A study of consumer perception towards eco-friendly drinkware

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Abstract **- This study is being carried out in order to learn and be conscious of the adverse environmental consequences of plastics, and our product, temperature-controlled mug, is made of magnesium alloy metals, which are environmentally safe and easily degrade.**

Green goods, such as those that are long-lasting, recyclable, non-toxic, and composed of decomposable materials, have witnessed a surge in demand as a result of rising consumption. Because of a growth in ecological consciousness, consumers are becoming increasingly concerned about the environment and seeking for green products. The biggest cause of environmental damage is population growth and our consuming habits.

The research findings and future research efforts provide up a new path for more research and contribution to the field.

Key words: **Disposable cups, Eco-friendly, Plastic, Smart mug, Sustainable, Temperature-controlled mug**

I. INTRODUCTION

Eco-friendly drinkware refers to cups, bottles, and other vessels that are designed to minimize environmental impact. These products are often made from sustainable materials such as bamboo, recycled plastic, or glass and are designed to be reusable, reducing the need for single-use products like plastic water bottles.

Consumer protection towards eco-friendly drinkware is important because there are many products on the market that claim to be eco-friendly but may not actually meet environmental standards or may not be safe for consumers to use. As such, there are various regulations and standards that govern the production and sale of eco-friendly drinkware.

Our SMART temperature-controlled mug is made up of magnesium alloy metals which are environmentally friendly and can easily decompose. It is also light weight and easy to carry it is designed with a wireless portable charger and it is suitable for any age group, anything can be easily heated or cooled without changing the taste of the drink. Our product prioritises both the preferences of the consumers and the environments safety.

In the United States, the Federal Trade Commission (FTC) regulates the advertising and marketing of eco-friendly products, including drinkware. The FTC's Green Guides provide guidance on how companies can make environmental claims in their marketing materials while still adhering to federal laws and regulations.

In addition to government regulations, there are also various third-party certification organizations that certify eco-friendly products. These organizations include the Forest Stewardship Council (FSC), the Rainforest Alliance, and the Sustainable Forestry Initiative (SFI), among others. These organizations provide independent verification that products meet certain environmental standards.

Overall, consumer protection towards eco-friendly drinkware involves a combination of government regulation, third-party certification, and consumer education. By being informed about the environmental impact of products and understanding the regulations and certifications that govern them, consumers can make informed purchasing decisions that support sustainability and protect the environment.

II. RESEARCH QUESTIONS

What are the consumer perceptions of eco-friendly drinkware, and how do these perceptions influence their purchasing decisions?

What are the most important factors that consumers consider when purchasing eco-friendly drinkware, and how do these factors vary by demographic group?
What are the environmental and health benefits of using eco-friendly drinkware, and how can companies communicate these benefits to consumers effectively?
What are the most common types of eco-friendly drinkware on the market, and how do they compare in terms of environmental impact, safety, and durability?
What are the regulatory frameworks that govern the production and sale of eco-friendly drinkware, and how effective are these frameworks in protecting consumers and the environment?
How do third-party certifications, such as those provided by the FSC or Rainforest Alliance, influence consumer perceptions of eco-friendly drinkware, and do these certifications actually indicate a lower environmental impact?
What are the ethical considerations that companies should take into account when producing eco-friendly drinkware, and how can they ensure that their products are both environmentally sustainable and socially responsible?
What are the current trends in eco-friendly drinkware, and how are companies innovating to create more sustainable and effective products?
How can consumer education and awareness be improved to encourage more sustainable purchasing behaviours when it comes to drinkware?
What are the challenges and opportunities facing companies that produce eco-friendly drinkware, and how can they best navigate these issues to create products that are both environmentally sustainable and financially viable?

Need for the study

There is a need for studying consumer protection towards eco-friendly drinkware for several reasons:
Protecting consumers: Consumers have the right to purchase products that are safe and effective, and eco-friendly drinkware is no exception. By studying consumer protection, we can ensure that products are tested for safety and durability, and that any environmental claims made about them are accurate and substantiated.
Promoting sustainability: Eco-friendly drinkware is an important tool for promoting sustainability, as it reduces the amount of waste generated by single-use products like plastic water bottles. By studying consumer protection, we can encourage the production and purchase of eco-friendly products, which can have a positive impact on the environment.
Encouraging innovation: As consumer demand for eco-friendly products increases, companies are incentivized to innovate and develop new and more effective products. By studying consumer protection, we can encourage this innovation and ensure that products are both environmentally sustainable and financially viable.
Supporting policy development: Consumer protection research can provide important insights into the effectiveness of current regulations and policies, and can inform the development of new policies that better protect consumers and the environment.
Overall, studying consumer protection towards eco-friendly drinkware is essential for promoting sustainability, protecting consumers, and encouraging innovation in the development of eco-friendly products.

Problem statement

Despite the increasing popularity of eco-friendly drinkware, there is a lack of clear and consistent regulations governing the production and sale of these products, which can result in inaccurate or misleading environmental claims, potential health hazards, and consumer confusion. This lack of regulation creates a significant problem for consumers who want to make informed purchasing decisions and for companies who want to produce and market eco-friendly products in a responsible and effective way. As such, there is a pressing need to develop and implement effective regulatory frameworks and consumer protection measures that ensure the safety, effectiveness, and accuracy of eco-friendly drinkware products while promoting sustainability and innovation.
The use of eco-friendly drinkware has become increasingly popular in recent years as consumers seek to reduce their environmental impact and promote sustainability. However, there is a lack of clear and consistent information and standards regarding the safety, effectiveness, and environmental impact of these products, which can result in confusion and potential harm to consumers. This lack of information and standards creates a significant problem for consumer protection, as consumers may unwittingly purchase products that do not meet environmental or safety standards, or may not have accurate information about the

environmental benefits of these products. As such, there is a pressing need to develop and implement effective regulatory frameworks, third-party certifications, and consumer education programs that ensure the safety, effectiveness, and environmental benefits of eco-friendly drinkware products while protecting consumers from misleading or false advertising claims.

III. REVIEW OF LITERATURE

As the world grows more aware of the crucial importance of environmental stewardship, we are beginning to notice some intriguing developments in regards to how the food and beverages are served. When compared to typical, throwaway solutions, eco-friendly drinkware has multiple benefits. Eco-friendly drinkware are made from renewable and sustainable materials like bamboo, glass, and stainless steel, rather than toxic and plastics that are not biodegradable. Unlike other existing products, our SMART Mug employs insulation and electricity from a thermoelectric cooler to maintain a chosen temperature of a hot or cold beverage for extended periods of time. These materials are also washable and durable, so you will not have to replace them for a long time.

1. Hussain F. Alsaif (2018): The author in his research introduced smart mugs that are capable of maintaining a perfect temperature of the beverages for a longer period of time. A double-walled mug with exterior steel and the inside being copper cylinders is the proposed design. Because of the negative environmental effects of disposable cups, this project tries to limit their use.

2. Spyros Foteinis (2020): The United Kingdom alone consumes over 7 million disposable paper cups each day and generates approximately 30,000 tonnes of paper cup garbage yearly. According to the waste hierarchy and the European Commission's ambitious Circular Economy Action Plan, less than 1 in 400 paper cups are now recycled in the United Kingdom. This leads to (micro)plastic trash and may pollute the waters of the planet. Consumption and minor everyday decisions, such as utilising reusable cups or bags instead of their disposable equivalents, may have a significant impact in climate change, according to the findings. Unfortunately, no specific steps to reduce the excessive use of paper cups have been implemented, and decision- and policy-makers prefer to intervene only when environmental issues attract broad concern.

   This article investigates the environmental impact of paper cup production, usage, and disposal. Using the IPCC 2013 LCIA approach, the carbon footprint of a typical paper cup made in the United Kingdom and disposed of in a sanitary landfill was calculated. It was determined that each FU emits 29.85 g of carbon dioxide equivalents (CO_2eq), with 63% attributable to the production process and 37% attributable to its disposal. The large contribution of the disposal process may be related to emissions from the anaerobic breakdown of paper in landfills, which creates a combination of carbon dioxide and methane in equal proportions. It will take tens to thousands of years for the petroleum-based plastic layer to degrade in a landfill. The comparative examination of these two scenarios might allow decision-makers and policymakers, as well as the general public, to advocate for more ecologically sustainable solutions to the problem of throwaway (paper) cups and other SUP products.
   Compared to landfilling, this study indicated that large-scale paper cup recycling programmes might lower the environmental footprint by up to 40%. Reusable cups are more ecologically friendly than disposable cups, and converting to reusable cups may reduce carbon emissions by up to three times. In the United Kingdom, the European Union, and elsewhere, no tangible steps have been taken to reduce the excessive use of paper cups or to implement large-scale recycling programmes. The suggestion by the European Commission to reduce SUP goods, including paper cups, is too little, too late. Consumerism and simple everyday decisions, such as adopting reusable cups or bags instead of paper cups and single-use plastic bags, may have a significant impact on climate change.

3. Haonan Wang (2020): The current issue is that those who wish to consume warm beverages at the workplace do not have access to gadgets such as microwaves. Original idea Electric Thermos Box attempted to tackle the issue by building a heating box with connected heating pads. To increase the heating effectiveness of

the original invention, we decided to build a self-heating cup with a coaster that could be attached. Our solution is substantially smaller than the original project and requires significantly less time to heat. We have designed our product in a way that eliminates the need for a built-in battery, which reduces safety concerns. Additionally, the majority of the printed circuit boards (PCBs) are placed in the coaster instead of the mug. We have also added silicone heating pads to the side of the mug to ensure that the liquid is heated evenly and to enhance the overall sipping experience.
Three units comprise the design of a self-heating cup: the power unit, the heating unit, and the control unit. The power unit accepts the normal 110V AC input voltage, while the heating unit comprises silicone heating pads and a heating base. A temperature sensor is used to detect the beverage's temperature within the cup. The control unit executes the logic necessary for the system to function and also ensures user safety. It is in charge of the I/O interface between the design and the user, making the design user-friendly.

4. Martin B. Hocking (1994): Five distinct varieties of reusable and disposable hot beverage cups have been thoroughly studied in terms of their overall energy consumption during production and usage. It has been determined that electricity generation techniques and efficiency have a significant role in the main energy consumption for washing reusable cups, but play a lesser role in cup manufacture. It was discovered that paper cups used once and discarded utilize less fossil fuel energy per use than all other cup types evaluated. The study demonstrates that the break-even points are not as sensitive to variations in this parameter as they are to variations in the energy necessary for washing and sanitizing reusable cups and the energy required for fabricating disposable cups. The procedures employed are described in sufficient detail to allow comparisons with any other input data to be easily inputted and analysed considering the results obtained here.

5. Chang, Alber (2011): This article analyses the ecological and social consequences of single-use coffee cups and suggests solutions to the problem by providing examples of adjustments made in various locations. It begins with a life cycle analysis of the paper cup, which highlights the three separate phases of production: raw material extraction, material processing and manufacture, and disposal. The report then examines improvement examples from other regions of the world and closes with four recommendations to mitigate the effect. The first step is to tackle the systematic recycling problem in British Columbia, and the proposals indicate that the government should enact rules and regulations to prohibit the use of disposable coffee cups and stimulate the use of reusable coffee mugs.

6. Hanna Ziada (2009): Every day, one million paper coffee cups are shipped to a landfill from Toronto, which is unsustainable. By examining several Solid Waste Management Systems in Ontario, this study examines the recyclability of the industry standard polyethylene lined paper coffee cup. Life cycle evaluation methodologies are used to examine biodegradable cups, Styrofoam cups, and reusable mugs as alternatives to the existing industry standard disposable cups. The planned waste reduction strategy's target group is regular coffee customers, as defined by IPSOS Reid survey data obtained in 2008 for 700 sample Toronto residents. The city has been entrusted with continuing research and pilot studies into effective methods of encouraging source reduction of hot drink cups at the retail level, in accordance with the city's goals.

7. Chang, Albert (2011): Reusable and disposable coffee cups should be examined for the green vending machine based on environmental, social, and economic concerns. The report evaluates the suitability of paper, ceramic, plastic, and stainless steel as materials for coffee mugs that can be carried around, as well as the energy consumption of vending machines. The methods utilized in this study were drawn from academic literature and trustworthy online sources. Paper cups generate a lot of garbage, but their use may be minimised with the right measures. Plastic mugs contain a variety of consumer benefits, yet they may be dangerous owing to Bisphenol A. Stainless steel mugs are long-lasting and do not offer any significant health risks, but they consume a lot of energy and emit a lot of CO2s.

IV. RESEARCH METHODOLOGY

Objectives of the Study

1. To observe if consumers know about the eco-friendly products.
2. To examine the relationship between age groups of the respondent and the usage of Eco-friendly products.
3. To examine the relationship between educational level of the respondent and the usage of
4. Eco-friendly products.
5. To what extent, consumers are willing to pay higher prices for the environmentally friendly products.

Hypothesis

Consumers are increasingly interested in and willing to purchase eco-friendly drinkware due to growing environmental concerns and awareness. The availability of a wide range of eco-friendly drinkware options, along with the convenience of purchasing and using them, will positively influence consumer behaviour towards sustainable products. Additionally, businesses that promote eco-friendly drinkware and provide incentives for its use can further encourage consumers to make the switch from traditional drinkware to more sustainable options. In recent years, there has been a growing awareness of environmental issues, including the negative impact of single-use plastics on the planet. As a result, consumers are becoming increasingly interested in eco-friendly alternatives, including eco-friendly drinkware. This trend is expected to continue as people become more conscious of their individual environmental impact.

Consumers are motivated to use eco-friendly drinkware for a number of reasons. Firstly, it helps to reduce the amount of plastic waste produced, which is a major contributor to pollution and environmental damage. By choosing eco-friendly options, consumers can feel that they are making a positive contribution towards a more sustainable future.

Secondly, many eco-friendly drinkware options are made from materials that are reusable and durable, such as bamboo, glass, and stainless steel. This can lead to cost savings over time, as consumers do not have to continually purchase new single-use drinkware. Additionally, these materials can provide a better taste experience compared to plastic, leading to a more enjoyable drinking experience.

Another factor that can influence consumer behaviour towards eco-friendly drinkware is the convenience and availability of these options. With more and more brands and retailers offering eco-friendly drinkware, it has become easier than ever for consumers to make the switch from traditional drinkware to more sustainable options. Additionally, the convenience of purchasing and using these products can further incentivize consumers to adopt more sustainable habits.

Research approach - survey

Population - 30 people

of age group 20 -40, in Bengaluru, in which 70% are male and, 30 % are female

Sampling method - stratified sampling

Sample size - out of 500 people available in the area we choose 30 people and did a survey through questionnaire where the man to woman ratio was 70 to 30

Data collection method - Questionnaire

Data collection analysis - we did a survey of 30 people in which 70% were man and 30% were woman.

In this survey we asked the people whether they would choose temperature controlled mug / tumbler / thermos flask / disposable cups where majority people chose temperature controlled mugs and others preferred glass or stainless-steel mugs.

Some people were even ready to pay premium prices for eco-friendly mugs.

V. Data Analysis

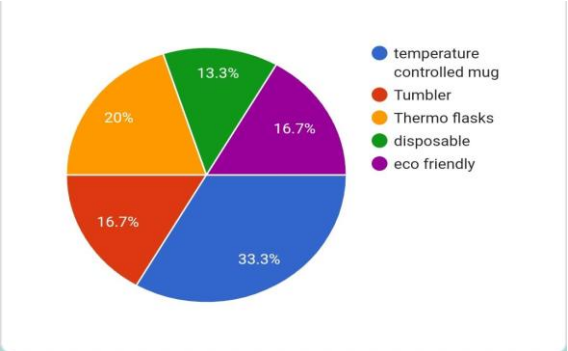

Fig 1.

From fig. 1 We found out that 33.3% people selected temperature controlled mug and 16.7% of people preferred eco-friendly and tumbler as for their daily used drinkware. 13.2% and 20% people preferred thermos flasks and disposable cups. Majority of the people selected temperature controlled mug.

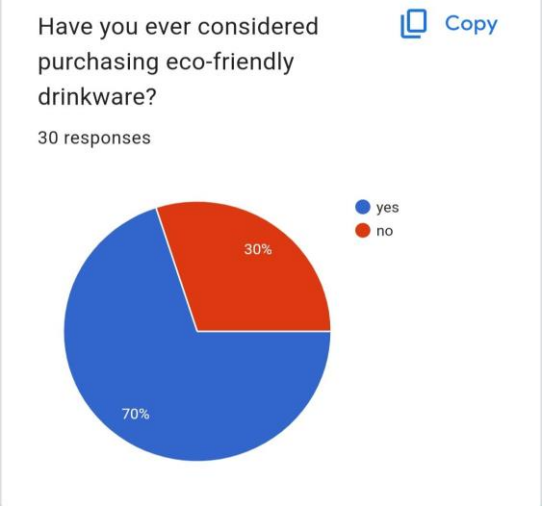

Fig 2.

Secondly, when asked, if they considered purchasing eco-friendly drinkware, 70% of the people selected yes and agreed for an eco-friendly product and 30% people said no.

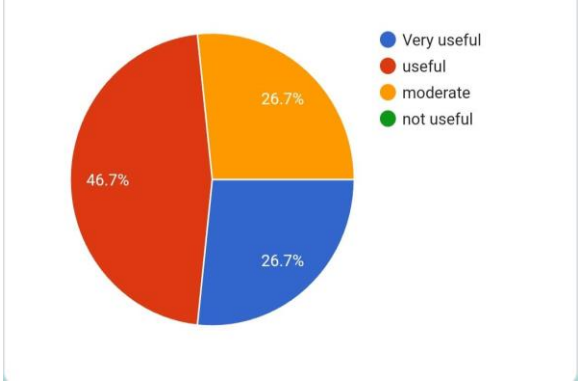

Fig 3.

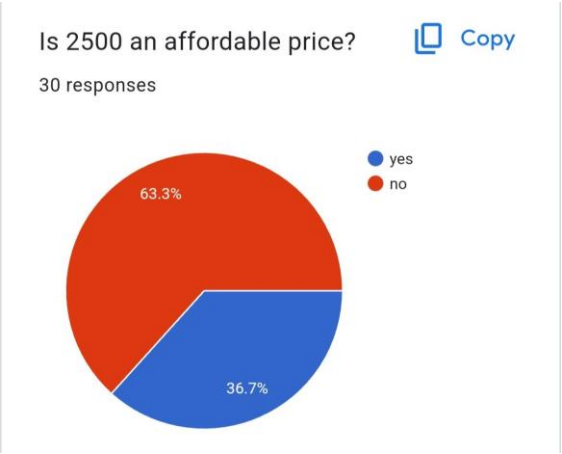

Fig 4.

In fig 3. And fig 4. We can observe that 48% people found the SMART mug useful in their day to day life. And as for the amount 63.3% of people did not find the proposed amount to be affordable and 36.7% agreed to pay the amount for the SMART mug.

V. FINDINGS

According to the results of the poll, the majority of individuals wanted and were comfortable purchasing a safe and eco-friendly product that they could use on a regular basis and that could keep their beverages at the proper temperature and fresh. Majority of the people were dissatisfied with proposed amount and very less agreed to buy the SMART mug. It was observed that many people required an eco-friendly cup for their morning coffee. After conducting this study, some suggestions have been made. One of the recommendations is that companies should give priority to using environmentally friendly materials, such as glass, stainless steel, and bamboo, in the production of drinkware. Second, companies should incorporate eco-friendliness as a key selling point in their marketing strategies to increase sales and revenue. Third, companies should consider the use of eco-friendly packaging to complement eco-friendly drinkware.

VI. RECOMMENDATIONS

The study's results have led to a few suggestions. Firstly, it is recommended that companies prioritize the utilization of eco-conscious materials such as glass, stainless steel, and bamboo in the creation of drinkware. Secondly, to enhance their sales and revenue, companies should make environmental-friendliness an essential component of their marketing strategies. Third, companies should consider the use of eco-friendly packaging to complement eco-friendly drinkware. Finally, the government should provide incentives and regulations that encourage the production and purchase of eco-friendly products to promote sustainability.

VII. LIMITATIONS

The study has several limitations that must be considered when interpreting the findings. The study's sample size was relatively minor, which could constrain the generalization of the results. Furthermore, the research only concentrated on the consumer's perspective concerning eco-friendly drinkware, and it did not consider other factors such as availability and cost. Therefore, future studies should address these limitations by using a larger sample size and incorporating other factors that may influence consumers' purchasing decisions.

VIII. CONCLUSION

The study concludes that consumer perception towards eco-friendly drinkware is positive, with consumers willing to pay more for eco-friendly drinkware. This positive perception is influenced by environmental concerns, health concerns, and product quality. People have become very health conscious nowadays and prefer everything organic and pure if all the companies adapt the idea of biodegradable products the demand for the products will rise rapidly. Our product the temperature control mug is both eco-friendly and consumer friendly.

Therefore, companies can increase their sales and revenue by focusing on eco-friendly drinkware, particularly those made of glass, stainless steel, and bamboo. The findings of this study can guide companies in the development and marketing of eco-friendly drinkware, considering factors that influence consumers' purchasing decisions.

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