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# A Study on Waste Reduction Strategies in Plastic Bag Manufacturing, a Focus on Recycling and Circular Economy Practices with Special Reference to Sha Polymers, K.K. Nagar, Chennimalai Road, Erode District- Tamil Nadu

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**ABSTRACT:** An investigation into waste reduction tactics in the plastic bag manufacturing sector is conducted, with an emphasis on recycling and circular economy principles. The abundance of plastic garbage poses a serious threat to the ecosystem, thus taking proactive steps to lessen its effects is imperative. Using an extensive analysis of existing literature and case studies, this study investigates the diverse strategies utilized by manufacturers to reduce waste production, improve recycling programs, and incorporate the ideas of the circular economy into their business processes. Purposive sampling is employed in this descriptive and empirical study. The core data used in the study was gathered using a structured questionnaire. 150 responders who filled out the member stake form were chosen at random using the percentage approach, and the data was analyzed.

**KEYWORDS:** plastic bag, waste reduction, circular economy.

## I. INTRODUCTION

Many methods, with a strong emphasis on recycling and circular economy principles, could arise from a study on waste reduction techniques in the production of plastic bags. This study would probably look into ways to reduce the amount of waste produced during production, make the best use of the resources available, and encourage the use of recycled materials in industrial processes. The core idea of a circular economy would be to establish a closed-loop system where materials are recycled, reused, or otherwise put to better use to lessen their impact on the environment and their need for nonrenewable resources.

### IMPORTANT OF TRENDS AND CHALLENGES FACING THE PP ROLLS AND PLASTIC BAGS:

1. Sustainability: As people's awareness of the environment grows, there is an increasing demand for environmentally friendly packaging solutions. Businesses are trying to find ways to use less plastic and more recyclable or biodegradable materials.
2. Regulatory Pressures: Stricter laws on single-use plastics are being implemented by governments across the globe, which may affect the manufacture and use of polypropylene rolls and plastic bags.
3. Technological Developments: The creation of more sustainable and effective materials is being fueled by advancements in polymer science and manufacturing techniques, which may upend established practices for the production of polypropylene rolls and plastic bags.
4. Changes in Consumer Behavior: As a result of consumers' growing preference for items packaged with sustainable materials, businesses are being forced to modify their packaging tactics to remain competitive.
5. Supply Chain Interruptions: Worldwide occurrences like the COVID-19 outbreak brought to light weaknesses in supply chains, causing hiccups in the manufacture and delivery of plastic bags and polypropylene rolls.

## II. STATEMENT OF THE PROBLEM

Particularly plastics Plastic waste is mostly caused by single-use plastics like straws, bags, and packaging, among other items. Plastic trash disposal is a complicated issue that calls for creative and long-lasting solutions. Improving circularity and creating a solution that can efficiently handle trash from single-use plastics and advance a circular plastics economy present challenges. The solution should consider the possible environmental and social effects of plastic recycling and disposal techniques in addition to addressing the difficulties associated with collecting, sorting,



and recycling plastic waste.

#### **OBJECTIVES OF THE STUDY**

- Investigate cutting-edge methods and technology for lowering waste and encouraging environmentally friendly procedures in the manufacture of plastic bags.
- To examine the effects of introducing waste reduction techniques in the production of plastic bags on the environment, the economy, and society.

#### **SCOPE OF THE STUDY**

- It looks into how to combine cutting-edge recycling technology to recover materials from used plastic bags and use them to make new products.
- The study emphasizes the value of closed-loop systems, which minimize environmental impact and reduce the need for virgin resources by continuously reusing components. Through an examination of case studies demonstrating effective implementations, the research pinpoints optimal methodologies and inventive strategies that firms might embrace to augment sustainability.

#### **LIMITATIONS OF THE STUDY**

- The study may be effective due to different industry standards and practices, challenges in tracking recycled materials throughout the supply chain, and limitations in the availability of comprehensive data on recycling rates and material usage.
- Illiteracy of the respondents during the questionnaire-based data collection.

### **III. REVIEW OF LITERATURE**

The following authors have been published in the Journal of Environmental Management: Victoria Foluke Arijeniwa, Adenike A. Akinsemolu, Deborah C. Nwauzoma, Dinah Awino Kawino, Helen Onyeaka. Urgent action is imperative in response to the growing problem of plastic pollution, especially in the food and beverage (F&B) business, which is a major contributor to single-use plastic waste (SUP).

Orathai Chavalparit Journal of Cleaner Production 391, 136203, 2023; Wilailuk Niyommaneerat, Kultip Suwanteep. An increasing number of businesses have embraced corporate social responsibility (CSR) initiatives that advance diverse societal goals in order to enhance their public perception.

Venkateshwaran Venkatachalam, Merlin Pohler, Sebastian Spierling, Louisa Nickel, Leonie Barner, Hans-Josef Endres, Macromolecular Chemistry and Physics 223 (13), 2200046, 2022.

#### **RESEARCH METHODOLOGY**

This study is being carried out in the Sha Polymers in the Rangaplayam, erode district from April to June 2024 in order to investigate waste reduction measures, recycling, and circular economy practices. Sha Polymers has been chosen as a research area within the plastic bag production sector. The study's conclusion is reached through the use of basic analytical instruments. The procedures for selecting samples, gathering data, and using sampling techniques are covered in detail in this section.

#### **RESEARCH DESIGN:**

A research design is the setup of parameters for data collection and analysis to balance procedural economy with relevance to the research question. Information was gathered from Rangaplayam employees who worked for Sha Polymers.

#### **DESCRIPTIVE RESEARCH DESIGN:**

Research described as descriptive gives a true picture of the features of a certain person, circumstance, or group. These studies are a way to classify information, describe what's there, find out how often something happens, and uncover new meaning. Descriptive research, to put it briefly, examines anything that can be measured and examined that affects the lives of those it examines.

#### **SAMPLE SIZE:**

The sample size is 150 employees in this study.



**DATA COLLECTION METHOD:**

- ✓ Primary data source
- ✓ Secondary data source

**STATISTICAL TOOLS USED:**

- ✓ ANOVA
- ✓ Ranking Method

**ANALYSIS AND INTERPRETATION**

**RANKING METHOD:**

Rank the following recommendations for waste reduction strategies in plastic bag manufacturing with special reference to Sha Polymers and recycling, with 1 being the most important and 5 being the least important

S.NO	FACTORS	TOTAL SCORE	MEAN SCORE	RANK
1	Implementing closed-loop recycling systems to maximize the reuse of plastic bag production.	450	1350	3
2	Investing in research and development to innovative methods for efficiently recycling into high-quality bags.	480	960	4
3	Collaborating with stakeholders across the supply chain to establish standards and guidelines for sustainable usage and recycling in plastic bag manufacturing.	510	510	5
4	Providing incentives for consumers to return used plastic bags for recycling, thereby reducing waste and promoting circularity in the sha polymer industry.	390	1950	1
5	Educating consumers about the environmental benefits of recycling and the importance of responsibly disposing of plastic bags to minimize environmental impact.	420	1680	2

**INTERPRETATION:**

From this study, it is found from the table that,

1. Providing incentives for consumers to return used plastic bags for recycling, thereby reducing waste and promoting circularity in the sha polymer industry is ranked as no.1.
2. Educating consumers about the environmental benefits of recycling and the importance of responsibly disposing of plastic bags to minimize environmental impact is ranked as no.2.
3. Implementing closed-loop recycling systems to maximize the reuse of plastic bag production is ranked as no.3.
4. Investing in research and development to innovative methods for efficiently recycling into high-quality bags is ranked as no.4.
5. Collaborating with stakeholders across the supply chain to establish standards and guidelines for sustainable usage and recycling in plastic bag manufacturing is ranked as no.5

**ONE WAY ANOVA:**

**ANOVA test for age and current level of engagement at work**

**HO=** There are no significant relationship between age and efficiency in current plastic bag manufacturing processes.

**H1=** There are significant relationship between age and efficiency in current plastic bag manufacturing processes.



Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
13	4	137	34.25	907.5833		
2	4	148	37	1021.333		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	15.125	1	15.125	0.015682	0.904433	5.987378
Within Groups	5786.75	6	964.4583			
<b>Total</b>	<b>5801.875</b>	<b>7</b>				

**INTERPRETATION:**

As the p value is lesser than sig.value (0.01 and 0.05) all the 2 case age and efficiency in current plastic bag manufacturing processes currently using the Null hypothesis are accepted.

Hence, it is concluded that there is a statistically significant difference among the age of the respondents with respect to the efficiency in current plastic bag manufacturing processes.

**IV. CONCLUSION**

Conclusively, the study on circular economy and recycling-focused waste reduction strategies in plastic bag manufacturing offers some important findings. Utilizing recycling techniques lowers waste output and raw material consumption considerably throughout the production cycle. By encouraging producers to design items with their end-of-life in mind, a circular economy framework can be implemented, boosting reusability and recyclability. Combining these tactics reduces waste management and raw material prices, which improves economic efficiency while also minimizing the impact on the environment. All things considered, adopting sustainable production methods for plastic bags is not only possible but also essential for realizing long-term financial and environmental gains. Manufacturers, legislators, and consumers must work together to adopt and promote sustainable production practices in order to make this shift.

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**JOURNALS**

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2. Bayramoglu, Gulay the year is 2019. Emphasis: Examines recycling strategies to minimize the waste from plastic bags.

**WESITES:**

1. Entrepreneur: <https://www.entrepreneur.com>
2. Harvard business school: <https://www.hbs.edu>



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