

**Project Dissertation Report on**

**UNDERSTANDING THE EFFECT OF**

**AWARENESS AND CONCERN ON**

**PLASTIC CONSUMPTION BEHAVIOR**

**Submitted By**

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# **CERTIFICATE**

This is to certify that the project report entitled, "UNDERSTANDING AWARENESS AND CONCERN EFFECT ON PLASTIC CONSUMPTION BEHAVIOR" was submitted to Delhi School of Management, Delhi Technological University in the partial fulfilment of the requirement for the award of Masters of Business Administration is an original work carried out by Amandeep Singh Makhija under the guidance of Mr. Mohit Beniwal. The matter embodied in this project is a genuine work done by him to the best of his knowledge and belief and has been submitted to this university earlier or any other university for the fulfilment of the requirement of the course of study.

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# DECLARATION

I hereby declare that this Project Report titled "**Understanding Awareness and Concern Effect on Plastic Consumption Behavior**" submitted to the **Delhi School of Management (Delhi Technological University)** is a record of original work done by me for the fulfillment of my MBA degree, under the guidance of **Mr. Mohit Beniwal**.

The information and data given in this report is authentic to the best of my knowledge.

This Project Report is not submitted to any other university or institution for the award of any degree, diploma or fellowship or published any time before.

**-AMANDEEP SINGH**

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**Amandeep Singh**

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# EXECUTIVE SUMMARY

The great invention of plastics brought with it many benefits to the world such that it became the world's number one choice of material in many industries like chemicals, pharmaceuticals, toys, appliances etc. But every coin has two sides the plastics which provide so many benefits come with the problem of pollution too. Pollution from plastic is one of the leading concerns for environmentalists today. Plastic is non-biodegradable stays in the environment for a long and has caused the destruction of natural habitats, danger to wildlife and pollution of resources.

The production of plastic despite its harmful effects has increased over years. The world's heavy dependence on plastics comes from the fact that it being cheap has also been able to provide durability to an extent for many usages. Also in case of use and through objects like in case of medical industry and plastics, not conductive nature has led to its adoption as a preferred material in the manufacturing of electronic appliances. The ease of using plastics their ability to be moulded in any shape, and the low weight and transportation benefits it provides. Apart from it, plastics are also a preferred material for packaging other goods.

Plastic pollution has exceeded to such a level that now even our food and water have been contaminated by it in the form of micro plastics. Governments and organizations have taken many steps to increase awareness about plastic pollution in the world. Many NGOs have been working alongside the government to help tackle the problem of plastic waste around the world. Many studies have been conducted to show that if plastic consumption does not decrease further deterioration of the environment is inevitable. The problem also arrives from the raw materials used in plastic manufacturing. Petrochemicals used in the

manufacturing of plastics are a great contributor to greenhouse gas emissions which are the major leading cause of global warming. To reduce the effect of global warming by 2 degrees Celsius the 2015 Paris agreement to reduce the consumption or use of single used plastics.

Although the government has run many campaigns and drives to reduce plastic consumption, lay down laws against manufacturing and banned single-use plastics the plastic production in the world

has been seen to grow only. The effect of mass awareness of campaigns on plastic consumption can be seen in people but there is a lack of evidence of the success of these campaigns in changing the consumption behavior of people.

This study attempts to understand the relationship between concern, awareness and actions and looks at the interdependence between gender and the above variables. The study builds upon the literature review on how to measure the behavior of people regarding plastic consumption, awareness levels of people, their concern levels towards the environment and the behavior change brought in by concern and awareness in form of actions.

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# **CHAPTER- 1**

## **INTRODUCTION**

### **1.1 Introduction to the study**

The study is about plastic, the raw material used in the packaging industry. There have always been issues with plastic used as a raw material for various purposes, it has many disadvantages than advantages but earlier due to its cheap availability every manufacturing & packaging industry used it. In recent years the awareness amongst the people has risen, due to its increasing harmful effects on the health of living creatures and the Environment. So the study mentions what is Plastic as a whole, how it is made & etc. It also talks about the plastic industry & its toxicity, facts & figures on plastic consumption in various industries and its consumption levels in various countries worldwide. The study includes a survey conducted on a sample of people regarding their awareness and consumption of plastics in daily life.

### **1.2 Introduction to the topic under the study**

#### **1.2.1 What is Plastic?**

The word "plastic" comes from the Greek (plastikos), which means "capable of being shaped or moulded," and (plastos), which means "formed."

Plastics can be casted into any shape. They can be used to form into any shapes by being pressed or extruded in their manufacturing process. Films, fibres hollow

tubes, plates, bottles and boxes etc. all of the above products can be made from plastics

The technical adjective plastic should not be confused with the colloquial term plastic. When strained beyond a certain threshold, any material suffers plastic deformation or a permanent change of shape.

Stamping and forging of Aluminium for example, also has the property of plasticity but is not plastic in the traditional meaning. Some polymers, on the other hand, will break before deforming in their completed shapes, and so are not plastic in the technical sense.

Plastics are a diverse group of synthetic or semi-synthetic organic substances the property of malleability of plastics allow it to be moulded into any shape. The property of all substances due to which they can be deformed into a new shape without them breaking is called Plasticity. The degree of plasticity in moldable polymers being high and specific has resulted in them being named plastics.

In the definition of industrial chemistry, the organic polymers containing high molecular mass and often containing many other components are termed plastics. Being synthetic in nature they are mainly manufactured from petrochemicals, but there are a variety of sustainable alternatives, for example, cellulosic and polylactic acids can be manufactured or obtained from cotton linters and corn respectively.

Plastics have a high variety of usage in the 21st century. From small things like paper clips to large air and spacecraft plastic is used everywhere. The low cost, availability, corrosion resistance, simple manufacturing process, water-resistance and adaptability are some of the particular reasons behind its usage.

Plastics have also become the preferred choice in the manufacturing of goods which earlier used natural traditional materials like wood, horn, stones leather, metal, glass, animal bones and ceramics.

Nearly a third of plastic is used in packaging in industrialized economies, and about the same amount is utilized in structures in applications such as piping, plumbing, and vinyl siding. Other applications include autos (up to 20% plastic content), furniture, and toys. Plastic is utilized in a variety of ways in developing countries; for example, 42% of total packaging in India uses plastics. The production of plastics has been found to increase 200% over the last 10 years and on average 50 kilograms of plastic are produced per person each year in the world.

Many of modern medical devices and implant materials used today are made up of plastic polymers. There is a wide usage of plastic in the medical and healthcare industry.

The world's first fully synthetic plastic was Bakelite invented by Leo Baekeland in New York which was created in 1907. He also popularized the phrase "plastics." Nobel laureate Hermann Staudinger, was given the title "the father of polymer chemistry," and Herman Mark as "the father of polymer physics," has given great contributions to polymer materials science.

Plastic's development and domination in the early twentieth century raised environmental worries about its sluggish disintegration rate after being abandoned as waste due to its massive molecule composition. One solution to this problem, at the turn of the century, was widespread recycling activities.

### **1.2.2. Plastic Structure, Properties & Classification:**

The word "plastic" comes from the Greek (plastikos), which means "capable of being shaped or moulded," and (plastos), which means "formed."

The material's plasticity, or malleability, allows it to be cast, pressed, or extruded into a number of shapes during manufacturing, including films, fibres, plates, tubes, bottles, and boxes, among many others.

The technical adjective plastic should not be confused with the colloquial term plastic. When strained beyond a certain threshold, any material suffers plastic deformation or a permanent change of shape.

Some Major classes of plastics are Halogenated plastics, polyesters, silicones, Acrylics, and polyurethanes.

Plastics are also classified on the basis of their manufacturing process. Condensation, polyaddition, and cross-linking are some of the classifications used to differentiate plastics by their manufacturing process.

The classification of plastic is done the basis of its physical properties like heat resistance, density, tensile strength, glass transition tempertaure and their chemical properties properties such as polymers reaction properties resistance to a variety of chemical products and processes, such as organic solvents, oxidation, and ionizing radiation are also used to classify them. Most plastics, in particular, will melt when heated to a few hundred degrees Celsius.

The classification is also based the industry usage in production and manufacturing processes. Thermoplastics and thermosets, conductive polymers, biodegradable plastics and engineering plastics, and other plastics with specific structures, such as elastomers, are examples of such properties and classes.



Plastics are classified according to their form's permanence or impermanence, or whether they are thermoplastics or thermosetting polymers. Those plastics which on heating go through changes in chemical composition are called thermoplastics, allowing them to be moulded again. Polyethene, polypropylene, polystyrene, and polyvinyl chloride are among the examples. Thermoplastics have molecular weights with a lower range of 20,000amu and a higher range of 500,000 amu, while for thermosets the molecular weight can have an unlimited range.

**Thermosets, also known as thermosetting polymers,** can only melt and take shape once before solidifying. In the thermosetting process the polymers go through an irreversible chemical change for example the vulcanization of rubber.

### **1.2.3. Crystalline and Amorphous Plastics**

Many plastics are completely amorphous, including all thermosets, polystyrene and its copolymers, and polymethyl methacrylate.

Plastics can also have combined molecular structure having partial crystalline and partial amorphous arrangements. This results in changes in melting point and glass transition temperature of the polymer. Some examples of Semi-crystalline are polyethene, polypropylene, polyvinyl chloride, polyamides (nylons), polyesters, and some polyurethanes.

### **1.2.4. Conductive Polymers**

**Organic Polymers** that conduct electricity are known as intrinsically conducting polymers (ICP). conductive plastics are being developed in the world to be used in areas where their anti-corrosion and water resistant properties could provide many benefits.

### **1.2.5. Biodegradable Plastics and Bioplastics**

Those plastics that can be easily degraded in the environment due to exposure to UV radiation from the sun, degradation by enzymes abrasion by winds or natural water degradation are known as biodegradable plastics.

Some types of decomposition require the plastic to be exposed at the surface (aerobic), while others will only work if specified conditions in landfills or composting systems are met (anaerobic).

To aid biodegradation, some firms create biodegradable compounds. Plastic can be filled with starch powder to help it decay more quickly, although this does not result in the plastic completely breaking down.

Some researchers have genetically engineered microorganisms to produce entirely biodegradable plastics like Biopol; however, they are costly as of now.

### **1.2.6. Bioplastics**

Bioplastics are generated mostly from renewable plant components such as cellulose and starch, whereas most plastics are made from petrochemicals. Bioplastics are becoming more popular as a result of the finite nature of petrochemical supplies and the threat of global warming.

Bioplastic development, on the other hand, starts from a very low point and does not yet compare favourably to petrochemical manufacturing. The global capacity for bio-derived materials is estimated to be 327,000 tonnes per year. In 2015, the global output of polyethylene (PE) and polypropylene (PP), the world's two most widely used petrochemical-derived polyolefins, was anticipated to be over 150 million tonnes.

### **1.2.7. Types of Plastic**

Plastics can be classified into three types:

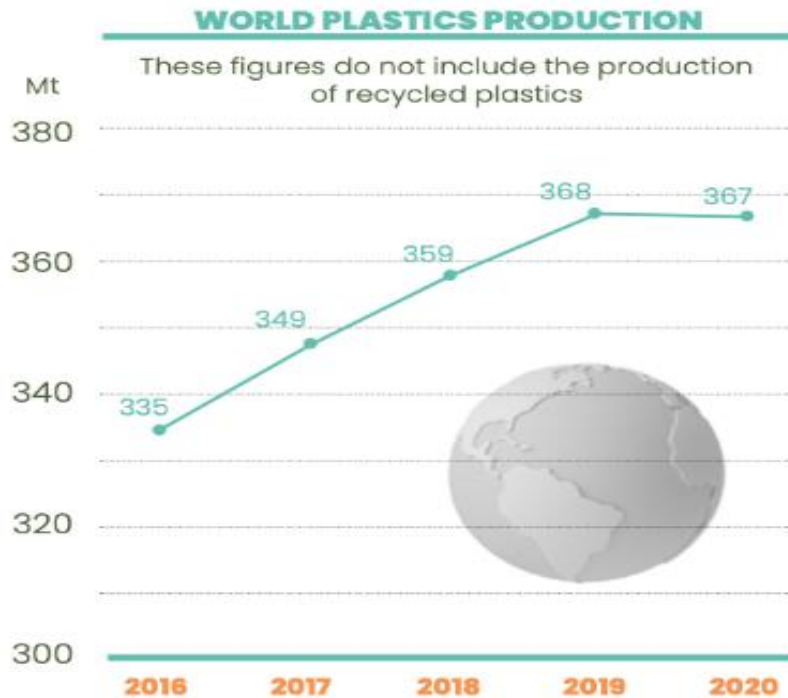
- 1) **Commodity Plastics:** Plastics produced in large quantities for applications where remarkable material qualities are not required are known as commodity plastics or commodity polymers (such as packaging, food containers, and household products). polyethylene, polypropylene, polystyrene, polyvinyl chloride, and poly(methyl methacrylate) are some examples of commonly used commodity plastics.
- 2) **Engineering Plastics:** Engineering plastics are a class of plastics with superior mechanical and/or thermal qualities to more commonly used commodity plastics (such as polystyrene, PVC, polypropylene and polyethylene). these are used in high-cost materials and equipment of use and have replaced traditional materials like glass and ceramics due to their higher durability and unique properties.
- 3) **High-Performance Plastics:** Plastics that meet higher performance standards than standard or engineering plastics are known as high-performance plastics. They are costlier and are utilized in smaller quantities. High resistance plastics different from the other cases as they are more chemically inert and have higher temperature stability. Polysulfone (PSU), poly(ethersulfone) (PES) and polyetherimide (PEI) are some examples of such plastics.

Under each of these headings, there are important classes of plastics.

### **1.2.8. The Plastic Industry**

Plastic production is a major operation of the chemical industry. there are companies established in the production of plastic since its discovery and have become market leaders such as DOW Chemical and BASF.

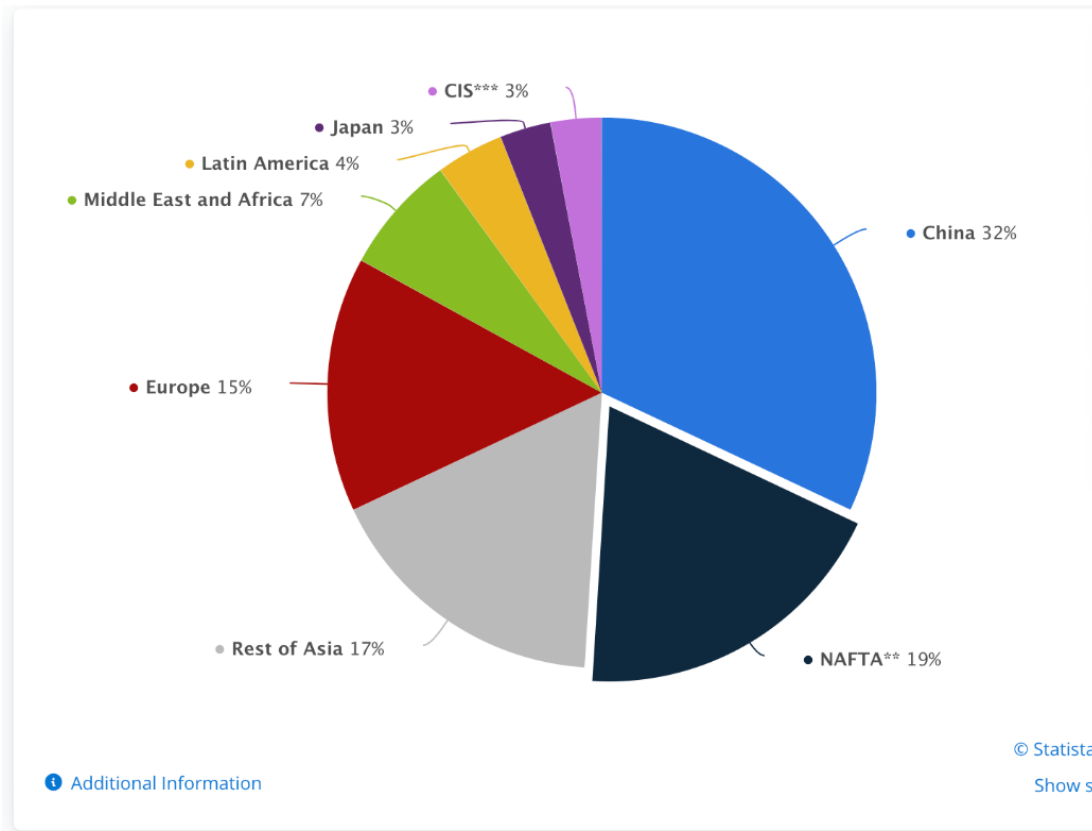
**Figure 1.1. Plastic production around the world**



**SOURCE - science.org**

In the year 2020, the overall production of plastic in the world reached 367 million tons with China being the largest producer having 32 % share in global production which is also the largest production by any single country. NAFTA - the North American free trade agreement countries are the second-largest producer with a 17% share almost half of China. India in this context only produces less than 0.5% of world plastic production and is a net importer of plastics and polymers. The total market worth of the plastic market became about \$ 654 billion in the year 2020.

**Figure 1.2. The share of plastic production in world**



Source - statistica.com

### **1.2.9. Toxicity: Human Health & Environment Effects**

Plastics in a pure state themselves have low toxicity as they are insoluble in water and are chemically inert in the environment. Although some additives used in plastics can make them toxic for example leaching of additives like phthalates and adipates used in PVC plastics which are commonly used to make food packaging or toys can be transmitted to humans and hence become toxic there for their usage is being banned by governments in many parts of the world.

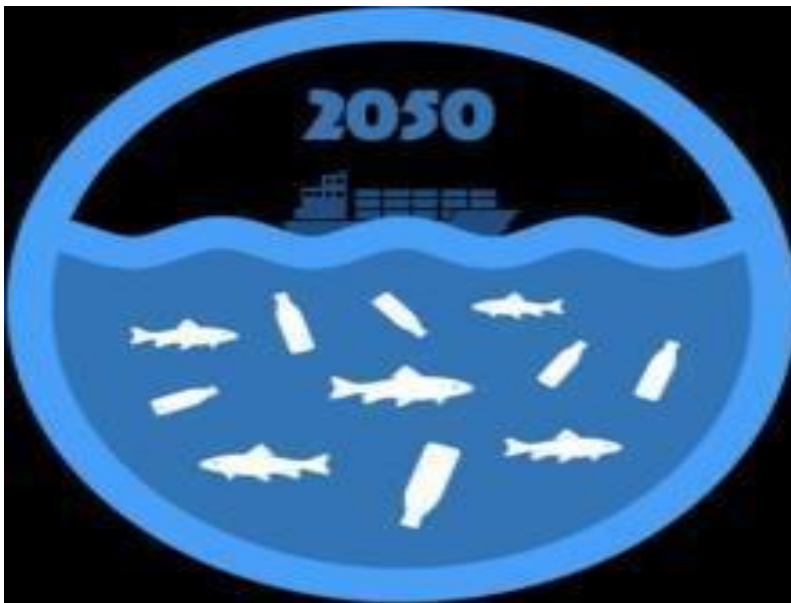
Hence, when talking about the toxicity of plastics it can be divided into three categories:

1. Pollution from plastics

2. Pollution from production
3. Pollution from reactive chemicals in the environment

The pollution from plastics is generally associated with the collection of plastics in the environment. Plastics are non-biodegradable in nature and hence accumulate easily in the environment. they pollute the environment by accumulating in the water bodies and forests where they disturb the habitat of natural animals and microorganisms. Plastics can be easily consumed by animals and get stuck in their throats or stomachs and cause death to these animals. Other than those plastics have now also made their way towards humans by the means of micro plastics present in drinking water or animal consumption which are highly difficult to separate out.

**Figure 1.3. Plastic in World oceans by 2050**



**Source own**

The overall production process of plastics is a highly pollutant intensive process. From the emission of harmful gases such as Carbon dioxide, and Sulphur dioxide to the wastage and pollutants of water leads to the destruction of the environment.

Finally, the leaching of plastics additives and their reaction with compounds present in the environment produces toxic products which can kill organisms and humans if consumed by accidents. For example, WHO research division on cancer the IARC has recognized that PVC (poly vinyl chloride can cause cancer in humans).

It is predicted that the amount of plastics will exceed the amount of fish present in the oceans by 2050. Looking at the current trends we can see only 9% of the total plastics produced every year are being recycled rest all the plastics is either incarcerated or being dumped into landfills or oceans. The Ocean Conservancy report 2019 showed that China, Indonesia, Philippines, Thailand, and Vietnam dump more plastics than other countries combined.

The growing presence of micro plastics is also a major concern in the world. Many studies have showed that over 83% of tap water in any metropolitan city contains micro plastics. A study by orcanation.org showed that out of 11 top bottled water companies in the world 93% contained micro plastics. The micro plastic problem isn't new it was even found in seabird's guts in 1960 but their penetration of the food chain has rapidly increased along with their concentration.

### **1.2.10. Climate Change and Global Warming**

A fresh assessment of the impact of plastic on climate change was released by the Center for International Environmental Law in 2019. According to the estimate, the carbon dioxide produced due to plastics would reach about 850 million tons in the year 2019.

By 2030 the emissions would increase to 1.6 times of 2019 which is approximately equal to 1.34 billion tons. The growth in CO<sub>2</sub> emissions is projected to follow exponential growth in the future too. By 2050 the share of plastics in the world's yearly CO<sub>2</sub> emission would reach 14%.

The plastics on one hand increase carbon emissions when incinerated that also act as carbon sinks if they are dumped in landfills. although they do release methane which is a much more potent greenhouse gas as compared to carbon dioxide. Hence they have a mixed effect on global warming. in some areas usage of plastics such as in case of the beverages industry plastic bottles has reduced transportation energy consumption by up to 52%.

### **1.2.11. Recycling of Plastics**

Plastics production and consumption in 2020 has increased more than 2.5 times what it used to be in 2000. The increase in plastic production has also led to increasing in plastic wastage around the world. In 2000 the total plastic waste was 156 metric tons which have doubled itself to 353 metric tons by the year 2019. Although plastic consumption and production grew rapidly recycling lagged far behind. “Only **9%** of all plastic waste is recycled, with 19% incinerated and almost 50% sent to landfills. The remaining 22% was disposed of in uncontrolled dumpsites, burned in open pits or leaked into the environment”.

## **1.3 The Problem Statement**

In my study I want to assess the fact that although massive campaigns have been run around the world to increase awareness of plastic pollution. How well these campaigns have resulted in behavior change in people. The study aims to understand the choices people make linked to plastic consumption in their daily life. The study deals with understanding the behavioral impact of awareness on consumption and perception of responsibility towards plastic pollution in a metropolitan city. The research tries to understand the relationship and impact of awareness and concern for plastic pollution in the consumption and actions of individuals. The study helps determine the correlation between awareness, concern and actions of people.



## **1.4 Objective of the study**

The objective of the study is:

- To assess the awareness about plastic and global warming caused by its consumption.
- To understand the link between plastic consumption and awareness
- Understand the price sensitivity of Indian customers regarding plastic packaging
- To understand the links and correlation between plastic consumption and gender, age and income.
- The relationship between awareness and the attitude changes in the people to reduce their plastic consumption

## **1.5 Scope of the Study**

The scope of the study is limited to the general correlation between the awareness and consumption of plastic in people. The study aims at millennials and Generation Z people and understands that even though they have been continuously taught about plastic pollution has any change been brought in their behavior or not. It also tends to look at the perception of their price sensitivity or responsibility of reducing plastic consumption in packaging materials and their preference in packaging goods. The scope of this study limits itself to an inferential approach rather than going for an exploratory one. Also, the study does not implore on the psychological reasoning about consumption practices nor does it distinguishes between type of awareness in people.

# **CHAPTER- 2**

## **LITERATURE REVIEW**

### **2.1. Plastic Pollution and Potential Solutions (Christopher J. Rhodes)**

Today 6% of world's total oil production is used in the manufacturing of plastics and in future by 2050 about 20% of the oil produced can be used in plastic production hence there is a need to look for alternative ways to manufacture plastic. This paper deals with the production and usage of various types of plastic, as well as the impact of these materials' contamination on animal, human, and environmental health. The paper talks about the problem of micro plastics which is a growing concern of health as they are being transferred to humans. The paper also shed light on the idea of bioplastics the problems associated with their mass usage as currently their share stands on at 0.5% of total plastic production. This paper also proposes solutions which are needed to be implemented to reduce plastic pollution in the future.

### **2.2. The Challenges of Measuring Plastic Pollution (Julien Boucher and Guillaume Billard)**

Plastic pollution is as widespread as the use of plastic. Every year, about 10 million tonnes of plastic are dumped into the oceans, generating a global environmental disaster. Due to technology restrictions and disjointed assessment campaigns, measuring or anticipating this issue is a difficult and time-consuming task. The world lacks metrics that are suitable enough to help develop actions and plans in order to reduce plastic pollution. This study deals with the current plastic pollution stats and the challenges faced in estimating the yearly pollution caused by plastic pollution along with the forecast for the future. The study shows that there are limited clear metrics to account for how much pollution is caused by

plastics and without these metrics, the designing or development of new and existing waste management strategies would be a difficult task ahead.

## **2.3. Characteristics of Plastic Pollution in the Environment: A Review Penghui Li<sup>1</sup>, Xiaodan Wang<sup>1</sup> Min Su<sup>1</sup> Xiaoyan Zou<sup>1</sup> Linlin Duan<sup>1</sup> Hongwu Zhang**

Plastics have been a hot issue in academic circles due to their widespread use in the environment. Analytical methodologies, abundance, movement, fate, and degradation of plastics in the environment, as well as hazards to natural environments, wildlife, and even human health, have all been the subject of extensive research. However, until recently, the properties of plastic pollution, which are important for understanding this rising problem, have remained unclear. This research examines the major characteristics of plastic pollution in the environment in order to improve current knowledge of the problem. This paper provides a summary of the global challenges plastic has brought due to its persistence, combined pollution and health risk to living beings and biodiversity. This assessment also covers the "plastic cycle" in the environment, which includes the aquatic, atmospheric, and terrestrial systems.

### **2.3.1. Predicted growth in plastic waste exceeds efforts to mitigate plastic pollution**

Plastic Pollution global problem that affects almost every marine and freshwater habitat worldwide. Strategies are being implemented in response to mitigate the effect of pollution at many levels, but there is a lack of quantitative data about effect of these policies and steps in reduction of plastic emission. To predict plastic emissions to 2030 for 173 nations, this study try to asses the outcome of reduction of plastic waste, waste managementand recovery of environment various levels of implementations. Plastic garbage generated globally in 2016 reached aquatic environments at a rate of 19 to 23 million metric tonnes, or 11

per cent, according to our estimates. Annual emissions could exceed 53 million metric tonnes per year by 2030, based on the aggressive commitments now made by nations. Extreme efforts to restructure the global plastics economy are required to cut emissions to levels much below this forecast.

## **2.4. Plastic-Free July: An Experimental Study of Limiting and Promoting Factors in Encouraging a Reduction of Single-Use Plastic Consumption- Lea Marie Heidebreder , Julia Steinhorst and Manfred Schmitt**

The global campaign 'Plastic Free July' attempts to encourage people to eliminate single-use plastics throughout the month of July in order to combat the plastic crisis. So-called 'windows of opportunity,' or times when people are receptive to new experiences, are thought to be important in getting people started with new behavior patterns. As a result, the current study examined whether a random month framed as a chance for change can disrupt people's everyday routines and reduce plastic consumption. The study included an experimental and a control group in an online survey (n = 509) with repeated measures (n = 366). During July, the people in the experimental group were encouraged to reduce their single-use plastic consumption and support the 'Plastic Free July' campaign. The consumption of single-use plastic was found to be lower in the experimental group than in the control group which were not encouraged to cut down their consumption of single-use plastic. Participants with a low pro-environmental identity seemed to benefit more from the programme. Plastic use (before the intervention) was significantly predicted by perceived difficulty, habits, and pro-environmental identification, according to path analysis. Problem awareness, pro-environmental identification, and perceived impediments all predicted policy support. We wrap off with suggestions for plastic-free shopping and policy support.

## **2.5. Responsible Consumer Behavior: Driving Factors of Pro-Environmental Behavior Toward Post-Consumption Plastic Packaging- Widayat Ardik Praharjo Viajeng Purnama Putri, Sri Nastiti Andhariniand Ilyas Masudin**

The goal of this quantitative study is to put the paradigm of responsible consumption to the test (RCB). The aim of this study is to use the theory of planned behavior to analyze the relationships in positive attitude, behavior, norms, intention, awareness towards the environment. People (n = 665) were chosen using a multistage sampling process. A self-administered questionnaire was used to obtain data from sample respondents. The data was examined using partial least squares structural equation modelling (SEM) (PLS). The research showed that the post-consumer plastic packaging activities are affected by Attitudes, norms, and awareness. This discovery backs up the notion of planned behavior, and by adding a plausible variable, it may be expanded to explain environmental behavior.

## **2.6. Green Consumer Behavior of the Educated Segment in India- Rajyalakshmi Nittala**

Green consumption is a prerequisite for the Earth's civilization's long-term viability. Several writers have discovered that one of the most important variables influencing green consumption behavior is education. This study analyses the factors that influence university professors' propensity to buy eco-friendly products, as well as the variables that influence and distinguish teachers' eagerness to buy green products from those who are not. The data reveal that product recycling has a favourable impact on university professors' desire to buy green items, but comfort, eco-labelling, and a lack of knowledge have a negative impact. Switching products for environmental reasons, a preference for ecological quality and the belief that plastic carry bags are more convenient and should not be outlawed are all good indicators of who is willing to buy green items and who

is not. Environmental advocacy is something that the instructors are aware of, even if their worries do not necessarily convert into green buying behavior.

## **2.7. Tackling the plastic problem: A review on perceptions, behaviors, and interventions- Lea Marie Heidebreder, Isabella Bablok, Stefan Drews, Claudia Menze**

The increased production and consumption of plastic in the world has led to many environmental and health related problems in the world. As a result, reducing plastic has become a huge global concern. Because technology solutions may not be enough to solve the problem, a perspective that emphasizes the role of human behavior is required. The current study covers a wide range of social-scientific topics related to plastic, including risk knowledge, consumer preferences, and predictors of usage behavior, as well as techniques of psychological and political intervention. We hope to uncover relevant drivers for future initiatives to minimize plastic usage by evaluating the research.

Despite a strong knowledge of the inherent concerns, the 187 studies evaluated reveal that people appreciate and use plastic on a regular basis. Plastic consumption behavior appears to be highly influenced by habits, norms, and situational circumstances. Political and psychological treatments both have the potential to be helpful, while their long-term implications are frequently unknown. The study concludes with recommendations for behavior-based treatments and future research, which should incorporate interdisciplinary approaches and take cultural differences into account.

## **2.8. Understanding choice behavior towards plastic consumption: An emerging market investigation- Pradeep Kautish, Rajesh Sharma, Sachin Kumar Mangla, Fauzia Jabeen, Usama Awan**

The study's main goal was to analyze the drivers of connectivity to nature and love for nature as determinants of behavior that promotes non-plastic consumption in people due to concerns about environment and consumer being aware about pollution. Plastic manufacture and consumption have resulted in a considerable volume of plastic garbage on a global scale. Solid garbage made of plastic is a severe threat to the environment. Plastic pollution is a major source of concern for all living things on the earth, as it has a negative impact on human and animal wellbeing.

The current study looks at the empirical links between how concern and love for the environment, awareness about pollution, connectivity to nature, love for nature, and plastic consumption choice behavior. Using covariance-based structural equation modelling, the researchers tested the hypothesis. The study determines the relationship between awareness, concern for the environment and love for nature in the population. The cross-sectional data was gathered using an online poll that involved a sample size of 745 people who responded back from all throughout India. Environmental concern and perceived consumer effectiveness, according to the findings, motivate connectivity to nature and love for nature, the consumer awareness is found to be the most important factor affecting connectivity and love for nature. Environmental concerns have no direct influence on consumer choice behavior, but perceived consumer effectiveness does.

# **CHAPTER- 3**

## **RESEARCH METHODOLOGY**

This research follows a quantitative approach in which we state hypotheses and collect data in form of variables which then can be used to verify those hypotheses

### **3.1 Research Context**

The research involves studying the link between awareness, concern, actions and plastic packaging consumption in the country. It helps define the bivariate correlation between these factors. The study also uses frequency analysis to determine the awareness level in the target population.

### **3.2. Sampling and Data Collection**

The sampling technique used in this study is convenience sampling. The reason behind choosing convenience sampling is due to the ease of collection and the limited scope of the study. In our study since we are not studying the diversity factor that is the effect of religion, ethnicity etc. on plastic consumption convenience sampling best serves our aim. The study is conducted in Delhi, one of the most polluted cities of the country but also a major financial hub and capital of the country.

The research involves quantitative analysis and has a confirmatory approach to be followed. The research follows the primary mode of data collection to gather responses of our target audience.

The data is collected with the help of a survey which includes a general perception question. The data collected in the survey is of ordinal, ratio and nominal types. Our survey group consist of people between the age of 18-33 which are considered to be the prime audience for leading e-commerce industries. Plus, this



is the audience whom have been found to most aware about plastic pollution by means of studies, TV campaigns etc. run by either private or public institutions. The higher level of awareness about the harmful effects of plastic consumption in India is shown in previous studies (Business Standard, 2018; Singh and Mathur, 2019).

The data was collected from April - to May 2022. To make the data reliable in order to eliminate invalid responses the survey contains contradictory or repeated questions framed differently to capture the same data. The data collected is then to be analyzed to understand the reliability of the responses.

Our Research uses Hypothesis testing to evaluate the data collected against the given set of assumptions.

### **3.3. Research Hypothesis**

H1: The awareness about plastic Consumption is dependent on Age

H2: Perceived consumer Awareness has a direct impact on concern for the environment

H3: The family income has a direct impact on the willingness to pay extra money for Eco-friendly packaging.

H4: Perceived consumer Awareness has a strong impact on actions taken to reduce plastic consumption

H5: Gender has no impact on the view of The benefits of environmental protection in the form of avoiding plastic consumption justify the costs involved in it.

For the hypothesis testing, we use Pearson bivariate correlation and chi-square test to determine the relationship between our variables. The significance level for all the Hypotheses is taken to be 95% which is the alpha value of 0.05 is to be considered.

# CHAPTER- 4

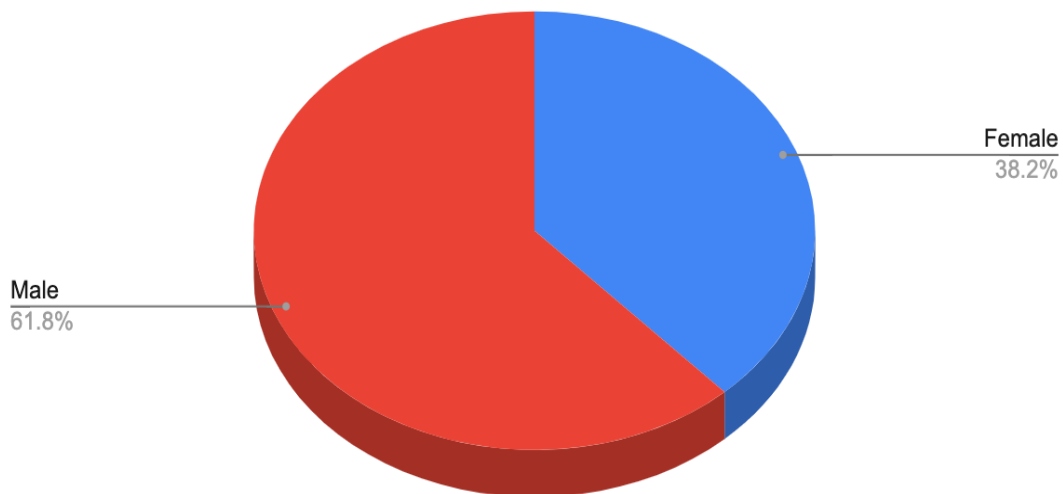
## ANALYSIS

### 4.1. Frequency Analysis

Frequency analysis of data provides us with the division of data into the following categories:

**Chart 4.1 Gender distribution**

Gender



#### Own creation

- **Gender** - the gender division contains categories male, female, other and prefer not to say. Our data shows that 61.8% per cent of males and 38.2% of females are division on basis of gender.

**Table 4.1. Frequency analysis of Age**

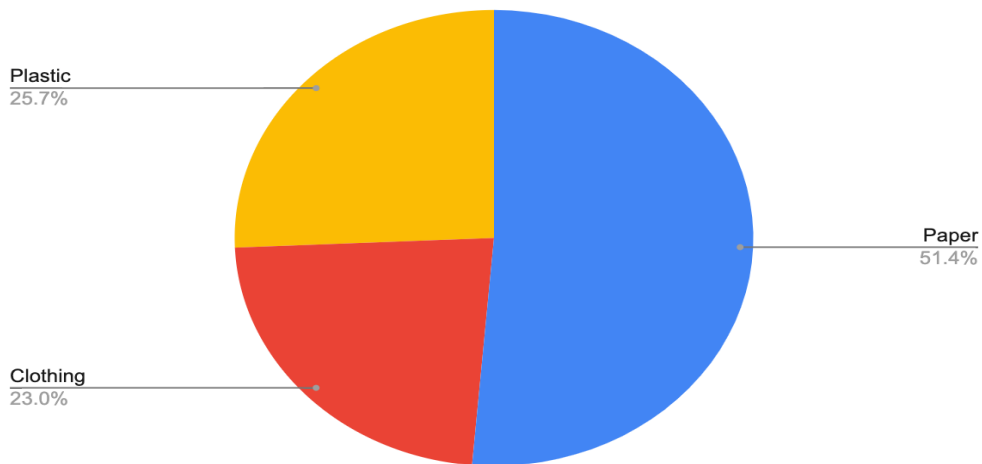
		Age			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17	1	1.3	1.3	1.3
	20	2	2.7	2.7	4.0
	21	3	4.0	4.0	8.0
	22	10	13.3	13.3	21.3
	23	22	29.3	29.3	50.7
	24	17	22.7	22.7	73.3
	25	8	10.7	10.7	84.0
	26	8	10.7	10.7	94.7
	27	1	1.3	1.3	96.0
	28	1	1.3	1.3	97.3
	32	1	1.3	1.3	98.7
	33	1	1.3	1.3	100.0
	Total	75	100.0	100.0	

**Own analysis**

- **Age** - The age demographics show that the maximum age group of respondents was in the age group 24 and 25 and the age range was 17 to 33 years. The frequency analysis shows us that the age group 23 and 24 are people are our maximum respondents.

**Chart 4.2. Choice of packing material**

The first choice of your packing material is

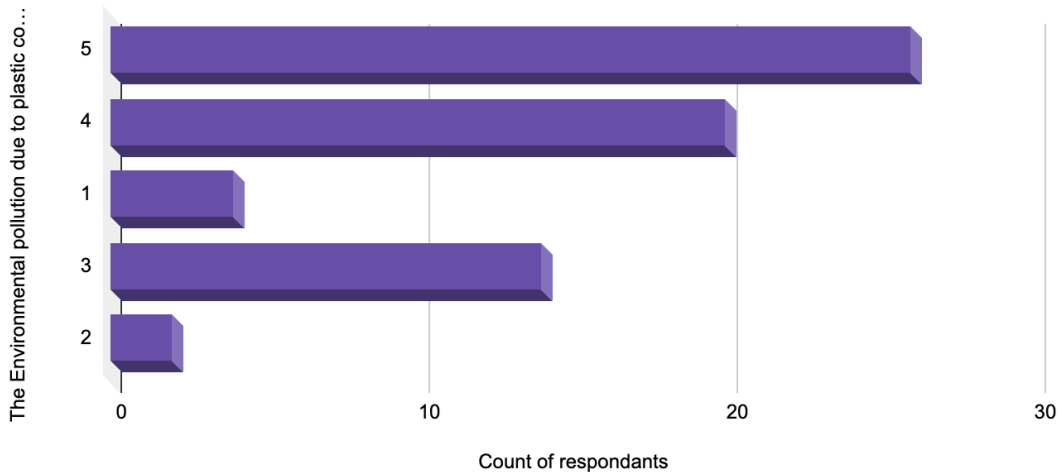


**Own creation**

- Choice of Packing Material** - the choice of packing material contains the preferred choice of material in packing as their first preference. The majority of people choose Paper as their preference with plastic being the second choice and clothing be the least favoured one. The choice of packing material shows that paper is the dominant choice with having 51.4% of weightage, followed by plastic (23%), and clothing (25.7%).

**Chart 4.3. Environmental concern due to plastic consumption**

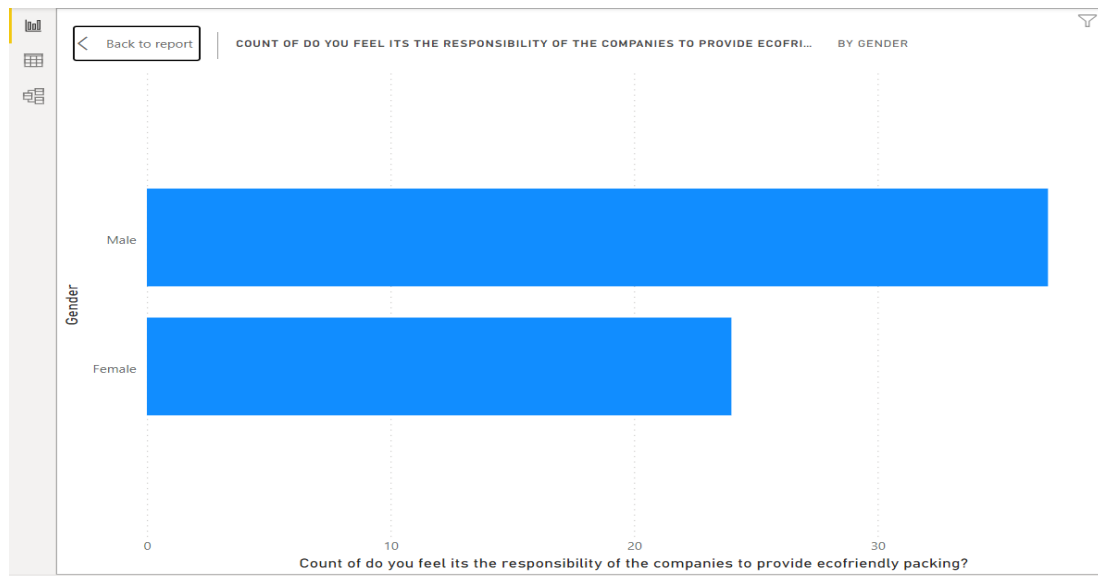
Count of The Environmental pollution due to plastic consumption is one of the most critical environmental concerns today.



**Own creation**

The data above gives us the concern level and the frequency of different concern levels. The bar graph shows that the maximum number of respondents say that plastic pollution is the most critical concern today.

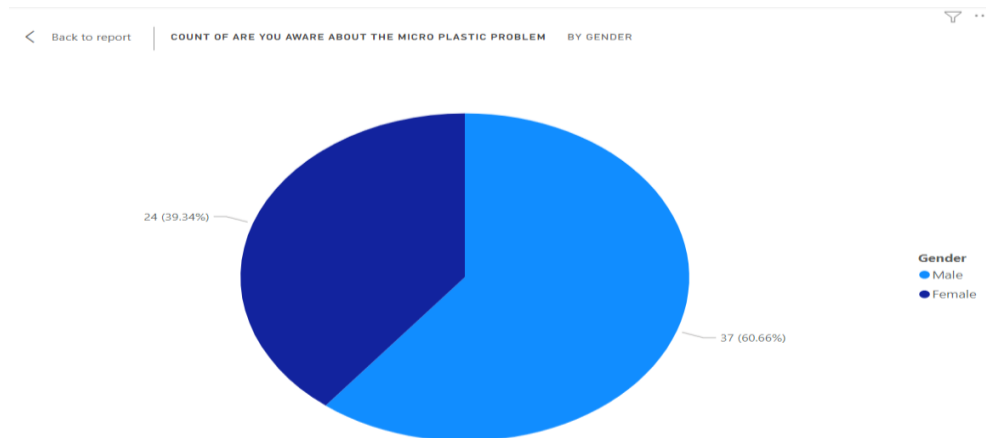
## Chart 4.4. Responsibility of the companies to provide eco-friendly packaging



### Own creation

- The data shows the division of responsibility on the basis of gender. The data shows the division of how many males feel that companies should be responsible for providing eco-friendly packing as compared to women.

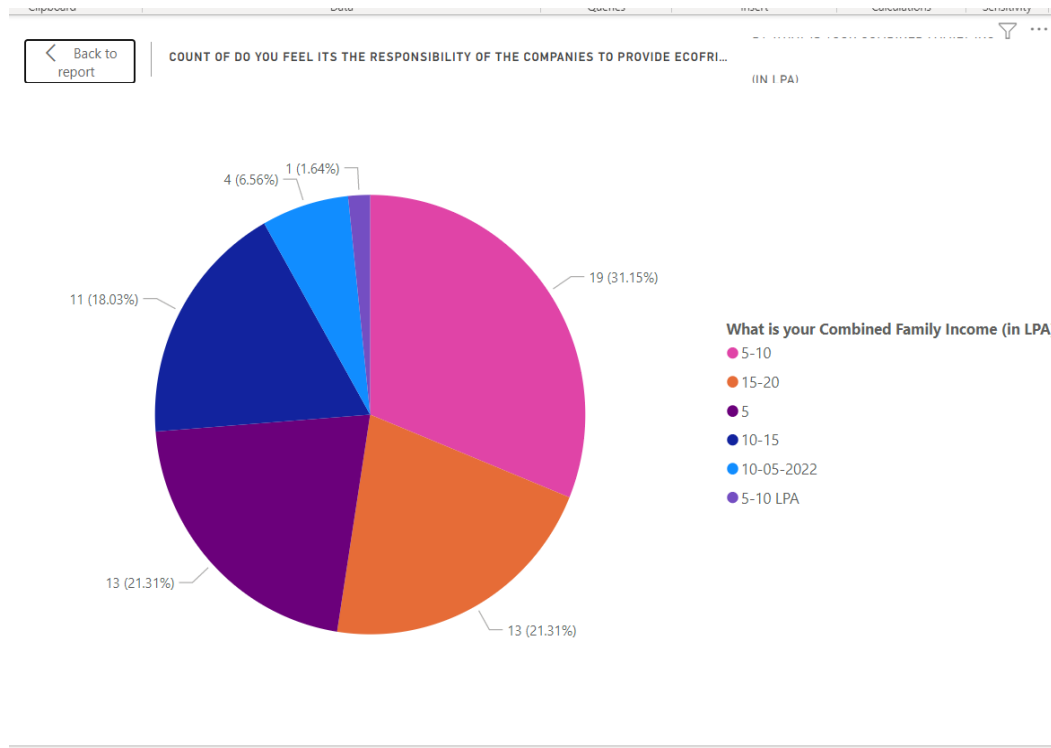
## Chart 4.5. Division of responsibility on the basis of gender



### Own creation

The above graphic shows the frequency between awareness and gender about micro plastic. About 39.5% of women show awareness about micro plastic whereas only 60.6 per cent of men show awareness

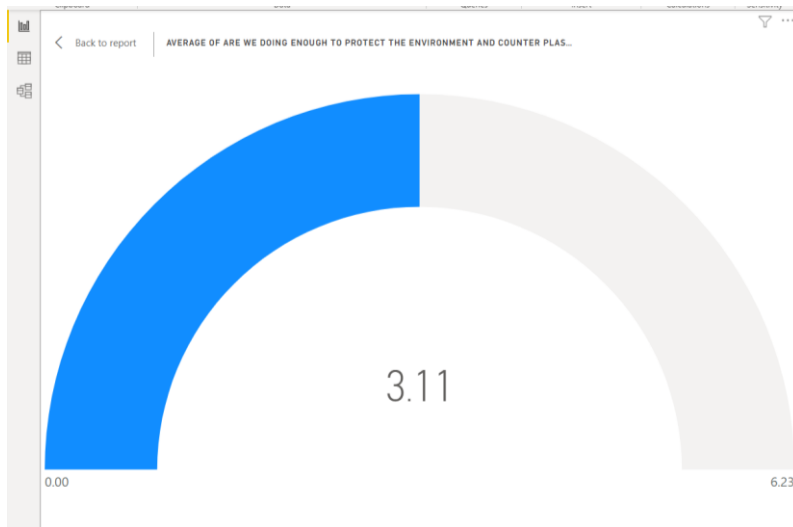
**Chart 4.6. Combined family income**



**Own creation**

- This graph shows us the responses of different family income groups and the number of them that says yes to companies' responsibility of eco-friendly packing

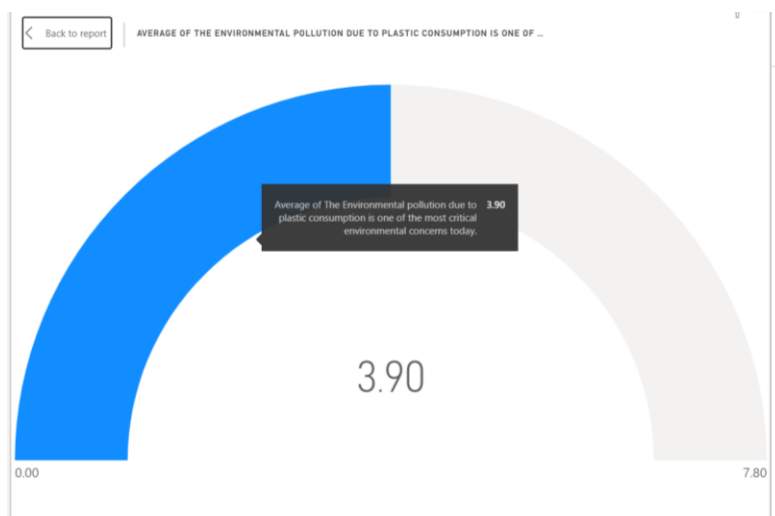
### Chart 4.7. Perception towards sufficiency of action to reduce plastic consumption



#### Own creation

The average statistic measure of respondents considering the fact that are we doing enough for the environment is greater than the 50% mark.

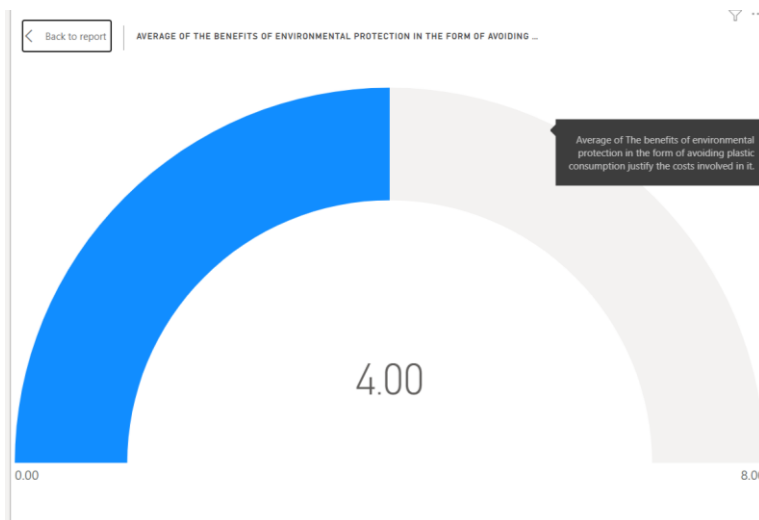
### Chart 4.8. Concern level towards environment pollution by plastics



#### Own creation

The average statistical value of the relationship between the environment pollution and plastic consumption shows a value of 3.90 suggesting that people relate environmental pollution with consumption of plastic.

**Chart 4.9. Perception toward the benefit of environmental perception by avoiding plastics**



**Own creation**

The avoidance of plastic consumption for benefits of environment gives us an average value of 4.0 for our response data suggesting that people relate that giving up plastic consumption would help the environment.



## 4.2. Mean Analysis

Table 4.2. Mean analysis

CONCEN JUSTIFICATION EFFECTVIEW MICROPLASTICDANGER AWARENESS *						
BAN						
BAN		CONCEN	JUSTIFICATION	EFFECTVIEW	MICROPLASTIC DANGER	AWARNNESS
maybe	Mean	3.87	3.93	2.73	3.60	3.13
	N	15	15	15	15	15
	Std. Deviation	1.356	.884	1.033	1.298	1.598
No	Mean	3.61	3.83	3.22	3.67	3.50
	N	18	18	18	18	18
	Std. Deviation	1.195	.985	1.215	.907	1.339
yes	Mean	4.29	4.21	3.12	3.10	3.40
	N	42	42	42	42	42
	Std. Deviation	.918	.925	1.329	1.620	1.594
Total	Mean	4.04	4.07	3.07	3.33	3.37
	N	75	75	75	75	75
	Std. Deviation	1.108	.935	1.245	1.427	1.523

CONCEN JUSTIFICATION EFFECTVIEW MICROPLASTICDANGER AWARENESS *						
Gender						
Gender		CONCEN	JUSTIFICATION	EFFECTVIEW	MICROPLASTIC DANGER	AWARNNESS
Female	Mean	4.17	4.13	3.03	3.43	3.33
	N	30	30	30	30	30
	Std. Deviation	1.117	.776	1.351	1.331	1.668
Male	Mean	3.96	4.02	3.09	3.27	3.40
	N	45	45	45	45	45
	Std. Deviation	1.107	1.033	1.184	1.498	1.437
Total	Mean	4.04	4.07	3.07	3.33	3.37
	N	75	75	75	75	75
	Std. Deviation	1.108	.935	1.245	1.427	1.523

### Own analysis

The mean analysis on basis of Ban, Gender and choice of material have taken against variables.

The analysis shows us that people saying yes to a ban have a greater concern and justification of cost of eco-friendly packaging. The concern means the level for females is found to be greater than males. But males show a greater concern level. The people who are not in support of the ban have been found to have lower concern mean levels.

**Table 4.3. Mean analysis of Choice of material**

CONCEN JUSTIFICATION EFFECTVIEW MICROPLASTICDANGER AWARENESS *						
Thefirstchoiceofyourpackingmaterialis						
Thefirstchoiceofyourpackingmaterialis		CONCEN	JUSTIFICATION	EFFECTVIEW	MICROPLASTIC DANGER	AWARENESS
Clothing	Mean	4.41	4.24	2.59	3.35	2.94
	N	17	17	17	17	17
	Std. Deviation	.712	.752	1.228	1.320	1.600
Paper	Mean	4.10	4.18	3.03	3.59	3.72
	N	39	39	39	39	39
	Std. Deviation	1.095	.823	1.287	1.352	1.413
Plastic	Mean	3.58	3.68	3.58	2.79	3.05
	N	19	19	19	19	19
	Std. Deviation	1.305	1.204	1.017	1.584	1.580
Total	Mean	4.04	4.07	3.07	3.33	3.37
	N	75	75	75	75	75
	Std. Deviation	1.108	.935	1.245	1.427	1.523

### Own analysis

The mean analysis of Choice of material shows that those whom have chosen clothing and paper as their packing material shows greater concern and more support for extra cost of ecofriendly packing than those whom chose plastic. But the awareness levels between these respondents is low which can mean that their might be other factors which promote clothing and paper as packaging material.

## 4.3. Hypothesis Testing

### 4.3.1. Correlation Analysis

H1: The awareness about plastic Consumption is dependent on Age

**Table 4.4. Correlation analysis of age with awareness**

**Correlations**

<b>Correlations</b>			
		Age	AWARENESS
Age	Pearson Correlation	1	-.218
	Sig. (2-tailed)		.061
	N	75	75
AWARENESS	Pearson Correlation	-.218	1
	Sig. (2-tailed)	.061	
	N	75	75

**Own analysis**

The Pearson Bivariate correlation coefficient for our above hypothesis came out to be - 0.218 this showed that age and awareness have a negative correlation i.e. younger people are more aware than older people. Also the value of Pearson coefficient is low i.e. 0.218 showing that there is a weak relation between age and Awareness.

This can be attributed to the fact that the recent trends of plastic awareness have been brought down in recent year. The reduction in campaigns in recent times can be the cause of the low awareness relationship we are seeing in our analysis.

H2: Perceived consumer Awareness has a direct impact on concern for the environment

**Table 4.5. Correlation analysis of awareness with concern**

**Correlations**

		AWARNESS	CONCEN
AWARNESS	Pearson Correlation	1	-.017
	Sig. (2-tailed)		.885
	N	75	75
CONCEN	Pearson Correlation	-.017	1
	Sig. (2-tailed)	.885	
	N	75	75

**Own analysis**

The Pearson correlation between the Awareness and Concern factor comes out to be -0.017 this indicates that there is a very impact of awareness about plastic pollution on the concern levels about pollution among the respondents.

**4.3.2. Chi square test**

H3: the family income has a direct impact on the willingness to pay extra money for Eco-friendly packaging.

The Chi-square test for the dependence of family income and willingness to pay extra came out to be 0.907 this shows that there is a significant relationship between the family income and willingness to pay extra. This shows that as family income increases people would be more readily spend on eco-friendly packaging.

**Table 4.6. Chi square test analysis**

Case Processing Summary						
	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
FAMILYINCOME * EXTRAPAY	75	100.0%	0	0.0%	75	100.0%

FAMILYINCOME * EXTRAPAY Crosstabulation						
FAMILYINCOME			Maybe			Total
			Yes	Maybe	No	
10-15	Count		6	1	8	15
	Expected Count		5.8	2.2	7.0	15.0
15-20	Count		7	4	6	17
	Expected Count		6.6	2.5	7.9	17.0
5	Count		5	2	6	13
	Expected Count		5.0	1.9	6.1	13.0
5-10	Count		11	4	14	29
	Expected Count		11.2	4.3	13.5	29.0
5-10 LPA	Count		0	0	1	1
	Expected Count		.4	.1	.5	1.0
Total	Count		29	11	35	75
	Expected Count		29.0	11.0	35.0	75.0

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.397 <sup>a</sup>	8	.907
Likelihood Ratio	3.842	8	.871
N of Valid Cases	75		

a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .15.

**Own analysis**

H4: perceived consumer Awareness has a strong impact on actions taken to reduce plastic consumption

**Table 4.7. Chi square test analysis of awareness and action**

→ Crosstabs

**Case Processing Summary**

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
AWARNESS * ACTION	75	100.0%	0	0.0%	75	100.0%

**AWARNESS \* ACTION Crosstabulation**

AWARNESS		Count	ACTION			Total
			Maybe	No	Yes	
1	Count		2	3	11	16
	Expected Count		3.0	3.6	9.4	16.0
2	Count		1	3	2	6
	Expected Count		1.1	1.4	3.5	6.0
3	Count		5	2	3	10
	Expected Count		1.9	2.3	5.9	10.0
4	Count		3	4	13	20
	Expected Count		3.7	4.5	11.7	20.0
5	Count		3	5	15	23
	Expected Count		4.3	5.2	13.5	23.0
Total	Count		14	17	44	75
	Expected Count		14.0	17.0	44.0	75.0

**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.960 <sup>a</sup>	8	.204
Likelihood Ratio	9.293	8	.318
N of Valid Cases	75		

a. 10 cells (66.7%) have expected count less than 5. The minimum expected count is 1.12.

**Own analysis**

The Chi-square test results in the value of 0.204 this implies our hypothesis is rejected. That means that even though we had high level of awareness. The awareness alone has not resulted in action of people.

**4.3.3. T-test Analysis**

H5: Gender has no impact on the view of The benefits of environmental protection in the form of avoiding plastic consumption justify the costs involved in it

**Table 4.8. T-test analysis of male and justification**

## T-Test

### Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
JUSTIFICATION	Male	45	4.02	1.033	.154
	Female	30	4.13	.776	.142

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Significance		Mean Difference
						One-Sided p	Two-Sided p	
JUSTIFICATION	Equal variances assumed	.504	.480	-.502	73	.309	.617	-.111
	Equal variances not assumed			-.531	71.880	.299	.597	-.111

## Own analysis

The analysis shows us that both genders equally support the cost of eco-friendly packaging for the benefit of the environment.

## CHAPTER- 5

## CONCLUSION

The analysis of the data reveals us that although the awareness level among people is high it does not amount to concern level between people. There is a negative correlation between awareness and age which shows that younger people are more aware of plastic pollution. The Pearson correlation between the Awareness and Concern factor comes out to be -0.017 this indicates that there is

a very small impact of awareness about plastic pollution on the concern levels about pollution among the respondents. Further research will be required to analyze what concern levels of individuals depend upon. Also as a solution of avoiding plastic packaging by eco-friendly packaging is accepted by the population and does not depend upon the income of people. Also increasing awareness does not lead people to take action for reducing their plastic consumption and there is no difference in preference for eco-friendly packaging between the genders.

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[b](#)

## **ANNEXURE**

### **Questionnaire used-**

1. Age - (answer in numeric Form)
2. Gender
  - Male
  - Female
  - Other

- Prefer not to say)
- 3. The first choice of your packing material is
  - Paper
  - Plastic
  - clothing
- 4. Do You Know Plastic is the number one Packing Material in the world?
  - Yes
  - No
  - Maybe
- 5. Do You Know Plastics are made up of Harmful Materials?
  - Yes
  - No
  - Maybe
- 6. Is Plastic a major Contributor to Global Warming
  - Strongly agree
  - Agree
  - Neutral
  - Disagree
  - strongly disagree
- 7. How much purchase of your come with Plastic wrapping? (below and up to %)
  - 20
  - 40
  - 60
  - 80
  - 100
- 8. Is Plastic your go to material for packing anything
  - Yes
  - No
  - Maybe
- 9. Do you still see the usage of single use plastic in the market?

- Yes
- No
- Maybe

10. Are you aware about the Micro Plastic Problem?

- Yes
- No
- Maybe

11. Whom should pay for ecofriendly packing?

- Companies
- Consumer

12. Will you be willing to pay extra for eco-friendlier packing?

- Yes
- No
- Maybe

13. How Much Price would you be willing to pay for a sustainable ecofriendly packing of your products?

- 20
- 60
- 50
- 100

14. Do you feel mircoplastic are dangerous for your health

- Strongly agree
- Agree
- Neutral
- Disagree
- strongly disagree

15. Do you feel it's the responsibility of the companies to provide ecofriendly packing?

- Yes
- No
- Maybe

16. Should plastic be completely banned from being used in packing of goods?
- Yes
  - No
  - Maybe
17. Have You taken any initiatives to control the plastic consumption?
- Yes
  - No
  - Maybe
18. What is your Combined Family Income (in LPA)?
- below 5LPA
  - 5-10
  - 10-15
  - 15 and above
19. The Environmental pollution due to plastic consumption is one of the most critical environmental concerns today.
- Strongly agree
  - Agree
  - Neutral
  - Disagree
  - strongly disagree
20. The benefits of environmental protection in the form of avoiding plastic consumption justify the costs involved in it.
- Strongly agree
  - Agree
  - Neutral
  - Disagree
  - strongly disagree
21. Are we doing enough to protect the environment and counter plastic pollution
- Strongly agree

- Agree
- Neutral
- Disagree
- strongly disagree