective tool in the movement towards achievement of SDGs there are issues such as operational and financial inefficiencies, when it is controlled by government agencies (Joshi and Ahmed, 2016 and Sharholy *et al.*, 2008). Support given to entrepreneurs in this area can help remove some of these roadblocks, increase operating efficiencies and reduce the operating and financial burden on governments (Joshi and Ahmed, 2016 and Colon and Fawcett, 2006) whilst simultaneously moving towards achieving the SDGs. In developing economies, informal business models developed around waste material management could create employment and livelihood opportunities when conjoined with NGOs and social enterprises (Holt and Littlewood, 2017; Nas and Jaffe, 2004). Entrepreneurs could work together with the informal work force and provide them with economic and social benefits while using their expertise and services to generate profits (Simatele *et al.*, 2017; Oteng-Ababio *et al.*, 2013; Imam *et al.*, 2008; Wilson *et al.*, 2006). Corporates are on the lookout for new business opportunities and improving their brand and image (Yadav *et al.*, 2017; Pollach *et al.*, 2009). Waste management activities can be perceived as an economic opportunity due to the resource value of waste material (Stenis and Hogland, 2002). Environmental innovation is another area of contribution by private firms, which can lead to more efficiency and sustainable development (Dias Angelo *et al.*, 2012; El-Kafafi and Liddle, 2011; Liddle and El-Kafafi, 2010).

Healthcare waste management has the potential to achieve at least four SDGs- 3,6,8 and 12 (Nor Faiza *et al.*, 2019). Where government agencies linked with NGOs for waste management, it was seen that there was progress in achieving SDG 12 (sustainable production and consumption patterns) in addition to some targets in SDGs 2,3,6,7,11 and 15 (Sallwey *et al.*, 2017). Some of the significant environmental issues that can be targeted for action also find a place in the SDGs. For example, SDGs 1-4, 6, and 11-15 can be directly related to pollution control and abatement activities (Dermatas, 2017) and focus on clean energy can positively affect sustainable development (Mori-Clement, 2019).

Most of the literature studied connects waste management activities with SDGs. This body of literature becomes the base for this study, which looks at the impact of waste management businesses specifically, thus bringing in the profit angle to the existing environment and society aspects studied. This exploratory study looks at the case of a waste management firm in Mumbai, India to understand the impact its operations has on the SDGs. The objective of this study is to qualitatively examine if there are linkages in the work done by waste management firms with SDGs.

Methodology

There is a need for research on the impact of waste management businesses on the achievement of SDGs. This research draws from the strand of literature that studies the impact of waste management activities (mainly by municipal corporations) on the environment and society. It adds the business angle to this strand to complete the triple bottom line perspective. As this is an exploratory study, the case study method has been found to be quite effective to draw out data and information from the views of participants and available information sources (Yin, 1994). The case study method is useful for creating meaning from the context and understanding the situation.

A single case study has been used here, with the data mainly drawn from interviews conducted with key personnel of the firm. This has been triangulated from sources such as websites, government reports and newspaper articles. As this was a single case study, there was scope to go into the depth of the case (Creswell, 2012) by considering the views of the participants. In addition to the interviews of Mr. Debartha Banerjee, the Director of the firm, data was gathered from the website of DBS Bank, Forbes India magazine and from the firm's own website.

The interviews and other data collected were recorded and transcribed, which led to more familiarity with the case and creating more insights. The data generated has been analyzed using pattern matching and connecting the findings with the targets embedded within the SDGs.

Case of Sampurn(e)Arth

Sampurn(e)arth Environment Solutions Pvt. Ltd. (Sampurnearth), a social enterprise started in 2012 by three graduates from the Tata Institute of Social

Science, Mumbai, works in the area of providing waste solutions. The Director and co-founder of the company, Mr. Debartha Banerjee, identified the entity as an end-to-end waste management company, with the intention of processing all kinds of waste, converting into utilizable resources and taking it to the right disposal or recycling or recovery channels so as to create a zero-waste situation. Their vision is to transform waste into usable resources without exploitation of people or the planet. Their concept led them to winning the Global Social Venture Competition in 2014, organized by the Haas School of Business of the University of California-Berkeley out of 650 entries from 40 countries (DBS Bank website).

The wet waste solutions include compost tumblers, compost pits, Organic Waste Composter machines, windrows, bio-gas plants and shredders. Dry waste operations include collection of the waste, processing it at own material recovery facilities (MRF) or associated facilities via informal network connections and then passing on to concerned recyclers. Services provided by them include waste audits, consulting, operations & maintenance contracts, educational visits and awareness campaigns. Their clients include housing societies, corporates and civic bodies. They assist clients with their CSR or Extended Producer Responsibility (EPR) requirements.

In India, a large amount of solid waste, including recyclable waste, reaches landfills or dumping yards. Many of these dumping grounds in large cities such as Mumbai, are situated within the city limits and in proximity to a high density of residential population. The open dumping grounds pose a health hazard to nearby residents. In addition, they also contaminate the ground water with leachate (polluting and contaminated liquid flowing out of solid wastes) and contribute to air pollution when there is open burning of waste. Sampurnearth tries to reduce the amount of waste that reaches the dumping ground and use the saved part for composting, recycling or energy recovery in the form of biogas. They also reach out to the supply chain as mentioned by Mr. Banerjee:

"We are also seeing whether we can create farmer waste organizations where the agricultural waste can be collected to these for processing and we can give them fertilizers back"

Due to their interaction at multiple levels of the waste management value chain, which includes in-

formal scrap dealers as partners, they can ensure improvement in the working condition of partners working in various facets of the value chain. They also have their own MRFs in Goa and Dwarka. Mr. Banerjee said:

“Across all these cities where we are working, where we work with informal scrap dealers as partners, we make sure that child labour is not used, fire safety is done, medical facilities are given. In Goa and Dwarka, (both in India), with our own self-managed facilities, ground operations are managed by Self Help Groups (a form of co-operative) who are linked to government programs, government insurances, government benefits. Of course, the dignity is one aspect and we are also seeing how new jobs can be created by the wet waste and the dry waste processing facilities, and we are creating better livelihood around that concept”

Sampurnearth also plans to help the informal partners, recyclers and other processors by guiding them in raising cheaper capital. They provide technical support to improve their operational efficiency. In addition, they help their partners by giving them access to more material (waste) and to better markets. The improved efficiency of the stakeholders would benefit the firm in the form of a more stable and financially viable market. They are also exploring tie-ups with international waste management firms. This approach of vertical integration has been appreciated by some of the investors in Sampurnearth. Mr. Siddharth Pansari of Primarc Investing believes the one-point solution to waste management could set them apart from their competitors (Sullivan, 2017)

There is a direct effect of their operations on the environment in the form of reduced land, air and water pollution. As the waste is processed before it reaches the landfill, there is a reduction in the need for land which can then be used for more beneficial purposes such as parks, hospitals and schools. There is also a reduction in the amount of toxic gases released from the open waste mounds due to the unscientific burning of the waste. The unprocessed waste, which is sometimes openly dumped in rivers, thereby polluting them, is now captured by the processing stream and recycled effectively. This also leads to a reduction in the amount of leachate which can pollute ground water.

Linkages with Sdgs

The issues gathered from the above case can be linked to the SDGs as under:

SDG 1- No Poverty: It has been understood that the reduction in poverty does not relate only to income levels, but also includes alleviating the associated impact of poverty, or ‘poverty in all its dimensions’. One of the impacts is that the poorer section of society is most exposed to pollution. Target 1.5 of this goal tries to address the exposure of the poor and vulnerable to economic, social and environmental shocks and disasters. The operations of this firm contribute to a reduction in pollution leading to reduced exposure for the poor and vulnerable. The poor also benefit from employment opportunities created by the formalization of waste management activities (Holt and Littlewood, 2006).

SDG 2- Zero Hunger: Target 2.4 of this goal says that there should be an improvement in agricultural practices that lead to, among other things, an improvement in the quality of land and soil. Compost from organic waste processed by Sampurnearth helps in reducing dependence on chemical fertilizers, thereby reducing costs for the farmers. There is a marked improvement in quality of land around dumpsites because less waste reaches the dumping grounds. Reduction of leachate from waste mounds leads to improvement in quality of water and land nearby.

SDG 3- Good health and Wellbeing: Target 3.3 entails the commitment to end epidemics of diseases such as TB, malaria, waterborne and communicable diseases and so on. As this firm works in such a manner to ensure that lesser waste reaches the dumping grounds, there is reduced possibility of mosquitoes, rats and other disease spreading vectors. Target 3.8 aims at universal health coverage, which this firm also targets. It ensures that the partner organizations are linked to government benefits and schemes, including health and health insurance. Target 3.9 mentions the reduction of deaths and illnesses due to exposure to hazardous chemicals, pollution and contamination. By ensuring that workers have access to protective material, safety standards at the workplace and health insurance, this firm plays its part in helping achieve this goal.

SDG 4- Quality Education: While the targets of this goal do not directly relate to the activities of Sampurnearth, target 4.7 says that learners should be enabled to acquire knowledge and skills to promote sustainable development. This firm helps to increase environmental awareness of waste generators about potential of waste and increase their sensitivity about environment and society by involving

waste generators in the waste management activity and getting benefited through compost and biogas.

SDG 5- Gender Equality: Women form a large part of the ground level workforce of waste collection and these women also graduate to managing and operating the waste processing machines.

SDG 6- Clean water and sanitization: Target 6.1 refers to safe and affordable drinking water, target 6.3 addresses reduction in water pollution by eliminating dumping of waste and by increasing recycling. The firm reduces the flow of waste to dumping grounds and encourages recycling of material. This reduces leachate and contamination of underground water tables which are used for drinking water. Sampurnearth also collects non-recycled waste, which is usually dumped in rivers, thus reducing water pollution. Target 6.6 (protection of water related eco-systems) is also addressed by this firm as it helps reduce dumping of waste into lakes and other water bodies.

SDG 7- Affordable and clean energy: All the targets in this goal refer to the promotion of affordable, sustainable and renewable sources of energy with emphasis on higher efficiency. The actions of this firm are aimed at producing biogas from organic waste and using it for cooking and electricity. Further, this energy or gas is available to all waste generators, irrespective of their economic or social status. There is a constant push to improving technology to capture more gas and energy from the waste processing activity.

SDG 8- Decent work and economic growth: This is a crucial goal which some studies have found to create a dissonance with some social and environment related goals (Campagnolo and Davide, 2019). However, the waste management industry can take these apparent dichotomies and create a synergy among the goals. Target 8.1 refers to per capita economic growth, target 8.2 emphasizes on economic productivity by focusing on high value added and labour intensive sectors, target 8.3 encourages formalization of micro, small and medium enterprises, target 8.4 plays the difficult role of decoupling economic growth with environmental degradation, target 8.5 refers to full and decent employment for all, target 8.7 addresses child labour and target 8.8 considers the working condition of labour. All these targets are addressed by the work of Sampurnearth. There is a marked improvement in working environment of the employees including those of partner organizations. These organizations are micro

and small groupings which are labour intensive. Sampurnearth's efforts include bringing them into formal system, making them part of government schemes and helping them avail social security benefits, access to finance schemes, etc. which also increase dignity of work.

SDG 9- Industry, Innovation and Infrastructure: Target 9.3 aims at increasing access of small industries to financial services and integration with value chains and markets. Targets 9.4 and 9.5 refer to increasing green technology and research. This firm encourages partner organizations in the value chain to become part of the formal system and avail government benefits and schemes meant for micro, small and medium enterprises. Due to this integration, the partners can also take advantage of improved credit facilities for their operations. Sampurnearth has increased access to other value chain members and market sources for waste. The firm also has technology improvement projects with domestic R&D service providers to upgrade their technology and improve their processing capabilities which could further help reduce pollution from waste.

SDG 10- Reduced inequalities: Target 10.1 addresses the income growth of the bottom 40% of the population, target 10.2 aims at social, economic and political inclusion of all without segregation, and target 10.4 aims at equality through fiscal, wage and social protection policies. The informal and poor sector represents a major part of the work force of this firm. By helping increase their income through formalization of work and increased access to opportunities, there is better wealth distribution. By encouraging the SHGs and informal sector in this area, there is more ownership of the work and empowerment of the poor.

SDG 11- Sustainable cities and communities: This goal encompasses improvement in several factors to ensure sustainability in habitations. All the targets aim to improve basic services, transportation, living environment, green spaces, pollution levels and links between urban and rural areas. Target 11.6 specifically refers to air quality and municipal and other waste management. This firm's functioning has a direct effect on all these factors. There is reduced air, land and water pollution, making the city aesthetically pleasing and helping the recycling industry which has the added benefit of creating more employment. Air quality is also improved due to the reduction in burning of waste, including agricul-

tural waste, and increasing energy recovery. Along with SDG 8, this goal is one of the most crucial contributions by this firm.

SDG 12- Sustainable consumption and production: Target 12.3 aims to halve per capita food waste at the global level. Targets 12.4 and 12.5 together try to encourage the 3 R's (reduce, reuse and recycle) in addition to prevention in connection with resources, thus reducing the amount of waste being generated. Specifically, target 12.4 focusses on chemical and other wastes as it has the potential of impacting more people if handled improperly. Target 12.6 refers to the adoption of sustainable practices by large companies and target 12.8 aims to ensure that people have a better awareness of sustainable development. Through its operations, Sampurnearth observes creation of awareness among waste generators about extent of pollution and helping them manage their own waste. Due to this awareness, there is an improvement in consumption and production patterns as well. Through the firm's education efforts and outreach, waste generators and production units are made more aware of the need to reduce, reuse and recycle and integrate sustainable practices into their operations.

SDG 13- Climate Action: Almost all the target in this goal focus on climate change adaptation and mitigation measures. Target 13.3 refers to increase in education, awareness and capacity building to counter climate change hazards. Sampurnearth reduces the flow of waste to dumping grounds and diverts it to recyclers. There is a reduction of greenhouse gases from these dumping grounds and by encouraging recycling, there is reduced pressure on other resources. Due to decentralization of waste management, pollution emitted from transportation of waste is also reduced.

SDG 14- Life below water: One of the targets (14.1) aims to reduce the amount of land waste flowing into oceans and seas. Target 14.2 also focuses on marine and coastal eco-systems. Through the reduction of waste material going into water bodies, including seas and oceans and instead diverting it to waste recyclers or processors, the firm contributes to protecting marine water bodies as well. Further, there is an interconnection between SDG 6 and SDG 14 in that the flow of many rivers ends in oceans and seas. Any pollution of river bodies would also contribute to polluting the seas. Hence, the improvement in quality of rivers as demonstrated by the working of this firm, contributes to

reduced pollution in the oceans.

SDG 15- Life on land: Target 15.1 to 15.3 refers to protection and conservation of forests, wetlands and other related eco and bio-systems, reducing deforestation and increasing afforestation, tackling desertification and improving soil quality. Targets 15.4 and 15.5 attempt to protect the bio systems and biodiversity in these mountains and forests. By drawing away waste from the landfills and dumping grounds to recyclers or processors there is lesser demand for these sites, which means lesser clearing of forest land for these purposes. Further, the use of bio fertilizers can lead to better soil quality and growth of trees and plants.

SDG 16- Peace, justice, stronger institutions: Target 16.2 aims at reducing child abuse, exploitation, violence, etc. against children. A big part of the work force engaged in waste picking consists of children, who are often economically exploited. This firm ensures that there is no child labour used in any of its partner organizations. By bringing the partners into the formal system, there is an increase in transparency and accountability which also keeps them from engaging such labour.

SDG 17- Partnerships to achieve the Goal: Targets 17.6 to 17.8 specifically look at technology-based partnerships where the focus is on international exchange and research and development of green technology and knowhow. Sampurnearth has plans to bring in international experiences in waste management and apply them with modifications to the local context (target 17.15) to synergize the benefits from different areas and contexts.

Discussion

From the above, we see that linkages with 12 out of the 17 SDGs are relatable to business activities and linkages with the remaining SDGs (SDGs 3,8,9,10 and 16) are due to the societal focus of this enterprise. Even if the social outlook were to be removed, the linkages with the SDGs would continue to exist, albeit to a lesser extent. For example, if the firm was not overly concerned about linking the partner organizations' employees to government schemes, there would still be an improvement in their condition due to economic opportunities generated due to waste collection.

The outcomes of the enterprise have differing levels of impact on each SDG. For example, SDG 8 (Decent work and economic growth) and SDG 12

(sustainable consumption and production) are clearly and strongly linked with the work done by this firm with linkages to 7 and 6 targets respectively. However, SDG 2 (zero hunger) and SDG 4 (Quality education) are weakly linked to the work of Sampurnearth with one target each. In some of the goals, while the linkage exists it is mostly indirect and derived. However, the scope of this exploratory study is restricted to observing the linkages with SDGs without considering the extent.

Conclusion

It is widely believed that the attainment of SDGs is the onus of governments. However, it is possible for all stakeholders to embrace and contribute towards attaining these goals. The activity of waste management has the potential to help achieve some or most of the SDGs (Nor Faiza *et al.*, 2019; Sallwey *et al.*, 2017). The output and outcomes of Sampurnearth has a positive impact on society, pollution levels, and operating and financial efficiencies. This is seen from the fact that all 17 SDGs are potentially affected by the working of the firm. 12 of the SDGs are affected by the operations of the activity, whereas five SDGs seem to stem from their society-oriented vision. The footprints of some activities or outcomes are common across some SDGs and the achievement of some goals helps achieve others. For example, the achievement of SDG 8 (economic growth) helps in moving towards SDG 11 (sustainable cities) and SDG 13 (climate action).

It is seen that waste management firms have the potential to create positive impacts by carrying out their day-to-day business activities and by extending their social vision to include the scope of the SDGs. There are linkages with all SDGs through the activities of the firm. This is in sharp contrast to a polluting firm that needs to consciously engage in improvement of society and environment around them, to reduce the negative impacts of their processes. Governmental support to industries such as waste management could lead to an improvement in the existing state of society, environment and economy in addition to faster achievement of the SDGs.

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