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Innovative Management of Plastic Waste and Utilisation of Green Practices: Towards Preservation of Environment and Social Welfare

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Abstract:- Management of plastic waste globally is seen as a major concern since plastic waste has enormously affected the environment and considered among others, as a contributory factor to climate change. It is observed that the plastic waste phenomenon has increased over a period, not only in quantity but also as a disastrous to the environment. This raised an empirical question of whether innovative management of plastic waste by relevant stakeholders such as organisations, communities, and government are yielding the desirable outcomes. This article is aimed at exploring the insight of various role players on the application of green practices as an effort for creative ways of preserving environment, and social welfare. The qualitative approach with semi-structured interviews were used to collect data from relevant stakeholders in plastic waste management. In the process, the findings revealed the ineffectiveness of management of plastic waste due to lack of strategic approaches and innovative ways for effective plastic waste management. It is further observed that creative ways of managing plastic waste could be beneficial to the welfare of communities. It was also articulated that this approach can be economically profitable to the organisation and communities. The idea of creative ways and the use of technology on plastic waste management is found to be in line with the strategic point of view that executive management and community representatives had about deal with plastic waste for economic viability and preservation of the environment.

Keywords:- *Green Practices, Plastic Waste Management, Environment, and Innovative Management.*

I. INTRODUCTION

Plastic waste management is a major challenge globally, particularly in developing countries. It is observed that poor management of plastic waste mostly contributes to negative environmental impact such as extreme climate change. It is worth noting that most organisations that are producing plastic, are largely affected by the way plastic waste is disposed by consumers. According to Rudolph, Kiesel & Aumnate (2017), plastic waste disposal methods include recycling and remolding, which most of the entities turned to make income instead of benefiting from the real output. This practice has a potential of negatively affecting the image and reputation of organisations since residents are often using methods that are destructive to the welfare of people and environment. The organisations may also find themselves in conflict with rules and regulations regarding the correct ways of plastic waste management. It is important to highlight that this is a definitive issue to most organisations as it has potential of affecting their economic viability. This has potential to hinders organisation's aim of achieving its strategic goals and objective to remain competent in the market. The organisations have an obligation to abide by rules and regulations in order to maintain their reputation and retain support of their clients. However, lack of innovative ways of managing plastic waste is seen as a major challenge. Therefore, this article highlights the plights and creative ways for effective plastic waste management.

II. BACKGROUND

Wiechers, Borland & Matsabu (2002) assert that waste management, particularly plastic waste has become a worldwide problem since it causes serious harm to the environment. For example, the study found that about 513 million tons of plastic end up in the sea annually. The main contributing countries in Africa are Egypt (0.97 million tons), Nigeria (0.85 million tons), South Africa (0.63 million tons). Geyer, Jambeck & Law (2017) conceded by indicating that plastic is accessible and cheaper to produce. These authors further point out that plastic material can last long and cannot be easily disposed by natural methods. Brouwer, Hadzhiyska, Loakeimidis & Ouderdorp (2018) state that countries which are applying municipal solid waste (MSW) management properly, plastic waste is disposed through recycling, burning or landfilling. However, there are countries which depend on the traditional way of plastic waste management (Samiha, 2014; Despeisse et al, 2017).

There are various strategies formulated by governments globally to articulate innovative ways to deal with plastic waste challenges. Rudolph, Kiesel & Aumnate (2017) postulate that management of waste, particularly in developing countries is often seen to be poor and attributes to weak economic and social welfare. These scholars further highlight that these factors result from lack of proper environmental legislation, financial management, and administrative capacities. This initiated a debate on the need for innovative ways for plastic waste recycling. It is vital to highlight that the existing ways regarding recycling of plastic worldwide provide a view that waste materials are a resourceful instead of being problematic. Drawing from this, the circular economy considers recycling as the strategy to reduce the negative impact of plastic waste on the environment and as an opportunity for job creation.

According to Kobza & Schuster (2016), the circular economy is viewed as a life cycle planning that is aimed at materials and products preservation value chain, where a waste material is transformed into a usable material. The circular economy approach has been adopted in many developing countries including South Africa, particularly in various economic sectors for economic stimulus. Challenges such as degrading of environment, scarcity of resources and high cost of products are observed to be the main drivers for adopting this approach. Hence, remanufacturing, recycling and other similar approaches in the business strategy, are remedies to these challenges. Be that as it may, a shift from linear economy to circular economy is often confronted with some difficulties and resistance from other role players.

Urbinati, Chiaroni & Chiesa (2017:54) maintain that "role players such as governments, policy-makers and business leaders are lacking an approach or guideline to outline methodology on how organisations could adapt to the circular economy". It is observed in Oudhia (2010:34) that "places that are highly populated and urban areas, citizens are mainly affected with poor management of plastic waste, which contributes to their health hazard". Oudhia (2010:34) further postulates that "hundreds of millions of plastic bags that are being issued by shops half of the number is regarded as waste that pollutes the environment and as a result the livestock and wildlife are affected". It is worth noting that poor plastic waste management has a detrimental effect on the lives of people and environment. It is on this background that this article analyses the effects of utilisation of green practices and strategies for effective plastic waste management in the context of various stakeholders such as organisations, communities and government.

III. RESERCH METHODOLOGY

This article is embedded within the qualitative research approach to explore the opinions of participants sourced from the relevant stakeholders such as representatives of organisations, communities and local municipalities in Durban region, South Africa. Purposive sampling method was used to select participants who took part in the study. For instance, 57 participants (20 organisation representatives, 20 community representatives and 17 local municipality representatives) were involved in the study.

IV. LITERATURE REVIEW

A. *Features of green practice and waste management*

The growing trends of population often leads to high production of waste, particularly plastic waste and other material products. This resulted in various features of waste management, which has become a difficult issue for organisations to apply creative ways to avoid pollution of environment. According to Smith (2010) green practice is viewed as an approach that result into ecology which is not harmful to the environment by preserving it and natural resources for the present and generation to come. Smith (2010) further indicates green practice is also seen as an approach of protecting the planet and natural resources by adapting innovative ways to minimise damage to the environment. Mensah (2007) postulates that green practice could include actions that possibly reduce the effects on the environment and on the other hand becomes beneficially to the economic growth.

It is important to note that the environment is negatively affected, particularly at the streams and oceans. In this regard, plastic waste is spreading at alarming rate, which causes harm to the living species. However, the plastic manufacturing companies globally are of the view that green practices are not realistic in opposing initiatives of Plastic Federation of South Africa. In contrast to this contradiction, Brouwer et al (2018) point out that greenery should be taken into consideration in order to preserve environment and social welfare. In this regard, several innovative methods for waste management are suggested. These include innovative methods such as recycling, reduction of plastic waste, burning and landfills.

- *Recycling*

Willis, Maureaud, Wilcox & Hardesty (2017) view recycling as the reusing of the plastic waste from a process of production for the similar produce or different product. Samiha (2014) add that recycling as innovative way of disposing waste is seen as a global inclination towards a circular economy. The worldwide trend of environmental awareness of the communities, clients and suppliers has increased compliance of industries on set standards of environment to sustain the environment and social welfare. Samiha (2014) further outlines that recycling is regarded as one of the most well-known innovative measure to fulfil the required standard of preserving the environmental. Smith (2010) argues that recycling is considered as the most important aspect to achieve a circular economy by reducing waste, mitigating environmental impact as well as creating equity and reputation of customers and suppliers.

Despite that recycling is regarded as the creative way for greenery practice, it can also be subjected to exploitation. For instance, waste such as plastic and steel are collected with the main aim of making an income. The fact that this practice is often not regulated and controlled by the government, there is an element of exploitation of waste collectors and vendors, while the manufacturing companies are earning high returns. Nyalunga (2006) supports this notion by indicating that in one of Africa's leading dumps in northwest Kenya, some communities are living through recycling of waste. Nyalunga (2006) points out that mega plastic industries are filthy rich through the poorest individual's efforts who are collecting waste such as plastic bottles and containers in order to make hard living.

The number of companies that are recycling waste, particularly plastic waste is drastically increasing in the developing countries. For instance, the South African Tire Manufacturing Conference (SATMC) (1998) reported that there were about 100 companies recycling plastics in South Africa. Furthermore, in January 1997 the Plastic Federation and Plastics South Africa was launched to provide a solid expression of plastic industrial obligations such as environmental upliftment, addressing the problem of plastic

littering, educating communities on recycling initiatives, as well as spreading a positive message regarding plastic production and usage through local media. In addition, Botha (2000) suggests some of the awareness initiatives. These initiatives include the following:

- To encourage plastic manufacturers on compliance with international accepted standards for circular economy,
- To facilitate publications on preservation of environment focussing on schools and environmental organisations,
- Arrangement of environmental programmes on South African Broadcasting Corporation stations covering local communities,
- To mobilise funds for educational and environmental bodies in conjunction with South African Education and Training,
- To mobilise sponsors for slogan such as 'Keeping South Africa Beautiful' initiative for two-and-a-half years.

It is worth noting that the recycling initiatives started to yield significant results. For instance, the Plastics Federation of South Africa report of 2001 states that since the launch of the Green Cage project in 1999, more than 100 job opportunities were created, and the number of plastic waste material collected by means of these cages increased drastically (PFSA, 2001). Although, this initiative was a success and that it has contributed to alignment of South African environmental standards with international once, the government should not ignore the negative impact of recycling initiatives on communities that are living in poverty and could be easily exploited (Nyalangu, 2006). The four-year target of the current Plastic Federation of South Africa set a four-year target which is aiming to reprocess about 300 000 tonnes of plastic waste material. This recycling initiative focuses at large cities such as Johannesburg, Cape Town, Richards Bay, and Durban.

Vince & Hardesty (2017) postulate that the inclusive of 'separation-at-source' for plastic waste initiatives to informal areas focuses on community participation in Gauteng Province. Vince and Hardesty (2017) further argue that achievement of this goal should be in such way that are participating in recycling process are not subjected to measures without being exploited by third parties or intermediaries, plastic organisations allowed for the formation of recycling facilities and the use of garden sites as arrangement facilities. On the same note, the waste management approach has identified main deliverables for the change of waste from landfills, which is to reduce waste to landfill through waste reduction and recycling; and institutes a recycling economy in the city of Johannesburg. Vince & Hardesty (2017) also stated that generally, the perceptions on recycling held by plastic manufacturing firms were primarily negative, going on to state that these companies often only put forward the ideal that they supported recycling initiatives when, they were actively against the practice as it was showing to negatively affect their bottom line and operating profits.

- *Reduction of plastic waste*

Reducing plastic waste may reduce the impact of plastic waste on the environment and minimise the actual need for green practices. The amount of waste is reduced by aggregating the efficiency of resource use and prolonging the life of the product. As a result of this, the key to the reduction is careful arrangement in the use of plastic so that waste reduction can be avoided in the early stages (Sheth, 2011). Karani & Jewasikiewit (2007) postulates that waste reduction is a fundamental step towards an effective waste management strategy. In first world countries, grocery shops have adopted the use of less plastic bags to reduce the amount of waste the volume of which, though preferred and coveted by many, can be a big problem to the residents and the city municipalities in terms of dealing with the waste. The authors agree that reduction in the volume of plastic packaging and plastic bags will go a long way in managing plastic waste. Literature by Hultman & Corvellec (2012) has reported trivial improvements in the waste disposal machineries in many cities in the low-and middle-income countries in Africa.

In its waste management report, the Environmental Management Association (EMA) (2018) reports that there are various measures taken by shop owners in ensuring that waste is properly controlled. However, no statistics are available on the effectiveness of this. It is also vital to stress that there is limited literature on how plastic manufacturing companies in South Africa uses waste reduction as a way of managing plastic waste.

In May 2003, the South African government enacted regulations related to the banning of production of thin-film plastic shopping bags. The government advocated that such thin-film plastic shopping bags were indiscriminately discarded because they had no intrinsic economic and recycling value (PFSA, 2003). However, in as much as the regulations led to significant reductions in plastic shopping bags in the environment, the law resulted in several unintended negative consequences, as jobs were lost because some businesses in the plastic shopping bag manufacturing sector closed. The 2005 report from the Plastic Federation of South Africa on these same regulations also reveals that key stakeholders, such as industry, business and labour, lobbied against the introduction of the regulations but without success (PFSA, 2003). On average, business went down by about 83% with a conservative 25% reduction in employment (PFSA, 2003).

Despite international drive towards minimising plastic waste, many organisations in developing nations such as India, South Africa and Brazil are more focused on limiting the effects of the waste on the organisation's image than on reducing the waste itself. It has largely been due to environmental regulations and legislature to force growing organisations in these countries to comply with specific waste standards, specifically in the plastic industry.

➢ *Burning of plastic waste*

Another method for disposing of plastic waste and managing waste in general is to burn it (incineration). Although not viably considered as a green practice by many states and environmental scientists, it is an effective way of reducing landfill capacity in countries where landfills themselves pose an even bigger threat to environmental fidelity. In Europe, incineration facilities are used as a last resort for overbearing landfills and even then, the waste that is to be burned is segregated such that a minimal quantity of toxic fumes and gases are produced (Ritchie, 2017).

Conversely, Chinese cities are reducing landfills and showing more interest in incineration by building waste furnaces (Rich, 2016). China has several burning factories, with one in Shanghai called 'Minhang,' which is allegedly the largest one in China and possibly the world (Samiha, 2014). Burning of plastic is more popular in developing nations and this practice usually produces foul odour and toxic gases that in themselves are harmful to human health and environmental fidelity. According to Nyalunga (2006), the Campania region in southern Italy has experienced serious problems with waste management issues since the mid-1990s. The author records that the area between Naples and Caserta has even been given a nickname called 'the land of fire', because of the numerous blazes burning up huge mounds of plastic waste.

In Nigeria, "8.3% of residents in Bama town collect plastic waste and nearly all of the waste is set ablaze amidst other refuse at refuse disposal points, usually within the neighbourhood, near to communities and residential homes" (Oelofse, Viljoen, Taljaard & Botes, 2007:232). Oelofse et al., (2007) further acknowledge that this open burning results in air pollution. The collected plastic waste is ditched into open dumps, where it may be burnt, and in most cases is dumped in illegal dumping sites. In South Africa, the Environmental Management Agency (EMA) is dazed by the outcry from various segments on air pollution, which is mostly cause by the plastics which are burnt in ditches and mostly coming from backyard plastic waste burning as well as the burning of trash in skip bins in and all around the central business districts. It is a common method in South Africa to get rid of waste through burning, and this mostly because local authorities fail to regulate collected refuse (Committee of South Africa, 1999).

➢ *Landfills*

Eichstad (2002:121) stipulates that "placing of waste in a landfill involves burying and storing waste in order to get rid of it or keep it in one specific area; and this is one of the most common waste disposal and waste management systems common in first-world and developing countries". Borrowed pits, abandoned and unused mining spaces often results in landfills. According to Rich (2006), a 'properly formed and well-managed' landfill can be a hygienic and equally inexpensive method of disposing waste material. Be that as it may, there are several hostile environmental impacts due to poorly designed or poorly managed landfills (Rich, 2016).

Thornhill (2012) claims that solid waste being disposed in landfills has more than doubled in the past eight years from 122 million metric tons in 2012 to 262 million metric tons in 2019. The research also found that the US had plenty of space to landfill solid waste. Additionally, the research found that the US had plenty of space to put waste in 2005 (more than 70 years of space), but the rate that this space has been filled has increased so rapidly that the country has recently been forced to 'export' waste to China in exchange for trade agreements (Philippines-Canada Local Government Support Program (LGSP), 2003). Landfills are disposed of with so much waste, and landfilling will continue to be a major way for people to manage waste in the future, so research into ways to reduce greenhouse gas emissions is of utmost importance. In addition to recycling and reducing waste, other green practices like incineration of viable waste can reduce the burden placed on landfills.

Plastic waste in South Africa, particularly in urban areas such as Durban, is disposed of in trash cans, dumpsters, or drains. Most houses store their plastic waste in bin bags. As a result, increasing amounts of plastic waste are swept into such facilities until they are filled, then collected or disposed by solid waste workers in Durban (Oelofse et al., 2007). There are two major types of waste disposal: legal and illegal. Most of the waste is dumped illegally in landfills by residents who run out of storage space or who are just trying to get rid of junk at home. In a similar vein, 12 percent of households bury their plastic waste in dogged pits, and most plastic waste from households is disposed of in open areas (Oelofse et al., 2007). If there is no control over illegal dumping and improper waste disposal by residents, the landfill system will collapse as mentioned earlier because there is no way to regulate the damage caused by improperly stored non-biodegradable materials.

South Africa's plastic waste management systems, according to Oelofse et al. (2007), are inefficient when compared to those in first-world countries. South Africa has a thriving, expanding plastic industry, which generates waste at a rate of 2 to 3% each year (Macozoma, 2000). According to Macozoma (2000), the principal alternative for waste management in the country is the dumping of ordinary waste in landfill regions. Garbage dumping at landfills is becoming the favoured method of waste disposal in South Africa due to socioeconomic causes, yet space constraints at these sites are becoming a severe concern. Landfills, according to the Environmental Management Authority (EMA, 2003), are a major environmental and human health threat.

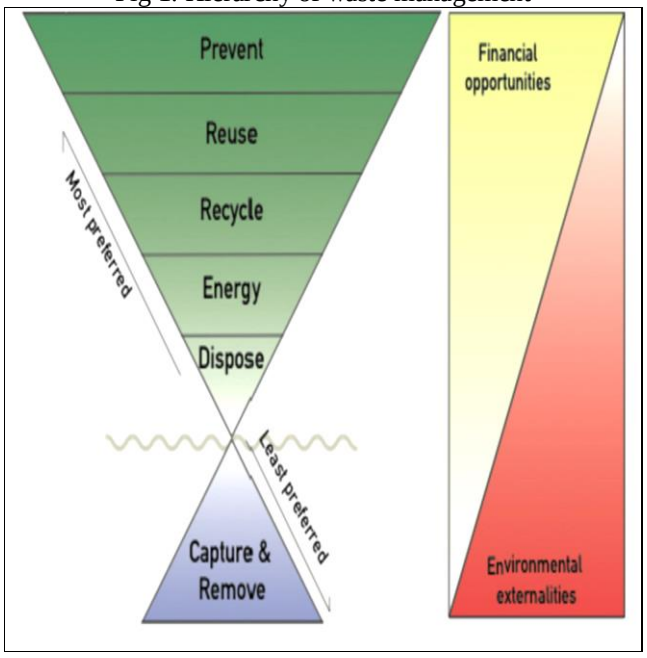
B. Plastic waste hierarchy

Kumar, Bhattacharyya, Vaidya, Chakrabarti, Devotta & Akolkar (2015) argue that the main aim of the plastic waste hierarchy is to focus on a subsection of sustainable business models related to sustainable plastic management (SPM). SPM can be considered as an intermediary to reduce the environmental harm of plastic materials. This is a revision of two related definitions of sustainable innovations in plastics and plastic waste. Sustainable plastics can be defined as plastics that are fit for purpose, require minimal resources, generate minimal waste, and pose a slight risk to social and

environmental systems (Kumar et al., 2015). Minshall, Gray & Hadim (2017) define plastic waste innovation as an activity in which stakeholders add value to plastic waste and close the material cycle, better managing plastic waste to reduce Disperse, recycle or reuse plastic waste and avoid plastic waste. In this regard, even recycling and green practices in general associated with the circular economy can be exploited by those who illegally use these practices for profit.

The term waste is avoided and instead involves management (Kumar et al, 2005), as many ways to reduce the environmental damage caused by plastics are to treat them as resources rather than wastes. SPM can be followed at the system level. Filters for household washing machines for capturing, for example, B. microplastics, by implementing waste management arrangements, including plastic management, or at the product level (Minshall et al., 2017). The variety of SPM procedures can be characterised along the waste hierarchy, shown in Figure 1.

Fig 1: Hierarchy of waste management



Source: Minshall et al. (2017)

According to Despeisse (2017), the EU Waste Framework Directive (WFD) supports the waste hierarchy as a means of emphasizing waste management based on environmental performance. The hierarchy begins with prevention, which includes employing substitute materials or delivery channels (for example, using digital items instead of physical materials) to avoid plastic from being formed, followed by reusing, containing, repairing, renovating, or reassembling a product.

The next stage is re-cycling, which includes up-cycling and down-cycling, in which the product is transformed into a new or improved version of itself (Willis et al, 2017). Processes such as incineration, which absorbs energy from the plastic, are examples of energy retrieval. The hierarchy's final choice is disposal, which essentially means landfilling, dumping, or burning without energy recovery (Willis et al., 2017). Due to the difficulties of managing plastic trash, it is generally agreed that avoiding it is the best way to reduce plastic waste pollution. As garbage may not end up in proper disposal pathways, a new category is introduced to the hierarchy: cover, capture, and remove from the environment (Urbinati, Chiaroni, & Chiesa, 2017). Plastic waste that has been captured can subsequently be returned into the plastic economy and recycled, repurposed, destroyed, or disposed of in a more environmentally friendly manner. Waste that does not go via regular management mechanisms, such as the 'plastic soup' of ocean plastic and microplastics found in Artic Sea ice, can be difficult and expensive to remove.

Capturing mishandled plastic is considered the least effective action to reduce pollution. The waste hierarchy is "a valuable framework to communicate and place in order plastic waste management, but there are some cautions and debates worth taking note of" (Urbinati, Chiaroni, & Chiesa, 2017:34). Certain preferred options may not be available depending on the structure of the plastic substance. Secondary polymers created from recycled materials, for example, are frequently unable to be recycled and must be downcycled or discarded. Certain complicated materials, such as the plastic-paper-aluminum sheets found in beverage cartons, are difficult to reuse or recycle, leaving treatment options restricted.

According to Despeisse (2017), the general public understands the short-term effects of waste on the environment, such as the negative effects of littering on city upkeep, drainage system blockages, and wildlife harm, whereas manufacturers of complex waste products are more concerned with developing means to counteract their association with long-term effects of mismanaged waste, such as the release of harmful chemicals.

C. Challenges for plastic waste management

Even though efforts to control plastic trash have been made, it is important to note that there are still underlying difficulties that contribute to poor garbage management. These difficulties are divided into two groups. Institutional obstacles, for example, include a lack of clear line authority, inadequate waste management and sanitation standards, and unpredictable service and collection frequency, whereas domestic challenges include a lack of information and knowledge, attitudes, and household issues.

- *Institutional challenges*

Poor institutional role is considered a major challenge to municipal waste management in developing countries. This problem has been intensified by increasing population and rapid urbanisation. Steyn and Dlamini (2000) noted that municipalities' management in developing countries usually spend about 20 to 50 per cent of municipal expenditure on waste management service delivery which eventually results in low level of service provision. These very low levels of waste service delivery are ascribed to inefficient institutional management. The institutional challenges such as lack of a well-defined line of authority, ineffective sanitation rules, unreliable services, and erratic collection schedules are discussed below.

- *Lack of clear line of authority*

Most municipalities in South Africa do not have well-defined and recognized lines of power in their institutions (Wiechers, Borland & Matsabu, 2002). The absence of clearly defined organizational roles and obligations in cities for employees means that superiors are more likely to face ongoing omissions. Due to this condition, it also means that there is no clear regulation of the right lines of personnel in the urban, resulting in inadequate assignment of duties. The lack of oversight manifests itself in an environment with weak institutional practices. As a result, ineffective monitoring often leads to inadequate attention to waste collection services, where waste can be found on the streets for days (Samiha, 2014). These irregularities in waste collection patterns have become a major challenge requiring urgent attention along with strengthening institutional systems in centrally run cities. Unclear authorities have contributed to private providers outsourcing waste collection obligations who are perceived to be more organized and equally resourced, thereby increasing the burden of providing waste services to cities. A perfect line of government is one where the roles and duties of every person in the city are clearly stated. Having a clear reporting line ensures that employees are aware of their responsibilities in the municipality (Geyer et al., 2017).

- *Ineffective waste management and sanitation rules*

Another important impediment to successful waste and sanitation management in South Africa is a lack of awareness of the aims, responsibilities, and capabilities of various levels of government (SATMC, 1998). The Bill of Rights stipulates that communities have fundamental rights to obtain social services, including trash service delivery, as stated in the Constitution of the Republic of South Africa (Act 106 of 1996, Chapter 2), as referenced in Karani & Jewasikiewit (2007). Furthermore, national, provincial, and local governments must establish policies and targets for trash reduction and recycling, while municipalities are responsible for overall waste management planning and bylaw formulation. These commitments, according to Beningfield (2002), include the provision of economic assistance to support waste minimisation and recycling in their areas.

According to the report of the National Treasury (2013), although the waste management is mainly controlled by the cities directly under the central government, there is often inconsistency in the application, direction and operation of the waste management system. Waste management functions vary from city to city, as each municipality must have its own regulation. Legislation must be specific to services provided with fees and rates normally associated with the services provided. The National Sanitation Policy emphasizes that municipalities have the primary responsibility for sanitation (Sanderson, 2005). According to the National Sanitation Policy, adequate sanitation services mean the collection, treatment or purification of human waste, domestic wastewater, sewage and wastewater resulting from the commercial use of water. commercial.

Then, the institutional commitments necessary to achieve the principles and practices of satisfactory sanitation services are the responsibility of the municipalities. Unfortunately, sanitation regulations are not currently being properly enforced by the municipalities of South Africa, mainly due to population growth, urbanization and industrialization, which means a large part of the community, mainly rural, lacks sanitation and waste treatment. For the successful implementation and enforcement of sanitation rules, the municipality's management must know and be familiar with the basic provisions of the relevant policy guidelines. It seems that many staff directly in charge of providing waste management services are not fully aware of their responsibilities due to inadequate and poor methods of disseminating information (Macozoma, 2000). Macozoma (2000) also points out that there are gaps in sanitation and waste management rules that can cause serious problems for cities in enforcement due to inadequate institutional practices. suitability of employees in areas, such as the life cycle of a landfill before it is closed. Therefore, municipal waste staff should familiarize themselves with the rules and regulations on sanitation and waste management as well as the provisions of the law through training courses, seminars and seminars. to enhance their expertise.

- *Unreliable service and collection frequency*

Solid waste collection has also encountered several hurdles in recent years, according to SAPPI (2004), however the difficulties faced by one municipality may differ from those faced by another. Most of the time, the technological procedures proposed for trash collection, storage, transportation, treatment, and retention are inadequate to meet the needs of most collection regions. According to the National Treasury (2013), the employment of inefficient technology and/or equipment types, particularly imported or international donor equipment, destabilizes the efficiency of garbage collection operations and equipment maintenance. Unfortunately, the variety of materials in garbage has exacerbated the problem, which now includes plastic packaging, paper, and technological waste in addition to food waste and ash. Unreliable garbage collection services and irregular collection have resulted from a failure to consider criteria relevant to a specific location. According to Sanderson (2005), governments waste money by purchasing large numbers of collection vehicles that aren't put to good use or are only used for a short time. This is also an indicator of institutional flaws. Unsuitable equipment is bought in most situations due to corruption, although in other cases, waste equipment is purchased with the expectation that it will perform efficiently (Geyer et al., 2017).

➢ *Domestic Challenges*

The following domestic challenges in relation to plastic waste management are identified and discussed hereunder.

- *Lack of information and knowledge*

Information and knowledge obstacles, according to Beningfield (2002), are linked because the trash collection authority has an obligation to inform and interact with its citizens and households about the local recycling program. People are frequently unclear of what they are supposed to

accomplish, or which articles should be placed in which receptacle. This could be due to the emergence of sophisticated recycling efforts, particularly for the management of plastic trash, as well as a lack of knowledge and education about these campaigns and initiatives in developing nations.

- *Household issues*

Many of the problems to waste management, according to Lucas (2010), are focused on personal expense and inconvenience. He also points out that, in practice, most South African homes are not large enough to accommodate multiple garbage storage containers. As a result, there may be storage issues for the boxes or wheelie bin containers both within and outside the house. According to Lombard (1999), many people acknowledge that recycling their waste material has not yet become ingrained in their daily household routines, so it is not automatically taken out, and some people forget to sort at the source, ensuring that plastic waste is separated from other types of waste such as food waste. This minor issue contributes to South Africa's rising problem of plastic trash pollution. People can profit economically by exploiting the problem in this way. A person could, for example, begin purchasing plastic waste from within a community for small amounts of money. This person might then profitably sell the rubbish to a recycling company. Although it appears that this aids in the recycling of the goods, there is also the possibility that the collector will begin forcing residents to retain garbage unnecessarily for a little fee. This waste may be recycled without the collector's 'businesses,' and should be handled by the municipality and certified collectors who are recognized by recycling companies.

- *Attitudes*

Developing theoretical models to explain how people's attitudes can predict behavior has been the focus of many investigations. According to Beningfield (2002), knowing or observing the activities of others can give the impression that one's own contributions are worthwhile. According to a national survey in the United Kingdom, 5-10% of home composters began after being encouraged by a friend (Benningfield, 2002). In addition, where procedures are so well-established that customers never bother to challenge them, habits might stymie the adoption of new behaviours. There is some confusion over the role of the local government in recycling, according to Vince & Hardesty (2017).

Some individuals hear half-truths about what happens to the waste from the media or their neighbours, and this has a detrimental impact on their motivation and mood. Others, on the other hand, are uninterested in recycling or believe that it is not beneficial to them personally. A key impediment has been found as indifference or a general lack of interest in the concept of prevention (Wiechers, Borland & Matsabu, 2002). Another impediment to appropriate trash disposal is the belief that it is someone else's job. Most individuals believe that garbage disposal is the responsibility of the municipality. A sense that businesses and industrialists are more responsible for the trash problem than consumers is sometimes blamed for a lack of engagement.

D. Strategies to improve plastic waste management

This section presents strategies for improving the management of plastic waste. Unpacked strategies include building sustainable business models, waste management campaigns, the use of technology, national waste management strategies, the creation of institutions, and partnerships.

➢ *Sustainable Business Models*

Companies that consider environmental objectives in their institutional strategy or value intents, according to Willis, Maureaud, Wilcox, and Hardesty (2017), are said to execute sustainable business models. Samiha (2014) provided a comprehensive definition, stating that business models that include active multi-stakeholder management, the creation of monetary and non-monetary value for a diverse range of stakeholders, as well as means to maintain relationships with the environment, will create a long-term position. The circular economy is emphasized in a subset of sustainable business models. The circular economy is a major supply-chain overhaul in which materials are cycled constantly rather than moving linearly from use to disposal (Urbinati, 2017).

These global business models aim to eliminate waste streams while also closing resource loops. Most plastic materials cannot currently be recycled without losing their high-quality properties. After recycling, they lose their technical and commercial worth as a result of this. Innovation, according to Willis et al. (2017), is an important feature of long-term company models. Entrepreneurs and well-known companies can take stock of present practices and make strategic improvements to better their own business models by documenting them. These advancements can help achieve objectives like increasing production, raising revenues, and promoting sustainability. According to Urbinati (2017), organizations avoiding business model innovation might result in inefficiency and missed opportunities. Furthermore, the possibility of protocol violations, lawsuits, or reputational damage as a result of bad plastic management could push a corporation to change its business strategy.

➢ *National Waste Management Strategy*

Brouwer, Hadzhiyska, Ioakeimidis and Ouderdorp (2017) suggest that putting the law into action is seen as the key to maintaining green practices in plastic waste management. From this perspective, this guidance helps agencies at different levels to standardize how legal requirements apply and the format of planning, licensing, monitoring, and reporting. Lazarevic, Aoustin, Buclet and Brandt (2010) acknowledged that both governments and citizens should be responsible for confronting waste disposal issues and seemingly deviating from current incinerator or landfill practices. In addition, the waste management strategy requires local governments to develop an integrated waste management plan (IWMP) to ensure proper enforcement of the law. This should be integrated into the plans of each county municipality and ultimately into state waste management. plan. It is imperative that these plans include the plastic manufacturer responsible for producing products that can ultimately be waste.

It also guides everyone involved in the disposal of plastic waste, not just the business community. Therefore, IWMP's policy documentation aims to build skills and guide the community, providing users with a systematic approach to key issues such as: B. Information needed for planning, how to collect data, and how to generate information from the data (Sanderson, 2005). The waste management plan must be reviewed, updated and expanded on a regular basis and must include a draft plan that specifies the required actions, timeframes and budgets. Sanderson (2005) agrees that such a strategy will help all municipalities systematically plan and budget waste management activities and be easily incorporated into an integrated development planning process. increase.

- *Creating Agencies*

According to Karani & Jewasikiewit (2007: 140), waste management is an essential prerequisite for ecologically sustainable development. Waste management strategies have been introduced in South Africa. This is evidenced by the South African government's establishment of the Environmental Management Agency (EMA). This agency oversees the enforcement of waste management laws and oversees the performance of local councils on all environmental issues. In addition, EMA is tasked with taking the lead in educating people on proper waste disposal. This allows waste to be collected properly and efficiently, trash cans to be properly emptied, and plastic waste to be treated to reduce pollution and hygiene issues. Beningfield (2002) also introduced and enforced legislative, procedural, and national policy frameworks that emphasized the government's transition to environmental awareness and the transition from an "end of pipe" approach to integrated waste management policies. Suggests that you need to. This is the responsibility of these Environmental Agencies. Such agencies in first world countries not only exist to uphold environmental regulations against citizens, but also against large organisations and industries whose waste streams affect the environment (Sanderson, 2005). It is also the responsibility of environmental agencies to mitigate the exploitation of green practices for profit by people who are looking to hoard and sell plastic waste.

- *Use of technology*

There is also a need for technical innovation to enable more effective waste management operations, in addition to the specified standards and commitment by government agencies (Kanyane, Houston & Sausi, 2013). The application of technology should allow for proper plastic waste management. Machines that allow for the recycling of plastic trash also aid in increasing recycling rates and reducing the environmental impact of plastic waste. Large waste management organizations have also reaped the benefits of customer-facing technology that is rich in features. Plastic-producing companies are also constantly developing technologies to increase production while reducing waste.

Technology has considerably contributed to the decrease of the complexity and cost of modern-day waste management systems, according to Galloway, Cole, and Lewis (2017), making them even more efficient, safer, and productive while minimizing their environmental impact. Furthermore, technological advancements have changed the way waste management works. Containers at rubbish disposal, for example, include automatic sensors that send out fast signals when they are full and need to be emptied.

Innovating to prevent plastic waste and trash in general, first-world countries are usually at the lead. These technologies are frequently transferred or sold to underdeveloped countries. In South Africa, significant expansion in plastic production has been matched by rapid growth in plastic garbage during the last decade. However, technical advancements and efficient waste management systems have not been able to keep up with the rate of demand and output (this is evident by the fact that plastic waste remains a problem in the country). Regardless of the safeguards put in place, it is critical that the government regulates plastic manufacturers and collaborates with them to use developed-country technologies. From the standpoint of stakeholders, investing in innovative techniques to speed plastic manufacture and ensure minimal waste would be tremendously profitable (Galloway et al., 2017). This could be financially beneficial to the company while also having a positive impact on the environment and communities.

- *Partnerships*

As Hultman & Corvellec (2012) suggests, all waste management activities, primarily in local governments, involve residents, institutions, local governments, and B. partnerships. For example, in Yarra, Thailand, recycling and reduction programs have been established as a result of poor community and city government relations (Kumar, Bhattacharyya, Vaidya, Chakrabarti, Devotta & Akolkar, 2015). Similarly, in Delhi, the Government of India has worked with the private sector and urban dwellers to introduce payment methods for recycling PET bottles (Kumar et al., 2015). Private sector initiatives, such as public and private community partnerships, have also helped improve the efficiency of plastic waste management systems (Kanyane, Houston & Sausi, 2013). Collaboration between governments, research institutes, non-profit organizations (NGOs), plastic manufacturers, and communities can reduce the environmental impact of plastics and significantly improve plastic waste management. However, it is imperative that these partnerships be concluded with agreement and proper legal compliance so that neither party can claim any interests or use the partnerships to obtain their own financial benefits.

- *Improved Recycling Rates and Techniques*

The Durban City Council (2011) reports that recycling and waste management companies are investing in improving tools and processes. The recent development of single-stream recycling, which allows individuals to dispose of all waste in one bottle, has reduced people's sorting work and significantly improved recycling rates. Studies show that both local and municipal governments are implementing more effective plastic waste treatment systems by improving recycling rates. As a result of stakeholder involvement (from major plastic manufacturers in the city such as Nampak, Afripack, Safripol), waste collection and the installation of

appropriate waste treatment facilities in its jurisdiction have been improved. rice field.

Over the last decade, companies have been under global pressure to create better recycling processes and develop more efficient tools and systems (Edward, 2003). According to Glasson, Therivel, and Chadwick (2005), increasing recycling rates in European countries such as Germany, Finland, Sweden, and Denmark are primarily simple, such as jagged garbage facilities and payashogo stations that deliver cash. It depends on the implementation of the system. Establishing a recycling facility where community members can exchange plastic waste collected for money in exchange for plastic waste.

- *Waste management campaigns*

To address the issue of plastic waste, the South African Environmental Management Authority often launches an intensive waste management program, also known as a waste management campaign (Wiecher et al., 2002). These programs include raising awareness of proper waste disposal, promoting hygienic waste disposal, distributing anti-plastic waste labels to all stores and specific products, and cleaning campaigns. Includes organizing. Coordinating solid waste management should also focus on a clearer definition of monitoring and assessment, especially the use of indicators that facilitate the recycling and reuse of plastic waste. Appropriate indicators should be included in national law to coordinate the overall approach to plastic waste management (Griffiths, 2005). From this perspective, municipalities need to encourage the participation of plastic manufacturers, locals and consumers by reasonably providing plastic waste recycling facilities and infrastructure.

- *Stakeholder perceptions on plastic waste management*

When it comes to green practices, many big companies take a holistic approach. Recycling policies and activities that support the circular economy are areas of interest and potential benefits to manufacturers as they open new ways to recycle their materials. About the disposal of plastic waste, historical evidence is that manufacturing company shareholders are usually opposed to plastic and waste laws, which adversely affect the company's success and have a direct impact, especially among the community. It shows that it is (Smith, 2010).

Shareholders in developed countries, on the other hand, have only recently embraced the concept of environmental awareness. Instead of fighting borders and laws, they seek to adhere to and promote safe waste disposal to strengthen their brand and reputation (Smith, 2010). In practice, Smith (2010) claims that most people outside of their employment duties have positive attitudes toward the use of any green technique.

According to Edward (2003), despite some negative attitudes toward greening, most individuals are personally supportive of long-term greening procedures and somewhat supportive of short-term greening methods when it comes down to it. However, it should be highlighted that stakeholders (as defined by the stakeholder theory) include people who aren't employees or who don't own stock in a company. As a result, the perspectives of individuals such as community members and local environmental authorities on each of these concerns are likely to differ from those of stockholders who earn directly from company activity.

V. FINDINGS

The findings uncovered the inadequacy of the executives of plastic waste by every single applicable partner and an absence of key methodologies for compelling administration of plastic waste. Nonetheless, according to stakeholders' viewpoint, it would be very beneficial to put resources into creative exercises that attention on process designing and plan to smooth out plastic creation by guaranteeing creation with insignificant waste. It was additionally expressed that this approach can be financially beneficial to the association and emphatically influence the climate and networks. This is predictable with the chronicled hypothesis expressed by Smith (2010) who shows that with regards to plastic waste administration, particularly among nearby networks, authentic proof recommends that investors of assembling associations ordinarily hall against plastic and waste guidelines which straightforwardly affect the association's presentation. As of late in any case, investors in created nations have started to embrace the thought of natural mindfulness and on second thought of retaliating against limitations and guidelines, they presently look to adjust and advance capable garbage removal for of building brand power and notoriety (Smith, 2010). About individual discernment on green practices and use of plastic, most respondents shared the insight that green practices about squander plastic administration are vital strategies for controlling plastic waste. The finding is reliable with Smith (2010) who expresses that practically speaking, the vast majority outside of their work jobs, hold positive discernments towards the usage of any green practice. Edward (2003:11) upholds that notwithstanding, a few pessimistic perspectives towards greening, all things considered, overviews generally show that the vast majority are by and by strong of long-haul greening techniques and gently support momentary greening strategies also. On the inquiry regarding effect of plastic waste administration, all respondents brought up that plastic waste adversely affects the climate. The finding is steady with the view in Despeisse (2017) who noticed that with regards to monitoring the adverse consequences of plastic waste on the climate, the overall population comprehend the momentary impacts, for example, the hindrances of littering on city upkeep, the blockages of seepage frameworks and the damage to untamed life. Nonetheless, the makers of mind-boggling side-effects are more worried about creating means to check their relationship with long haul impacts of bungled waste, for example, the arrival of hurtful gases through consuming that can add to a worldwide temperature alteration.

VI. CONCLUSION

It is obvious from the research and the data presented above that there are differing perspectives on the use of green techniques and the management of plastic garbage. The literature has highlighted the challenges and options for successful plastic waste management, while certain players have demonstrated a business sense about how plastic trash is managed. This has resulted in the creation of a competition platform to encourage further conversation about the use of green practices for economic viability and effective plastic waste management for environmental protection. This page serves as a guide for organizations, communities, and municipal officials who want to take responsibility for environmental and social welfare preservation.

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