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STUDY ON CIRCULAR ECONOMY BUSINESS MODELS AND THEIR IMPACT ON SOCIETY

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Abstract:

The Circular Economy (CE) reduces waste, promotes resource reuse, and supports sustainability. This study examines how Circular Economy Business Models (CEBMs) enhance environmental sustainability, economic resilience, and social well-being. Key models, including product life extension, resource recovery, and sharing platforms, are analyzed for feasibility and impact. Case studies and data reveal CEBMs' role in responsible production, job creation, and environmental protection. The findings highlight their potential for inclusive growth, resource efficiency, and environmental justice, concluding with policy recommendations to accelerate CE adoption across industries.

Keywords: *Circular Economy and Circular Economy Business Models, Sustainability, Resource Efficiency, Economic Resilience, Sharing Economy*

Introduction:

The **Circular Economy (CE)** offers a sustainable alternative to the linear **"take, make, dispose"** model, which depletes resources and harms the environment. CE minimizes waste by keeping materials in use and regenerating natural systems, fostering innovation, economic resilience, and social well-being.

Circular Economy Business Models (CEBMs) reshape production and consumption by optimizing resources, extending product lifecycles, and promoting reuse and recycling. They challenge the **"use-and-dispose"** mindset, urging businesses to rethink design, manufacturing, and customer engagement. CEBMs help align operations with global sustainability goals, such as the **United Nations Sustainable Development Goals (UN SDGs)**, including **SDG 12: Responsible Consumption and Production**.

There are several types of circular economy business models, each with a distinct approach to sustainability:

1. **Product Life Extension:** This model focuses on extending the lifespan of products through repair, refurbishment, remanufacturing, or upgrading. By keeping products in use longer, companies can reduce the need for new resources and minimize waste, providing significant savings on material costs.
2. **Resource Recovery:** In this model, businesses aim to recover materials from waste streams and repurpose them into new products. It involves recycling, composting, or upcycling, which not only reduces waste but also lessens the demand for virgin materials, mitigating environmental impact and conserving finite resources.

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OPEN ACCESS Original Research Article

3. **Sharing Platforms:** This model facilitates the sharing or leasing of products rather than ownership. It encourages collaborative consumption by maximizing the use of goods through shared access, reducing the overall demand for new products and lowering resource consumption while promoting community engagement.
4. **Product-as-a-Service (PaaS):** In this approach, companies offer products as services rather than selling them outright. Instead of purchasing a product, consumers pay for the service it provides (e.g., leasing or renting). This shifts the responsibility for product maintenance, repair, and eventual disposal back to the manufacturer, driving innovation in durability and efficiency while reducing consumer waste.

The shift to **Circular Economy Business Models (CEBMs)** transforms business operations with broad societal impacts. These models enhance sustainability by reducing waste and conserving resources while creating economic opportunities, promoting social inclusion, and encouraging responsible consumption. This study explores how CEBMs drive sustainable development, generate green jobs, and tackle challenges like climate change and resource scarcity.

Working definitions of the terms used -

1. **Circular Economy (CE):**
   A regenerative economic system that eliminates waste and maximizes resource use. CE promotes reuse, refurbishment, remanufacturing, and recycling to keep materials in circulation longer, reducing environmental harm and resource depletion.
2. **Circular Economy Business Models (CEBMs):**
   Business strategies that align with CE principles by minimizing waste, extending product life, and improving resource efficiency. CEBMs emphasize sustainable production, repairability, recyclability, and service-based consumption.
3. **Sustainability:**
   Meeting present needs without compromising future generations. In CEBMs, sustainability focuses on reducing environmental impact, conserving resources, and encouraging responsible production and consumption.
4. **Social Inclusion:**
   Ensuring equal access to economic, social, and cultural opportunities, particularly for marginalized groups. In CEBMs, this means equitable job opportunities, affordable services, and reducing social disparities.
5. **Economic Resilience:**
   An economy's ability to withstand and recover from disruptions. CE fosters resilience by reducing dependence on virgin resources, generating jobs, and supporting sustainable business practices.
6. **Upcycling:**
   Transforming waste into higher-value products. Unlike recycling, which may degrade material quality, upcycling enhances waste by creating more useful or aesthetically appealing items.
7. **Green Jobs:**
   Employment in sectors that restore or protect the environment, such as renewable energy and sustainable agriculture. CEBMs drive green job creation by embedding sustainability in business practices.
8. **Responsible Consumption and Production:**
   Using resources efficiently to meet needs while minimizing waste and environmental impact. Central to CE, it promotes sustainable business and consumer behavior.

Research Methodology:

Meaning of Research Methodology:

This study used a survey to assess awareness and usage of Circular Economy (CE) products among individuals

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Volume–XIV, Special Issues– II Jan – Feb, 2025

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aged 18–25. Questionnaires captured data on consumer knowledge, attitudes, and behaviors, with findings analyzed to identify trends and barriers.

Research Design:

Research design encompasses the general approach that a researcher uses to integrate different components of a study logically and coherently. It provides a blueprint for conducting research and serves as a roadmap for the entire research process.

Need of the Study:

Resource depletion, climate change, and waste highlight the need for sustainable models. Circular Economy Business Models (CEBMs) offer a solution, promoting environmental benefits, job creation, and social equity. However, gaps remain in their long-term impact, scalability, and feasibility. This study explores consumer adoption challenges, policy roles, and CEBMs' overall impact, aligning with global sustainability goals and fostering a resilient economy.

Research Problem Statement:

Despite the growing recognition of circular economy (CE) business models as a sustainable alternative, there is limited empirical research on their tangible impacts on economic growth, environmental sustainability, and social equity. This study aims to explore how CEBMs influence these societal dimensions, identify barriers to their widespread adoption, and evaluate the implications for businesses and policymakers in promoting a more sustainable and equitable economic system.

Research Objective:

The study was designed to accomplish the following objectives:

1. To understand the circular economy principles and business models compared to traditional linear models.
2. To assess the impact of circular economy models on customer behavior, satisfaction, and societal benefits.
3. To evaluate the economic and environmental benefits of circular economy practices for businesses and society.
4. To explore future trends, opportunities, and technological advancements facilitating circular economy practices.

Statement of Hypothesis :

This study hypothesizes that the adoption of Circular Economy Business Models (CEBMs) positively impacts environmental sustainability and social equity, leading to improved resource efficiency, job creation, and enhanced access to sustainable products and services. Additionally, it is expected that effective regulatory frameworks and consumer engagement strategies will significantly influence the successful implementation and scalability of CEBMs across various industries.

Scope of the Study:

1. **Awareness Assessment:** Evaluates awareness of Circular Economy concepts across demographics (age, gender, education, location).
2. **Product Usage:** Examines the adoption of recyclable, reusable, and shared products.
3. **Consumer Attitudes:** Analyzes perceptions, adoption barriers, and purchase influences.
4. **Behavioral Patterns:** Identifies trends in sustainable consumption and circular product engagement.
5. **Societal Impact:** Assesses environmental, social, and economic benefits of Circular Economy adoption.

Data Collection Methods:

The researchers used a combination of primary as well as secondary data collection methods to complete the study.

PRIMARY:

The primary data was collected through an online close-ended questionnaire which was made with the

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AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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help of Google Forms. The questionnaire was circulated to diverse age groups of people.

An open-ended questionnaire was also administered through personal interviews with the people working at the Pune Handmade Papers Shop and Factory at KB Joshi Path, Narveer Tanaji Wadi, Shivajinagar, Pune, Maharashtra 411005.

We observed the processes involved in making sustainable products in the factory.

SECONDARY:

Various sources were referred to gather secondary data for the survey. These sources include:

- Research Papers/Journals
- Government Websites
- News Articles
- Books and Publications

Sampling:

Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population by making use of certain tools.

For the purpose of close-ended sampling (Google Form Questionnaire), the researchers have applied the method of simple random sampling.

For the purpose of open-ended sampling (Personal Interviews), the researchers have applied the method of convenience sampling.

Sample Size:

The sample size for the questionnaire administered to people from diverse age groups is hundred and five (105)

The sample size for the personal interviews conducted is one (1) which is the Pune Handmade Papers Factory and Shop.

Limitations of the Study:

1. **Scope of Discussions**: Limited prior experience in research and academic writing may have impacted the depth of discussions, though every effort was made to maintain research quality.
2. **Sample Scope**: The survey focuses on young adults (18–25), which may limit the generalizability of findings to broader demographics.
3. **Geographic and Industry Scope**: Regional or industry-specific focus may restrict the applicability of findings to wider contexts.
4. **Methodological Bias**: If qualitative methods were used, findings could be influenced by researcher bias or participant perspectives, affecting reliability.

Review of Literature:

1. **Defining Circular Economy and Business Models**

   The **Circular Economy (CE)** aims to decouple growth from resource use by eliminating waste, extending product life, and regenerating natural systems. CE business models replace linear processes with **recycling, remanufacturing, sharing economies, and Product-as-a-Service (PaaS)**. **Product Life Extension** reduces resource demand through repair and remanufacturing, while **Resource Recovery** focuses on recycling to limit virgin material use. **Sharing Platforms**, like ride-sharing, encourage collaborative consumption, and **PaaS** fosters durable, repairable product designs by retaining company ownership.

2. **Socio Economic Benefits of CEBMs**

   Circular Economy Business Models (CEBMs) generate jobs in **resource recovery, remanufacturing, and repair** while reducing reliance on finite resources. Community-based CE practices promote **social inclusion** by providing jobs and affordable goods for marginalized groups. By addressing **resource scarcity**, CEBMs enhance supply chain stability and lower risks.

3. **Environmental Impacts of CEBMs**

   Circular Economy Business Models (CEBMs) reduce waste, resource use, and emissions by extending product lifecycles and promoting recycling. They help combat climate change by

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AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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lowering industrial emissions and improving energy efficiency. However, rebound effects from cost savings may drive higher consumption, highlighting the need for consumer education and regulation.

4. **Challenges in Adopting CEBMs**
   Key challenges include **high initial costs, infrastructure gaps, and consumer reluctance** due to ownership and quality concerns. Regulatory barriers favoring linear systems also hinder adoption, requiring **government support, incentives, and policy updates**.
5. **Societal Impact of CEBMs**
   Circular Economy Business Models (CEBMs) support **environmental justice, green jobs, and sustainable lifestyles**. Recycling and repair jobs strengthen local economies and resilience, while promoting **responsible consumption and sustainability**.

Conclusion:

CEBMs offer environmental, economic, and social benefits, but their potential depends on overcoming challenges such as consumer behavior, economic feasibility, and policy barriers. Future research should focus on scaling CEBMs and assessing their long-term societal impacts.

Research Gap:

Research on Circular Economy Business Models (CEBMs) reveals key gaps: a lack of long-term data on environmental and social impacts, limited scalability studies, and insufficient understanding of consumer adoption barriers. Policy frameworks, including tax incentives and EPR, remain underexplored, as do potential rebound effects. Lastly, while technologies like IoT and AI support circular models, their integration, costs, and risks need further research.

Analysis and Interpretation of the Data:

Analysis and Interpretation of the Data through Interview:

The Pune Paper Factory, established in 1940, has been a pioneer in the recycling industry by producing high-quality paper from textile waste, specifically long-fibered cotton cut-offs sourced from textile factories. This makes their paper superior in both strength and durability compared to mill-made wood pulp-based paper, which often contains chemicals and acids. Cotton fibers, known for lasting over 100 years without significant fading or deterioration, further enhance the quality of their products. By using cotton waste that would otherwise end up in landfills, the company adheres to sustainable circular economy practices.

Their primary customers include universities and companies seeking premium, customized products such as certificates, diaries, and paper bags. While the paper's uniqueness makes it 3-4 times more expensive than regular paper, many customers have become loyal, appreciating the superior quality and sustainability.

However, the company faces challenges in expanding its market due to high prices, limiting its customer base to high-end buyers. They have benefited from government funding and higher profit margins, but they do not advertise heavily, as they feel individuals may not purchase expensive paper for personal use.

Looking ahead, Pune Paper Factory plans to make its products more affordable and target younger audiences and the growing gifting market, while continuing to emphasize sustainability and quality.

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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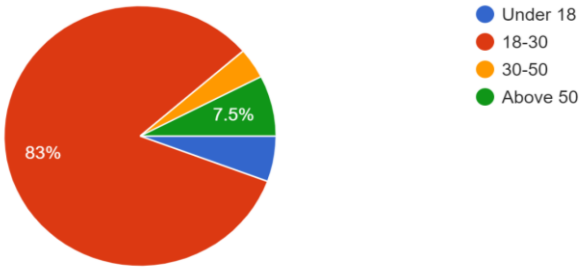
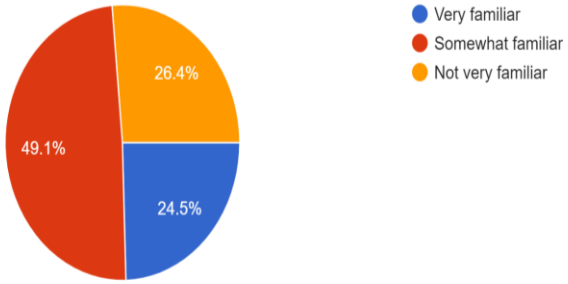
Analysis and interpretation of data gathered through open-ended questionnaire:

Age Groups - We can observe that the majority of the people who have answered the survey are youngsters.



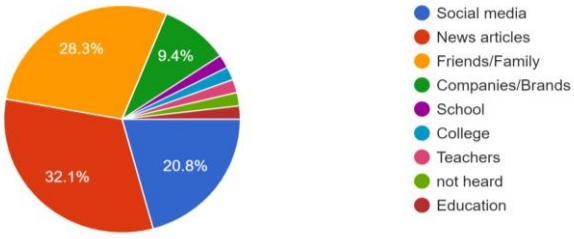
1. **Awareness about the concept of Circular Economy Business Models**



- **50% of people** are somewhat familiar with the concept of a circular economy.
- **25% are very familiar**, and **25% are not very familiar**.

  From this, we conclude that a significant portion of people (around 75%) have at least some awareness of the circular economy.

2. **Sources of knowing the concept of Circular Economy Practices**



- **32%** learned about circular economy practices from **news articles**.
- **28%** were informed by **friends and family**.
- **20%** discovered it via **social media**.
- **9%** learned about it through **brands**.

This suggests that traditional media like news articles play a major role in spreading awareness, followed by personal networks and social media. Brands, while contributing, seem to have less of an impact in spreading the message directly.

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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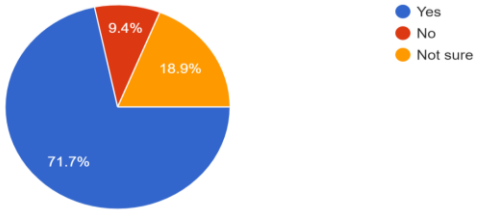
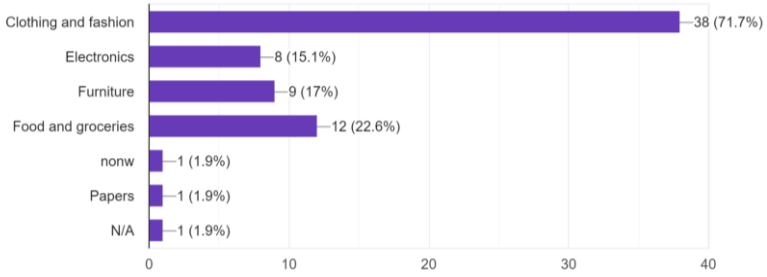
3. **Purchasing from a business that follows circular economy practices (eg.recycling, product-as-a-service, reuse)**



Based on the data collected, it appears that a significant majority of people—71%—have purchased sustainable products. The remaining 29% either are unsure or have not made such purchases.

This indicates a positive trend towards sustainability, with most consumers actively engaging in eco-friendly purchasing decisions. The remaining portion represents an opportunity for further education and encouragement, perhaps targeting those who are unsure about what constitutes a sustainable product or its benefits.

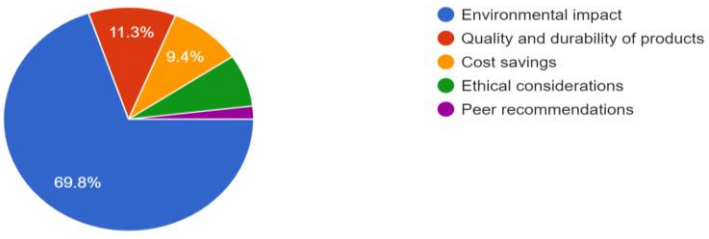
4. **Type of products or services have been bought from circular economy businesses**



- Fashion: Many consumers are turning to sustainable and circular fashion choices, like recycled or second-hand clothing.
- Food and Groceries: Sustainable food products, including organic or locally sourced options, are popular.
- Electronics: Consumers are purchasing refurbished or recyclable electronics, which fit within the circular economy framework.

  This shows a growing trend across diverse industries, indicating that circular economy principles are becoming more mainstream in various aspects of consumer life.

5. **Motivation to choose a business with circular economy practices**



ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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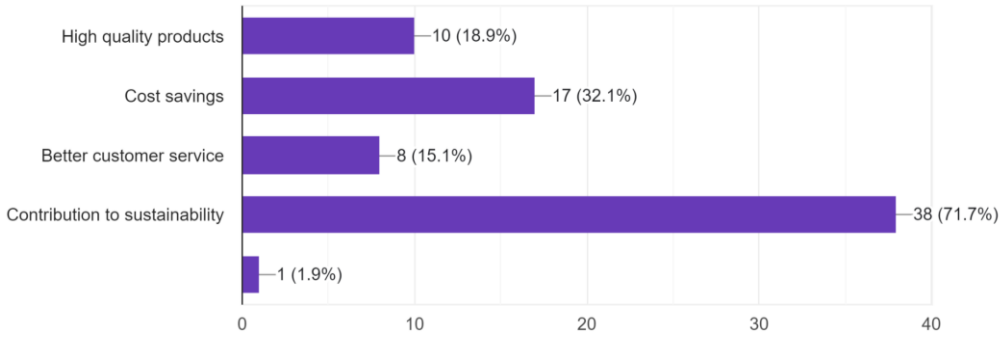
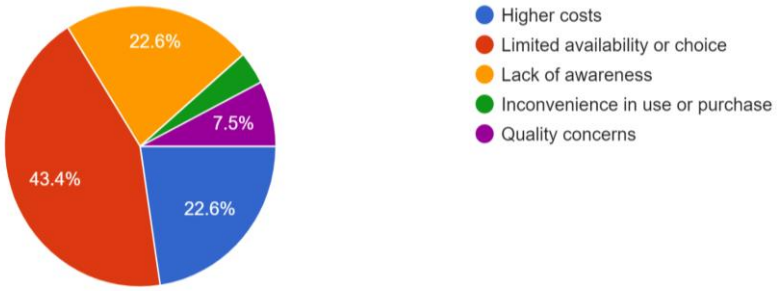
From our observation, it's clear that **70%** of people are concerned about the **environmental impact** of their purchases. This environmental consciousness seems to be driving their decision to choose **sustainable products**. This insight highlights that environmental concern is a key motivator for sustainable purchasing behavior. As people become more aware of issues like climate change, resource depletion, and waste, they are likely to favor products that align with their values.

6. **Benefits have been experienced from purchasing from circular economy businesses**



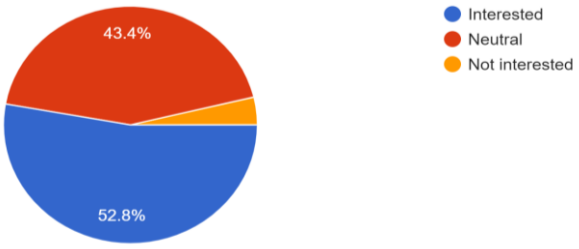
Sustainability contribution: The biggest benefit is contributing to environmental sustainability.
Cost savings: Many experience long-term savings through durability and efficiency.
High-quality products: Sustainable products are often viewed as better made and longer-lasting.

7. **Main challenges or barrier you face when choosing circular economy products or services**



One of the major barriers to choosing circular economy products or services is limited availability (43%), followed by lack of awareness and higher costs (22.6% each). These challenges highlight areas where improvements in accessibility, education, and affordability could drive more widespread adoption of sustainable options.

8. **Interest in learning more about circular economy practices and their benefits**



ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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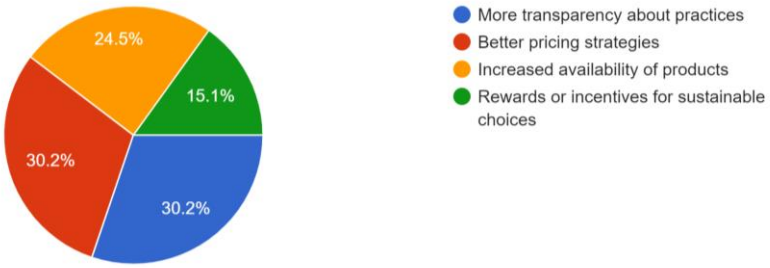
43% of people are neutral about sustainability practices, while 52% are interested. This suggests that while most people show interest in sustainability, there is still a significant portion who remain indifferent, representing an opportunity for further engagement and education on sustainable practices.

9. Actions that can be taken for circular economy businesses to increase engagement and trust



Approximately 30.2% of people want greater transparency regarding sustainability practices and better pricing strategies. This highlights the need for clearer communication about the environmental impact of products and more competitive pricing to encourage wider adoption of sustainable choices

10. Additional Comments / Suggestions from the interviewee

Here are the additional suggestions gathered from people regarding circular economy businesses:

1. **Expand Awareness and Education** – Use modern marketing strategies and educational initiatives to increase public understanding of circular economy practices, emphasizing their benefits for both businesses and the environment.
2. **Showcase Value and Transparency** – Highlight comparative data on sustainability and cost advantages, improve transparency in pricing and environmental impact, and build trust through clear communication.
3. **Enhance Consumer Appeal** – Provide incentives such as discounts or rewards to encourage sustainable choices, while ensuring product designs prioritize durability, repairability, and long-term value.
4. **Commit to Innovation and Sustainability** – Continuously improve product quality, refine processes to reduce environmental impact, and innovate to meet evolving consumer needs and sustainability goals.

Testing of Hypothesis:

Formulation of Hypotheses:

- Null Hypothesis (H_0): There is no significant relationship between consumer awareness, product availability, and purchase decisions for circular economy products.
- Alternative Hypothesis (H_1): There is a significant relationship between consumer awareness, product availability, and purchase decisions for circular economy products.

Data Collection and Analysis:

- Collect survey data on consumer awareness, availability of circular economy products, and purchasing behavior.
- Analyze the impact of factors like limited availability (43%), interest in sustainability practices (52%), and pricing transparency (30.2%) on consumer decisions using statistical tests like chi-square or regression analysis.

Conclusion:

- Based on the statistical analysis, determine whether to reject or fail to reject the null hypothesis. If the data shows a significant impact of awareness,

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AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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availability, and pricing on purchasing behavior, the alternative hypothesis is supported.

Findings and Conclusions:

Findings: The data reveals key insights into consumer behavior towards circular economy products. A major barrier is limited availability, with 43% of respondents struggling to find such products. Additionally, 22.6% cite lack of awareness and high costs, highlighting the need for better communication and pricing strategies.

However, 52% express interest in sustainability, and 71% have already purchased sustainable products, indicating a strong consumer drive towards responsible choices. Furthermore, 30.2% demand greater transparency in sustainability practices and clearer pricing strategies, emphasizing the need for comparative data on sustainable vs. traditional products.

These findings suggest that enhancing awareness through modern marketing and addressing concerns about availability, transparency, and pricing could accelerate the adoption of circular economy products, benefiting both businesses and consumers.

Conclusion:

The study found a gap between awareness and adoption of Circular Economy (CE) products among individuals aged 18-25. While many understood recycling and reusing, actual usage was low due to cost, convenience, and availability barriers. Despite this, attitudes toward CE were positive, indicating potential for growth through education, marketing, and accessibility improvements. Policy interventions like subsidies could further boost adoption. However, the study's limited sample size highlights the need for broader research. Overall, enhancing consumer education, policy support, and accessibility is key to bridging the awareness-adoption gap.

Suggestions: Future research should expand geographic and industry scope for broader applicability. Collaborating with businesses, governments, and industry bodies can improve data access. Longitudinal studies will offer deeper insights into sustainability. Standardizing definitions and measurement criteria will enhance comparability. Mixed-method approaches can balance qualitative and quantitative data, while considering economic and policy factors will provide a more comprehensive perspective on circular economy outcomes.

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AMIERJ Aarhat Multidisciplinary International Education Research Journal

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Pictures of the Visit:

Image of the Team Members at the Handmade Paper Factory

The process of drying paper made from waste cotton

The machine used to make flat paper

Process of making the paper

Paper Mesh

Cotton Grinding Machine

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AMIERJ Aarhat Multidisciplinary International Education Research Journal

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Products for Sale

Entire Process Explanation

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