

Research Article

Assessing Port Harcourt Superstores' Contributions to Sustainable Development Goals via Consumer Waste Management Behaviours

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Abstract: Waste management particularly in Port Harcourt, poses a significant challenge due to the generation of refuse from domestic, commercial, and industrial sources. Globally, superstores generate substantial amounts and diverse types of waste daily, necessitating environmentally friendly practices to align with sustainable development goals. Consumers' environmental consciousness significantly shapes their shopping and consumption habits. This study aims to evaluate consumer awareness of sustainable development goals (SDGs) related to waste management in Port Harcourt's superstores and assess consumer involvement in waste management practices during shopping. Employing a descriptive approach, quantitative data was collected through a random sampling method via questionnaires from 112 participants. The tools used were validated, with Statistical Package for Social Science version 26 employed for analysis, encompassing frequencies, percentages, chi-square, and Spearman correlation. The study rejected the null hypothesis, revealing a significant association between consumer awareness of SDGs in waste management and various socio-demographic factors, indicating that heightened awareness correlates with increased engagement. Notably, environmental consciousness drives participation in waste management activities. Importantly, the study underscores that consumer knowledge and awareness, particularly concerning plastic packaging waste, significantly influence waste reduction efforts, indicating the pivotal role of stakeholders, especially superstores, in communicating information and fostering consumer engagement for environmental sustainability.

Keywords: sustainable development goals; waste management; behaviours

1. Introduction

Waste management is defined as the control of waste related activities, with the ultimate aim of resource conservation and protection of human health and the environment. Adegoke (2010) defined waste as substance and materials, which are disposed of, or required to be disposed of, according to the provision of national laws. In the same vein, waste can be generally described as any item or material that is generated and disposed of or intended to be disposed of by a person that has custody of it. However, in addition to considerations of legal nature and geographical location of generation, different definitions of waste exist based on conditions under which they occur (Williams et al., 2005). The importance of the adoption of effective waste management practices, by the retail sector and especially supermarkets, is further highlighted by facts regarding the annual quantity of food and packaging waste and the cost, related to this waste. Waste management has been identified as a challenge in many countries all over the world, much more so in developing countries, and a correlation has been identified between accelerated urbanization, population explosion, industrial development and rate of waste generation in cities found in such countries (Narayana, 2009).

According to the UN Environmental Programme (UNEP), every year, an estimated 1.3 billion tonnes of solid waste is collected worldwide. This figure is expected to increase to 2.2 billion tonnes by 2025, with almost all of the increase from developing countries. It has been recorded that Nigeria generates over 32 million tons of solid waste yearly, and only 20–30% is collected (Bakare, 2020). Most of these wastes are generated by households and in

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some cases, by local industries, artisans and traders who litter the immediate surroundings. Waste management is one of Nigeria's greatest challenges, in Port Harcourt, refuse is generated from domestic, commercial and industrial sources. The rate of generation has been steadily increasing and will likely continue to do so in future with the rapid increase of population in the city. Superstores across the globe generate and accumulate tons of solid waste per week, which may consist of the following: expired food products, meat and vegetable trimmings, cardboard boxes, empty wooden produce boxes, other types of secondary packaging. Plastic packaging will make up approximately two-thirds of the waste (Smith, 2022). Reckless disposal of waste has led to blockage of sewers and drainage networks, and choking of water bodies.

According to Jones et al. (2005), environmental issues are the earliest and most commonly reported corporate social responsibility agendas among top retailers. In this context, retailers, including super markets, incorporate the dimension of environmental responsibility, along with the dimensions of human and product responsibility, in the corporate social responsibility positioning (Anselmasson & Johansson, 2007). This means that they are perceived to trade environmental-friendly, ecological and non-harmful products and they apply environmental policies and use recyclable product packaging (Carrete et al., 2012). The importance of the adoption of effective waste management practices, by the retail sector and especially supermarkets, is further highlighted by facts regarding the annual quantity of food and packaging waste and the cost, related to this waste. Consumers' level of environmental awareness and understanding influences how they shop and consume, which in aggregate influences the direction of demand and supply, as consumers' decisions are influenced by their level of environmental knowledge and concern. Identifying gaps in consumers' knowledge, attitude and behaviour would support policy developments targeting Sustainable Development Goals (SDGs) (Pearson et al., 2013). Environmentally sound and integrated solid waste management programs and plans affect the achievement and improvement of many indicators of SDGs, whether that effect is directly or indirectly (Jurgilevich et al., 2016).

The individual consumer behavior is one of the factors affecting the quality of the environment. Consumers know that their consumption behavior has an impact on sustainability (Guercini & Runfola, 2009). Consumer behaviour represents acts or decisions that influence the direction of production and consumption activities, which are, in turn, driven by household and, ultimately, economic activities. Many of the leading retailers report on their corporate commitment to SDGs and sustainable consumption, but there is, at best, limited evidence of this commitment at store level (Abdulredha et al., 2020). Here, the retailers might be seen to be transferring the responsibility for adopting more sustainable approaches to consumption to customers without providing them with any information to guide their choice at the point of sale. In particular, the statements relating to goal number 12- Ensure sustainable consumption and production patterns and goal number 11 - Sustainable cities and communities that underlines the need to substantially reduce waste generation through prevention, reduction, recycling and reuse (Parfitt et al., 2010).

As plastic remains as the most prevalent packaging and product material, it is difficult for consumers to avoid it. Consumers might also be reluctant to take the sole responsibility for reducing plastic consumption as convenience is often governed by the prices and availability of sustainable alternatives (Heidbreder et al., 2020). Hence, with supermarkets as one of the world's leading retailers, consumers will need to shape the change necessary in those places that can actively make an impact in production, in consumption and in the recycling of products in as much as they should be thoughtful about what to buy and choose a sustainable option whenever possible (Song et al., 2016).

1.1 Justification of the study

Plastic wastes are hardly recycled in Nigeria with less than 12% being recycled and about 80% of these wastes end up in landfills and dump sites. A comparative analysis of municipal solid waste (MSW) composition in three local government areas (LGAs) in Rivers State revealed that waste generation rate was 0.45, 0.98 and 1.16 kg/capita/day for Emouha, Obio/Akpor and Port Harcourt, respectively (Bakare, 2020). The most prominent categories identified were organic waste, paper and nylon. Mean percentage composition was 59, 65.5, 65 for organic waste, 6, 11 and 13% for paper and 14, 16 and 12% for nylon in Emougha, Obio/Akpor and Port Harcourt LGAs, respectively. However, recognizing trash as a problem does not prevent littering or other negative behaviors concerning waste management (Knickmeyer, 2019). This attitude-behavior gap often emerges and can be further affected by

a variety of reasons including convenience, social norms, lack of public participation, and lack of education and awareness of effective waste management techniques (Heidbreder et al., 2020).

In Nigeria, the commonly practiced waste management option basically involves the collection of mixed waste materials and subsequent dumping at designated dumpsites. It is not a practice to separate waste materials at source or any point during its management (Lawrence et al., 2020). Indiscriminate dumping of waste in urban areas is common, creating increased risk of disease, flooding and environmental pollution. Recycling and treatment infrastructure is typically inadequate to safely deal with these waste streams resulting in direct impacts to human health and the environment (Lazzarini et al., 2018). Nigeria generates an estimated 32 million tonnes of solid waste yearly; one of the highest in Africa, from that figure, plastic constitutes 2.5 million tonnes. According to the reports presented during the World Economic Forum in 2016, the largest application of plastic is packaging, representing 26% of the total volume of plastic used, 95% of material value of which are lost to the economy after a first use. It is estimated that 40% of plastic packaging is landfilled and 32% leaks out of the collection system.

Public awareness and participation are remedies to the problems of waste management in Nigeria. Amalu and Ajake (2014) pointed to the need for community education programs to adequately educate the people on environmental issues. Sound waste management contributes to sustainability: consumers deserve to know more about how they can unlock hidden value for themselves, and for the good of the environment.

Since consumers increasingly buy manufactured, packaged products (Boesen et al., 2019; Monnot et al., 2019), packaging of fast-moving consumer goods (FMCG) and packaging waste are important in their own right in the transition to a circular economy (Testa et al., 2020). Due to the size of its contribution to the waste stream and litter, the EU waste directive (EU, 2018) demands that member states drastically reduce packaging waste and increase its recycling. The goal is that 70% of packaging waste is recycled in 2035. Consequently, actions on reducing plastic packaging and plastic packaging waste (PPW), as the main contributors to plastic waste in general, are a high priority in the European Union's New Circular Economy Plan (EU, 2020). Packaging accounts for 40% of global plastic consumption, which makes it by far the largest user of plastic (Testa et al., 2020).

Research Objectives

The broad objective of this paper is to assess Port Harcourt Superstores' contributions to SDGs via consumer waste management behaviours. However, the specific objectives are:

1. To assess consumer awareness of SDGs related to waste management within Port Harcourt Superstores.
2. To assess the level of consumer engagement in waste management practices while shopping at Port Harcourt Superstores.

Research Questions

The research questions are as follows:

1. Are consumers aware of the SDGs related to waste management?
2. To what extent do consumers actively engage in waste management practices while shopping at Port Harcourt Superstores?

Research Hypothesis

The research hypotheses are as follows:

H01: There is no statistically significant association between consumer awareness of SDGs in waste management and the socio demographic factors in the study.

H02: Consumer awareness of SDGs related to waste management does not significantly influence consumer engagement in waste management practices during shopping at Port Harcourt superstores.

2. Literature Review

2.1 Sustainable Development Goals (SDGs)

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 & Ratiu, 2019; Fiorini & Hoekman, 2018). In September 2015, over 150 world leaders decided to adopt the agenda for sustainable development in the form of 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.

SDGs is the global plan of the United Nations Members established in 2015. Belonging to the 2030 Agenda for Sustainable Development, SDGs provide a shared framework for prosperity and peace for humanity and the planet and encompass prosperity, peace, and partnership. 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 & Davide, 2019).

SDGs which can be useful to policy makers in setting policies which could affect a larger number of stakeholders (Biggeri et al., 2019). Entrepreneurs and public-private partnerships have the capacity to drive the push towards sustainability using SDGs (Majukwa et al., 2020; Andersen & Ratiu, 2019). Advances in organization and management research on waste management would contribute to the achievement of several SDGs (Jurgilevich et al., 2016). Waste management businesses have the inherent advantage of helping to improve the environment, create employment opportunities and create profits for the entrepreneurs. Identification of sustainable alternative materials to plastics, and innovative packaging and recycling technologies such as the 2020 National Policy on Plastic Waste Management which is aimed at ensuring that all plastic packaging in the market are recyclable or biodegradable or compostable and reusable by 2025, ensure that all plastic packaging in the market meet at least two criterion of being recyclable or biodegradable or compostable or reusable by 2030 and phase out single-use plastic bags and Styrofoam, effective December 2028 mostly packaging used for shopping in supermarket.

For this study, as earlier stated SDGs 11 and 12 will be considered as important aspects regarding sustainable and resilient societies including affordability, access to services, employment and education, a clean and healthy environment, adequate social infrastructure, gender equality and respect for human rights.

2.1.1 SDG 11- Sustainable cities and communities

This goal encompasses improvement in several factors to ensure sustainability in habitations. All the targets as listed below are to improve basic services, transportation, living environment, green spaces, pollution levels and links between urban and rural areas.

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.

11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage.

11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.

The pledge of Goal 11 to make cities and human settlements inclusive, safe, resilient and sustainable provides an unparalleled opportunity for the attainment of collective and inclusive progress, and for the achievement of sustainable development in the world.

Managing solid waste remains a major environmental challenge in cities in several regions. The safe collection, removal, treatment and disposal of solid waste are among the most critical services in the urban environment. As urban populations grow, income levels rise and economies become more consumer oriented, the volume of solid waste generated will only get larger. Data from 214 cities or municipalities in 103 countries show that about three quarters of municipal solid waste generated is collected. In sub-Saharan Africa, less than half of all municipal solid waste generated is collected, with adverse effects on the health of residents. Moreover, even when waste is collected, it is often not treated and disposed of in a

sustainable and environmentally sound manner. Managing such waste continues to be a major challenge facing urban areas in several regions

2.1.2 SDG 12 - *Ensure sustainable consumption and production patterns*

Achieving SDG 12 through environmentally sound management of plastic products and waste through their life cycle would reduce the amount of plastic litter ending up in the ocean and would help countries implement the 2030 Agenda.

12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

12.2 By 2030, achieve the sustainable management and efficient use of natural resources.

12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.

12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.

12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.

12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.

12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.

12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

Waste management and resource recovery is an ongoing challenge, particularly with the large number of relevant supply chains and the complexity of national and state regulatory frameworks. Reducing waste and improving our use of waste will achieve broader environmental, economic and social benefits and will become increasingly important as the population continues to grow. Waste generation is projected to increase from 1.3 billion tons per year to 2.2 billion tons per year by 2025, with high increases in middle-income developing countries.

Environmental awareness is also identified as the driver of waste management participation in developed countries (Kokkinos et al., 2019; Elkiran et al., 2018). When evaluating determinant factors of waste management behaviour conducted in Rayong Province, Thailand in 2016, Janmaimool & Denpaiboon (2016) found that environmental awareness was mediated by environmental efficacy to affect their decision to participate in the waste management process. The individual should realize their capability to contribute to environmental improvement to some extent (Janmaimool & Denpaiboon, 2016). The study in Kerbala City, Iran in 2016 (Abdulredha et al., 2020), two Slums, Central Uganda (Mukama et al., 2016), and Macau residents in 2011 (Song et al., 2016), proved that improving people's awareness toward proper waste management process influenced the effectiveness of waste management system. Lack of environmental awareness was a barrier to waste recycling practice in two districts in Palestine (Kattoua et al., 2019). A study conducted by Heidari et al. (2018) toward students at Ferdowsi University, Iran, in 2016 showed that awareness affected waste separation intention toward attitude and personal moral norms. This finding is agreed by Zhang et al. (2018), who investigated the waste separation behaviour of households in China. Zhang et al. (2020) showed that awareness would influence intention through personal attitude and personal moral norms. In this study, attitude is considered as the personal moral norms itself. In relation to participation, Trihadiningrum et al. (2017) found that 40% of residents involved in their study in Surabaya City, Indonesia stated that

their reason to be involved in the waste separation activities was their awareness of the environment. Environmental awareness was also proven to affect residents' waste separation behaviour in China (Choon et al., 2017; Fan et al., 2019) and Vietnam (Nguyen & Watanabe, 2019). On the other hand, low environmental awareness was to be the main reason for the absence of participation in waste separation in Macau residents (Song et al., 2016).

2.2 Engagement in Waste Management

Waste management behaviour refers to all actions where residents must be involved in the waste management process, including waste separation, waste reduction, waste recycling, waste reuse, and waste disposal behaviour (Sukholthaman et al., 2017). The behaviours required in 3R are waste reduction behaviour, waste separation behaviour, waste recycling behaviour, and the combination of those behaviours. These green behaviours in consumers have been defined as being more adaptive to environmentally friendly or sustainable product choices.

Irresponsible shopping behavior and the lack of shopping lists create the optimal conditions for the food waste phenomenon within households by over-provisioning and high sensitivity to marketing offers and campaigns (Pearson et al., 2013). Thus, good household management is essential (Stancu et al., 2016). Planning routines represent an important factor of waste prevention and reduction throughout the use of shopping lists (Bogevska et al., 2021).

Four exogenous factors were identified as driving factors for sustainable consumption and waste behaviour, namely (i) environmental concern, (ii) environmental knowledge, (iii) opinion/belief, and (iv) concern for local businesses. Previous study reported that one of the food waste antecedents in the household is buying too many foods (Porpino, 2016). Understanding how food shopping behavior is developed may lead to solving the main problem. Food waste could be prevented by efficient food shopping behavior. This is shown from the condition if the consumer does not buy more food than the amount of their needs, then the possibility to discard leftovers or excess food supplies will be reduced. And examining the understanding of food shopping behavior is needed to be able to develop good communication strategies in reducing food waste campaigns. Therefore, environmental effects are part of consumer behavior analyses including food wastage (Bogevska et al., 2021).

According to UN Environment on African Waste Management Outlook Changing consumer behavior has resulted in increasing plastic consumption in Africa, which combined with weak waste collection systems, places Africa at risk of increasing marine plastic litter. If Africa does not put measures in place to mitigate the flow of plastic (and other waste) into the ocean, increasing pollution is likely to negatively impact coastal economies.

Several studies have focused on how the context facilitates or impedes consumer activities for avoiding plastic packaging waste (Bartolotta & Hardy, 2018). For instance, Heidbreder et al. (2020) found that perceived difficulty was the strongest predictor of willingness to reduce single-use plastic. Many studies in this category investigated the impact of policy interventions aiming at reducing single-use plastics, such as shopping bags (Luis et al., 2020; Martinho et al., 2017) and water bottles (Bartolotta & Hardy, 2018). However, when consumers were required to separate their plastic waste at the same time, it appears that they prefer to recycle rather than buying refill packaging. Heidbreder et al. (2020) found that a plastic free week campaign led to a small, but significant, reduction in single-use plastics consumption, particularly among consumers with low pro-environmental identity. Overall, research suggests that consumers' plastic packaging and plastic packaging waste avoidance depends on motivational as well as opportunity and ability factors.

2.3 Theoretical framework

This work is anchored on Cradle-to-Cradle theory developed by William McDonough (2002). It is designed to stop the cycle of use-waste-pollute, which suggests that certain products could be reused endlessly to make similar products (cradle-to-cradle), rather than recycled into lower-grade products until the last stop is a landfill (cradle-to-grave). This means that products can be used, recycled, and used again without losing any material quality-in cradle-to-cradle cycles. Therefore, it could be a good way for reducing the waste from the raw materials of the products instead of using more and more virgin materials. Besides, considering the waste hierarchy, it also increases the proportion of waste reuse. Hence, when we face the problems of municipal solid waste, this theory can bring us the possibility for the breakthrough. All in all, "cradle-to-cradle" plays an important role in developing China's waste treatment hierarchy and implementing China's waste management system.

2.4 Empirical Framework

A number of related research has been conducted along these lines.

Jones et al. (2011) conducted a study aimed at providing a general review of the reporting process adopted by some of the world's leading retailers along with the sustainability agendas, which they have publicly reported. They, also, tried to provide a wider exploration of the ways these retailers are currently addressing and pursuing sustainability agendas. In order to achieve this, they reviewed the most recent sustainability reports as well as information, which have been posted on the webpages of the eight out of ten retailers. Their findings suggested that the structure of the sustainability reports vary considerably among the retailers, while three broad sets of schemes can be identified, the environmental, the social and the economical. In general, the authors argue that the world's leading retailers are, at best, adopting weak models of sustainability. In addition, they point out that during the pursuing of consumption and continuing growth, retailers are ignoring the fact that the present patterns of consumption are unsustainable in the long term. In their own research, Cacho-Elizondo & Loussaief (2010) explored the perceptions of young consumers about the sustainable development initiatives of French food retailers and evaluated their impact on the brand image of retailers and their relationships with their consumers. Their methodology included the review of the corporate websites of the retailers and a press review as well as eight in-depth interviews and one face-to-face survey. Their results suggested that young consumers seem to relate sustainable development more to ecology and less to social and economic issues. In addition, they report the five dimensions that seem to best describe brand image in relation to sustainable development, which include sympathy, innovativeness, human touch, responsibility and opportunistic behavior.

Finally, Guercini & Runfola (2009) focused their research on the concept of traceability, by offering some evidence of the adoption of different traceability approaches by actors along the supply chain and by illustrating the relevance of the traceability issue and how it can be exploited. Authors describe two different approaches to traceability. According to the first, a company uses traceability as a tool for strengthening organizational control and is not willing to share information with its customers. In the second approach, traceability is used as a market tool, which helps customers to acquire knowledge about the origin of the products and the conditions of their manufacturing. Authors also explain that the traceability process has intra-organizational consequences in terms of contents, technologies and the parties involved in its implementation. Waste management, along with energy consumption, land use, transportation etc., constitutes one of the main environmental issues in the retail sector. Consequently, it has been heavily researched by various authors so far.

3. Materials and Methods

3.1 Study Area

The study focuses on Port Harcourt, the capital city of Rivers State, Nigeria. Situated in the Niger Delta region, Port Harcourt is renowned for its vibrant economic activities, particularly in the oil and gas sector. Established in 1967, Rivers State comprises 23 Local Government Areas, each characterized by unique socio-economic and environmental dynamics. Across the various Local Government Areas are supermarkets of different sizes and capacities, patronized by urban and rural dwellers in the state. Port Harcourt boasts several superstores offering a diverse range of products. Examples include Spar Nigeria, known for groceries, household items, electronics, and clothing; Shoprite, offering groceries, fresh food, household items, and electronics; Next Cash and Carry, providing wholesale options for groceries, household goods, and electronics; Everyday Emporium, popular for competitive prices on groceries, household items, electronics, and clothing; and Park 'n Shop, known for groceries, fresh produce, household goods, and electronics. These superstores cater to various needs, providing a convenient one-stop shopping experience for residents and visitors in Port Harcourt.

3.2 Research Design

Employing a descriptive research design, this study aims to provide a comprehensive understanding of the variables related to waste management in superstores across Port Harcourt. Descriptive research design is a type of research methodology used to describe characteristics or behaviors of a population or phenomenon. It focuses on observing and documenting the existing state of affairs without attempting to manipulate or control variables. Descriptive research is chosen for its ability to elucidate consumer awareness and

engagement in waste management practices without manipulating variables, thereby allowing for an in-depth exploration of complex societal phenomena.

3.3 Study Population

The population of the study refers to the entire group or set of individuals, items, or phenomena that the researcher is interested in examining or drawing conclusions about. The study targets customers of superstores in Port Harcourt, encompassing a diverse demographic. A random sampling approach was employed to ensure the representation of various consumer profiles and preferences. In total, 112 customers participated in the study, providing a robust sample size for thorough analysis and meaningful insights. This population was made up of both male and female genders, with ages ranging from 18 years and above, and included married and single respondents of diverse occupations, different levels of education, and frequencies of shopping at superstores.

3.4 Study Instrument

Data collection involved a combination of primary and secondary sources. Primary data were gathered through structured questionnaires and interviews administered to the selected sample (Appendix A). The questionnaire, designed with a summative rating scale ranging from 1 to 5 in Likert scale format, facilitated nuanced responses. The Likert scale is a commonly used psychometric scale for gauging attitudes or opinions of respondents in surveys or questionnaires. It typically consists of several statements or items to which respondents indicate their level of agreement or disagreement on a scale, often ranging from “Strongly Disagree” to “Strongly Agree.” Section A of the questionnaire collected demographic information, while Section B addressed specific research inquiries. Secondary data sources, including libraries, journals, articles, textbooks, and online databases, contributed to the literature review and contextual understanding of waste management issues.

The instruments used in data collection for this study are structured questionnaires. The questionnaire was designed in Likert scale (5 points) format. It was divided into two parts: Section A deals with the personal information about the respondents, while Section B addresses the research questions. The questionnaire was distributed to customers of superstores.

3.5 Data Analysis

The data analysis process involved several steps to extract comprehensive insights. Data was organized into tables and percentages to present key findings clearly. Statistical techniques like Chi-square and correlation analysis were used to test hypotheses and explore relationships between variables. Advanced statistical analyses, including standard deviation and correlation coefficient calculations, were conducted using SPSS version 26. This software facilitated thorough examination of the data, providing deeper understanding of variability and relationships within the dataset. The combination of structured data organization, hypothesis testing, and advanced statistical analyses ensured robust interpretation of results, leading to valuable insights and informed conclusions.

3.6 Validity and Reliability of Instrument

Ensuring the validity and reliability of the research instrument was paramount. To validate the questionnaire, it underwent rigorous evaluation by the institutional ethical committee to ensure it effectively covered the study variables. Additionally, reliability assessment was conducted using Cronbach’s alpha, a measure of internal consistency, to confirm the reliability and consistency of the questionnaire responses. These measures contribute to the credibility and trustworthiness of the study findings.

4. Results

The data obtained was analyzed as follows:

Table 1 below describes frequency tables of the distribution of respondents based on gender, age, and marital status.

The Gender table indicates that out of the 112 respondents, 58 identified as male (51.8%), and 54 identified as female (48.2%). The percentages represent the proportion of each gender category relative to the total number of respondents.

Age table provides information on the distribution of respondents across different age groups. The majority of 67 respondents (59.8%) within the 18-33 age range, followed by 36

respondents within 34-49 (32.1%), 8 respondents within age 50-65 (7.1%), and a single respondent in the 82 and above age category (0.9%).

The Marital Status table indicates that 33.0% of respondents are married (37 individuals), while 67.0% are single (75 individuals).

Table 1. Frequency distribution table of gender, age, and marital status

Gender	Frequency	Percentage (%)
Male	58	51.8
Female	54	48.2
Total	112	100.0
Age	Frequency	Percentage
18-33	67	59.8
34-49	36	32.1
50-65	8	7.1
82& above	1	0.9
Total	112	100.0
Marital Status	Frequency	Percentage
Married	37	33.0
Single	75	67.0
Total	112	100.0

Table 2 shows frequency and percentage distribution for level of education, occupation and frequency of shopping with total subjects of 112.

The Level of Education table shows that the majority of subjects (98.2%) have a tertiary level of education (110 individuals), while only a small percentage (1.8%) have a secondary level of education (2 individuals).

The Occupation table provides information on the occupational distribution of subjects. The majority are employed 61 (54.5%), followed by students 30 (26.8%), self-employed individuals 14 (12.5%), unemployed individuals 6 (5.4%). Retired subject is 1 (0.9%).

The Frequency of Shopping table indicates the shopping habits of subjects. The most common frequency is once a week 23 (38.4%), followed by 2-3 times a month 27 (24.1%), once a month 23 (20.5%), and 19 subjects rarely shop (17.0%)

Table 2. Frequency distribution table of level of education, occupation, and frequency of shopping

Level of Education	Frequency	Percentage
Tertiary	110	98.2
Secondary	2	1.8
Total	112	100.0
Occupation	Frequency	Percentage
Employed	61	54.5
Unemployed	6	5.4
Self employed	14	12.5
Retired	1	0.9
Students	30	26.8
Total	112	100.0
Frequency of shopping	Frequency	Percentage
Once a week	43	38.4
2-3 times a month	27	24.1



Once a month	23	20.5
Rarely	19	17.0
Total	112	100.0

Table 3 provides insights into the levels of awareness among male and female consumers regarding various aspects of sustainable development goals related to waste management. The mean scores indicate patterns and differences in awareness across different questions asked.

The mean score for item 1 is 2.45 ± 1.54 for males and 2.19 ± 1.67 for females. Males have a higher awareness level than females regarding superstores being aware of the need to reduce, reuse, and recycle. Item 2 measures awareness of the connection between sustainable development, lifestyles, and nature. Both male and female have mean and standard deviation of 2.34 ± 1.48 , 2.46 ± 1.26 respectively, females have a higher awareness level compared to males. Also, for item 6 males and females have similar awareness levels (means of 2.48 ± 1.49 and 2.44 ± 1.44 , respectively) Furthermore, male and females have low awareness levels for item 1, 2 and 6 respectively.

Additionally, item 3, 4 and 5 have mean scores of (3.10 ± 1.64 , 2.78 ± 1.28), (2.55 ± 1.49 , 2.24 ± 1.29) and (3.22 ± 1.58 , 3.41 ± 1.58) respectively for both male and female indicating that they do not have high awareness level except for item 4 that shows that the female respondents are aware that achieving sustainable development goal would phase out single-use plastic bags for shopping.

Table 3. Level of awareness of SDGs related to waste management

S/N	Description	Male Mean \pm SD	Female Mean \pm SD	Aggregate Mean \pm SD
1	I know superstores are aware of the need to reduce, reuse and recycle	2.45 ± 1.54	2.19 ± 1.167	2.32 ± 1.37
2	I am aware that sustainable development and lifestyles harmonizes with nature	2.34 ± 1.481	2.46 ± 1.255	2.40 ± 1.37
3	I am not aware that good waste management can contribute to the achievement of sustainable cities and communities	3.1 ± 1.64	2.78 ± 1.284	2.95 ± 1.48
4	Achieving sustainable development goal would not phase out single-use plastic bags for shopping	2.55 ± 1.489	2.24 ± 1.288	2.40 ± 1.39
5	Sustainable consumption and production cannot be achieved through waste management	3.22 ± 1.579	3.41 ± 1.584	3.31 ± 1.57
6	I am aware that sustainable development goals targeted to improve living environment	2.48 ± 1.49	2.44 ± 1.436	2.46 ± 1.46
	Mean of Awareness	2.69 ± 1.05	2.59 ± 0.70	2.64 ± 0.89
	Total	16.16 ± 6.29	15.52 ± 4.22	18.48 ± 9.53

Table 4 represents the chi-square table of association between awareness and social demographics.

The chi-square test for gender and awareness yields a chi-square statistic of 37.082 with 19 degrees of freedom. The p-value is 0.08 which indicates that there is no statistically significant association between gender and awareness at 0.05 levels. The chi-square test for marital Status and awareness value is 35.079 with 19 degrees of freedom. The p-value is 0.04, representing a significant association between Marital Status and Awareness.

The chi-square test for level of education, occupation, age and frequency of shopping with awareness shows a chi-square statistic value of 54.98, 250.99, 198.43 and 110.79 respectively. Also, their degree of freedom is 19, 76, 57 and 157 respectively. Additionally, the p-value for the 4 variables is 0.00. There is statistically significant association between level of

education, occupation, age and frequency of shopping with the awareness of sustainable development goals related to waste management.

Table 4. Chi-square table of association between consumer awareness of SDGs in waste management and the socio demographic factors

Awareness	X ²	Df	p-value	Remarks
Gender	37.082	19	0.08	N/Sig
Level of Education	54.982	19	0.00	Sig
Marital Status	35.079	19	0.04	Sig
Occupation	250.993	76	0.00	Sig
Age	198.43	57	0.00	Sig
Frequency of Shopping	110.787	157	0.00	Sig

H01: There is no statistically significant association between consumer awareness of SDGs in waste management and the socio demographic factors in the study.
The null hypothesis is rejected.

Table 5 provides insights into the extent of customer’s engagement in waste management practices.

The mean scores and standard deviation for items 1, 2, 3, 4 and 5 measuring participation in waste reduction and recycling practices while shopping, separation of waste when shopping at Superstores, making conscious choices that align with proper waste disposal while shopping, seeking information and resources related to waste management and advocating for waste reduction at the superstores among friends and family are 2.29±1.38, 2.04±1.23, 2.17±1.29, 2.19±1.35, 2.31±1.29 and 2.68±1.39 respectively. It was revealed that the respondents had a low level of engagement in waste management patterns across the questions asked.

Although, the mean score and standard deviation of item 6 measuring providing feedback or suggestions to Superstores regarding their waste management is 2.68±1.39 reveals that the respondents have an average level of engagement in waste management practices

Table 5. Descriptive statistics of customer’s engagement in waste management practices

S/N	Description	Mean±SD
1	I participate in waste reduction and recycling practices while shopping	2.29±1.38
2	I do not separate waste when shopping at Superstores	2.04±1.23
3	I make conscious choices that align with proper waste disposal while shopping	2.17±1.29
4	I seek information and resources related to waste management.	2.19±1.35
5	I advocate for waste reduction at the superstores among friends and family.	2.31±1.29
6	I provide feedback or suggestions to Superstores regarding their waste management.	2.68±1.39
	Mean of engagement	2.28±0.85
	Total	15.96±6.13
	Aggregate mean±SD	2.28±0.87

Table 6 shows that there is a statistically significant relationship between consumer’s awareness and consumer’s engagement ($r= 0.45, p= 0.00, N=112$). The correlation coefficient (r) indicates a positive moderate relationship between “awareness” and “engagement” suggesting that higher level of awareness is associated with higher level of engagement.

Table 6. Correlation table showing the association between consumer awareness and consumer engagement

Variable	N	R	Interpretation	p-value	Remarks
Awareness VS Engagement			Moderately positive		



112	0.45	0.00	Sig.
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r = Correlation coefficient

The null hypothesis is rejected.

5. Discussion

The results of this study from the first objective suggest that the male and female respondents have differing average levels of awareness on the SDGs related to waste management. Awareness becomes pivotal because it is the primary step to change personal behaviour by influencing its attitude, leading to a willingness to change. For example, the findings from the studies about waste management behaviour of households conducted in Sharjah City, UAE (Hammami et al., 2017), Padang city, Indonesia (Ulhasanah & Goto, 2018) and in Macau, China (Song et al., 2016) which showed the vital role of awareness. Hence, recycling packaging waste is easier when the consumer has acquired a habit of recycling, and correctly sorting of packaging waste material requires knowledge of how to do that (Thøgersen, 1994). Limited knowledge about the problem and how to solve it is a general psychological barrier to engage in sustainable consumer behaviour (Gifford, 2011). Consumers are more likely to engage in a particular behaviour if they believe it will make a difference and contribute to environmental sustainability (Antonetti & Maklan, 2014; Leary et al., 2014). Also, the hypothesis of association between consumer awareness of SDGs in waste management and the socio demographic factors where the p-value for gender indicated not significant that is based on the observed data, there isn't strong evidence to suggest that a relationship exists between customer awareness and sex (gender). This implies that gender might not play a substantial role in determining or influencing customer awareness.

Although, the p-value of level of education, marital status, occupation, age and frequency of shopping indicated a significant association with consumer awareness of SDGs in waste management. This implies that level of education, marital status, occupation, age and frequency of shopping play a substantial role in determining or influencing customer awareness. In line with the findings of the study above, earlier revealed younger generations often have higher levels of environmental awareness, exhibit 'green behaviours' and are more active than older generations on environmental issues (Deliana & Rum 2019). Likewise education that becomes the platform to share facts, information, and values for the targeted community to change behaviour through intrinsic factors in the personal domain (Stern, 1999) as insufficient understanding of the impact of human activities toward their environment might be the cause, as indicated by the studies conducted in China in 2011 (Song et al., 2016), Shanghai in 2014 (Fan et al., 2019), Thailand in 2016 (Janmaimool & Denpaiboon, 2016), and Iran in 2016 (Heidari et al., 2018). Further, the study conducted by Gyimah et al. in 2019, which aimed at examining waste separation practice of Cape Coast Metropolis households in Ghana in 2016, indicated that attitude was also affected by knowledge toward health impacts, perception of time availability, facilities, and technical knowledge toward waste separation. Consequently, a strong and intensive educational program is required to improve both knowledge and attitude (Padilla & Trujillo, 2018).

Further, the results of this study reveals that the respondents have a limited level of engagement in waste management practices judging from their responses. Although, consumers are more likely to engage in a particular behaviour if they believe it will make a difference and contribute to environmental sustainability (Antonetti & Maklan, 2014; Leary et al., 2014). Opportunity is the objective conditions for performing the behaviour (Olander & Thøgersen, 1995). This often relates to convenience in the form of place and time utility. By optimising these conditions, consumers' likelihood of engaging in a given sustainable behaviour becomes higher (Thøgersen, 2005). Also, Consumers face various structural barriers to engage in sustainable behaviour (Verplanken, 2018) and their engagements depend on the actual context. Considering the second hypothesis guiding the study it was evident the higher the level of awareness of the customers on SDGs related to waste management the more their level of engagement in waste management practices. Hence, education is the best intervention to change people's awareness of waste management and encourage them to be involved (Chow et al., 2019).

6. Recommendations

Following the findings of the study the under listed recommendations were considered appropriate:

Waste Management Education: Through the superstore'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. Effective education is often considered as a robust solution to nurture intrinsic factors effectively to improve waste management behaviour (Idamah, 2015; Nnaji, 2015; Oduro-Kwarteng et al., 2016; Choon et al., 2017; Padilla & Trujillo 2018; Kattoua et al., 2019; Lawrence et al., 2020; Nmere et al., 2020). Even though extrinsic factors are available such as infrastructure, there is no assurance that the residents want to participate if they have no proper environmental awareness and technical knowledge toward the activity (Kattoua et al., 2019). The educational system is supposed not only applied to the formal system (such as school-based or college-based education), which is commonly intended for youth (Singer & Song, 2019). The local government should provide an educational system specifically designed for adults as well in the concept of resident-based education. The waste management education will improve specific residents' knowledge to nurture various intrinsic factors needed to improve participation. The educational setting might allow intensive interaction such as face-to-face interaction for better knowledge internalization (Knickmeyer, 2019), involving internet (Padilla & Trujillo, 2018) and learning-by-doing to encourage changing behaviour and improve waste management performance.

Some of the possible ways of reducing the quantity of waste generated include buying products that involve less packaging or buying products in bulk so as to reduce the quantity of materials used for the packaging; making use of reusable items rather than the disposable ones, for instance, the use of handkerchiefs rather than tissue papers, rechargeable batteries, refillable ink pens, etc.; making use of reuseable/cotton/textile bags for shopping rather than plastic bags; maintaining/repairing of damaged products like clothes, leathers, furniture, etc.

A survey of grocery stores in Quebec, Canada revealed that materials such as fruits, baked products, seafood, packaging materials and other frozen products make up a large amount of waste from grocery stores. These wastes are in the form of polymers and plastics which research has shown that they are difficult to manage. Over the last fifty years, plastic has become the packaging material of choice for many of the goods we consume.

Avoiding plastic packaging can be achieved, for instance, by buying packaging free/reduced products (Louis et al., 2021) or products with bio-based or other alternative plastic packaging solutions. Another important strategy of achieving waste reduction is the separation at source (Ugwu et al., 2020). This is achieved by providing separate bins/containers, which are clearly labeled, at designated places of collection or generation points like households, industries, workplaces, commercial areas, offices, etc.

To promote the practice of recycling, regulations in several developed economies mandate retail stores to operate a free 'take back' scheme that allows customers to return to the items they no longer find useful (Modak, 2010). These could include household electrical and electronic appliances, batteries, cell phones, among others. Businesses are expected to take these wastes to designated recycling centres or recycle the items themselves (Wagner, 2007). In some countries, retail stores have also been mandated to display visible posters and banners in their outlets, websites and products packages informing customers of this free waste 'take back'

7. Conclusions

This study focuses on the fact that in a city like Port Harcourt, with several tens of thousands of supermarkets, there is a need to critically examine the waste emanating from the sector to identify the best waste management method. This research assessed Port Harcourt Superstores' contributions to SDGs via consumer waste management behaviors, considering factors such as consumer awareness of SDGs related to waste management and the level of consumer engagement in waste management practices while shopping. It was evident that poor waste management can lead to significant environmental and health hazards. Considering the low level of environmental management awareness in Nigeria, knowledge of environmental management techniques becomes crucial for life sustainability. Through descriptive and quantitative analysis, the research identifies a significant association between consumer awareness of SDGs related to waste management and various socio-demographic factors, indicating that heightened awareness correlates with increased engagement. Specifically, SDG 12: Ensure sustainable consumption and production patterns, and SDG 11:



Make cities and human settlements inclusive, safe, resilient, and sustainable, were emphasized. Waste management is a crucial component of achieving these goals. The research highlights the critical challenge of waste management in Port Harcourt, particularly the generation of refuse across domestic, commercial, and industrial sectors. Superstores, as major contributors to waste, need to adopt environmentally friendly practices to align with sustainable development goals. The study underscores the pivotal role of consumer awareness in shaping shopping and consumption behaviors, especially concerning waste management practices. Environmental consciousness emerges as a driving force behind consumer participation in waste management activities. The findings emphasize the importance of consumer knowledge, particularly regarding plastic packaging waste, in influencing waste reduction efforts. Overall, the study emphasizes the necessity for stakeholders, particularly superstores, to play a proactive role in communicating information and fostering consumer engagement for environmental sustainability in waste management practices. This includes initiatives such as implementing efficient waste collection systems, promoting recycling through a return of PET bottles policy and composting programs, reducing litter and pollution, and investing in waste-to-energy technologies. Ultimately, integrating waste management into urban planning and development is essential for creating sustainable and resilient cities that can support the well-being of present and future generations. Conclusively, the study reveals that the ability to avoid plastic packaging waste particularly depends on the consumer's knowledge and awareness of plastic packaging waste and its consequences, influenced by information communicated from different stakeholders, as residents must understand the benefits of waste management activity for the environment and their role and moral obligation to keep the environment.

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Appendix A

Assessing Port Harcourt superstores' contributions to SDGs via consumer waste management behaviours

Dear Respondent,

This questionnaire is aimed at collecting information that will ensure the publication of “Assessing Port Harcourt Superstores’ contributions to SDGs via consumer waste management behaviours”. Answers will be treated with utmost confidentiality and used for academic and research purposes only. Thank you very much for your profound contribution towards this study.

Esther Joseph Azubuike (Researcher)

Do you wish to participate in this study?

Yes

No

Socio-demographics

Gender

Male

Female

Age Group

18- 33

34-49

50-65

66-81

82 and above

Marital status

Married

Single

Widow/Widower

Divorced/Separated

Level of Education

No Formal Education

Primary

Secondary

Tertiary

Occupation

Employed

Unemployed

Self-Employed

Retired

Student

Frequency of shopping at superstores

Once a week

2-3 times a month

Once a month

Rarely

Awareness Level of SDGs Related to Waste Management

I know superstores are aware of the need to reduce, reuse and recycle

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I am aware that sustainable development and lifestyles harmonizes with nature

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I am not aware that good waste management can contribute to the achievement of sustainable cities and communities

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

Achieving SDG would not phase out single-use plastic bags for shopping

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

Sustainable consumption and production cannot be achieved through waste management

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I am aware that SDGs targeted to improve living environment

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

Consumer engagement in waste management practices

I participate in waste reduction and recycling practices while shopping

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I do not separate waste when shopping at superstores

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I make conscious choices that align with proper waste disposal while shopping

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I seek information and resources related to waste management

Strongly disagree

Disagree

Strongly Agree

Agree

Neutral

I advocate for waste reduction at the superstores among friends and family

Strongly disagree

Disagree

Strongly agree

Agree

Neutral

I provide feedback or suggestions to Superstores regarding their waste management

Strongly disagree

Disagree

Strongly Agree

Agree

Neutral