

Project Dissertation Report On
SURVEY OF CONSUMER AWARENESS AND
ATTITUDE TOWARDS E-WASTE
MANAGEMENT

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CERTIFICATE

This is to certify that the project report titled “**Survey of Consumer Awareness and Attitude Towards E Waste Management**” as part of the final year Major Research Project submitted by **Lidwin Cleetus - 2K18/EMBA/516** in Fourth Semester of MBA, Delhi School of Management, Delhi Technological University during January - May 2020 was conducted under my guidance and supervision.

This work is his original work to the best of my knowledge and has not been submitted anywhere else for the award of any credits/degree whatsoever.

This project is submitted to Delhi School of Management, Delhi Technological University in partial fulfillment of the requirement for the award of the degree of Master of Business Administration.

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DECLARATION

I hereby declare that work titled “**Survey of Consumer Awareness and Attitude Towards E Waste Management**” as part of the final year Major Research Project submitted by me in the Fourth Semester in MBA, Delhi School of Management, Delhi Technological University, during January - May 2020 under the guidance of Prof. P.K. Suri is my original work and has not been submitted anywhere else.

The report has been written by me in my own words and not copied from elsewhere. Anything that appears in this report which is not my original work has been duly and appropriately referred/cited/acknowledged.

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I have put all my efforts to ensure that the project is completed in the best possible manner and also ensured that the project is error free.

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ABSTRACT

Increased usage and ever-increasing demand of electronic products in daily life has led to growth in the amount of waste that is being generated from electrical and electronic equipment. The current situation in India is alarming due to the fact that along with China, it is the largest importer of E-Waste, with only 3% of it being recycled properly. Considering the volumes of E-Waste that is being generated, there is a need to understand the need for its efficient disposal and management along with the environmental and health problems that are being faced currently due to its informal recycling.

The research paper focuses on presenting an outline on E-Waste along with understanding the consumer behavior and awareness on the management of E-Waste that is being generated in Delhi through Descriptive research method. For this purpose, data was collected through questionnaire-based surveys to understand the awareness level among people regarding existing E-Waste management measures and the attitude towards the same. The target respondents for the survey included households, offices and youngsters. Different zones based on population density and socio-economic status from Delhi were selected for the survey. The paper also intends to study trend analysis of historical data on E-Waste along with analysis on the secondary data that was collected from various sources to highlight and bring forward the schemes and solutions to assist the management of increasing quantities of E-Waste.

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CHAPTER 1

1 INTRODUCTION

1.1 Background

The significant rise in E-waste volumes is a critical issue in the global development paradigm. The government decided to restructure the power sector in a phased manner starting from 1991, through liberalization and inviting foreign players to infuse funds and introduce modern technology.

It was concluded that 50 million tons of E-waste generation will happen globally. More than half constituted of devices such as smartphones, computers, TVs and electronic tablets, while rest of it was larger in house appliances like washing machine, air conditioner etc. Out of all this, it is a matter of huge concern that only 20% of it is recycled every year, and a big implication of this is that 40 million tons of it is disposed off in landfills, burned down or in improper and hazardous manner. This occurs in spite of the fact that around 66% world population is already regulated by e-waste legislation. Most of the governments acknowledge the fact that consumers are the key resources in the entire cycle to ensure better e-waste management. The aim must be to encourage consumers to properly dispose off the e-waste in the realm of defined recycling procedures, ensure reuse rates and develop sustainable consumer habits to cultivate a circular economy.

Within India, the quantification of e-waste recycled and disposed of is difficult due to the absence of developed resources of E-waste management. As per the Central Pollution Control Board from 2005, it has been forecasted that E waste of 0.8 million tons was to be generated by 2010. Although such an estimate was forecasted beforehand, it has been reported multiple time that number was greater. Nearly 82% of the forecasted value consisted of personal electronic devices.

India is ranked 5th in the world among the highest e-waste producing countries-USA, China, Japan and Germany. The report said, “The multitude of increase was mainly attributed to India”. *“Electronic Waste Management in India*, an ASSOCHAM-KPMG study, has identified computer equipments contributing almost 70%, tailed by phones (12%), electrical electronics (8%) and medical electronics (7%) and remaining contributed by household e-waste. The increment in the amount of e-waste generated is because of large amount of consumption and obsolescence. Discarding of mobiles, computers, fitness bands and other equipment has been much faster than their actual lifespan. As per

the study conducted in May 2017, the E-waste volume has been increasing at growth rate of 21% annually. By 2020, e-waste from discarded mobile phones in India would be about 18 times higher; from old computers would increase by 500%; from televisions it will be 1.5 to 2 times higher.

The newly launched E-waste (Management) Rules, 2016 established the concept of Extended Producer Responsibility (EPR) which made it mandatory for producers of electronic and electrical equipment to register and specific entities for collection of e-waste and ensure the channelization to authorized and regulated recyclers.

In March 2018, the E-waste (Management) Amended Rules reduced the target to 10% for 2016-17 (as against 20%), 20% for 2017-18 (remains same). By the seventh year the target rose up to 70. The sections 15 and 16, specify a fine that may extend to Rs. 1 lakh or maximum 5 year imprisonment term as penalty for non-compliance.

The Central Pollution Control Board (CPCB) has provided EPR authorization to 726 producers as on 12th October 2018. The authorization, with validity for five years from the issue date, clearly specifies the collection entities for producers for a timeline of 5 years. However, no one is utilizing the random check provisions, as defined by the rules. There is no existence of independent mechanisms to check the claims which are made in authorizations. Improper implementation has defamed the robust set of defined rules.

The issue of e-waste has been discussed to some of the levels; however, it has not been addressed at a large scale to make a substantial and big impact, especially in the sectors which are unorganized in nature. Biggest proper lies in the improper handling of E-waste. Unfortunately, India is in no way equipped in proper skilled labor to manage e-waste and the recycling processes which accompanies with them. The fact that only 1.5% of e-waste is getting recycled highlights the role of the unorganized sector as well as none so ever awareness regarding e-waste management accompanied with its recycling processes. The elements which can be reused like the base metals are lost and it also leads to soil contamination which is caused by crude and unorganized dismantling. Consumers of electronic or electric devices are not educated about the end of the product value chain. Information should be provided with the product package about the responsibility of the consumer or the e-collection centre for the product. New schemes around refunds on recycling of the product, is not available in India. It should be adopted as one of the methods to incentivize consumers.

With an annual electronic waste generation of 1.8 million metric tons in 2016 and forecasted value of 5.2 million metric tons by 2020, India is racing ahead. Mumbai ranks top in the list of top 10 Indian

e-waste generating cities, followed by other cities like Delhi, Bengaluru, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat and Nagpur. The primary source of E-waste are the government, public and private sectors accounting nearly 70%. Individual households are contributing around 15%. The remaining 15% is contributed by various electronics manufacturers. Such a scenario of e-waste generation in India, highlights the fact that it is high time the government rises to the occasion and assumes responsibility to prevent health hazards and environmental damages. To tackle this, it is necessary to educate the consumers about E-waste. Electrical and electronic equipment which have crossed their expiry date or have become unfit for their originally intended use are called “e-waste”.

Computers, monitors, mainframes, servers, CDs, scanners, printers, copiers, fax machines, calculators, battery cells, transceivers, cellular phones, TVs, iPods, medical apparatus, air-conditioners, washing machines and refrigerators are examples of e-waste. Valuable metals such as gold, silver, platinum and copper can be recovered from e-waste if it is processed scientifically, However, substances like polychlorinated biphenyls (PCBs), liquid crystal, mercury, lithium, nickel, selenium, brominated flameproofing agent, arsenic, barium, cadmium, copper, chrome, lead and cobalt, which form an inherent part of electrical and electronic equipment, are carcinogenic and toxic. If e-waste is processed and dismantled in a crude manner, its toxic constituents can prove dangerous to the human body. The cathode ray tubes (CRTs) in computer monitors, with heavy metals like cadmium, lead and barium may be harmful during their improper processing and cause an adverse impact on the human respiratory and nervous systems. Similarly, cadmium and lead in printed circuit boards, mercury in flat-screen monitors and switches, beryllium in motherboards, polyvinyl chloride (PVC) in cable insulation, cadmium in computer batteries and bromine in plastic housing may damage human body parts such as the nervous system, lungs and skin, kidney and liver, heart, brain and skin, liver and muscles, kidney and liver, endocrine system and immune system.

Around 90% of the disposal and recycling of E-waste is carried out by the unorganized or informal sector. Such sectors constitute of unskilled workers who work without any safeguards or protection measures, but dwelling in slums near landfills and e-waste dumps which are untreated. For instance, they do not wear any mask or glove while utilizing nitric acid to remove platinum and gold soldered in the electronic circuit boards. Small kids are majorly engaged in disintegrating the circuit boards without any protection of any kind. The public and private sectors mainly sell their e-waste to informal labor since they are able to draw more price as the expenditure for recycling through the unorganized sector is less.

1.2 Objective of Research

The main objective of conducting this survey is to present the level of customer attitude and awareness towards E Waste Management through a representation of data collected. Based on the data collected, a pattern has been tried to be established among the consumers which can be targeted by the Government or respective regulatory bodies and in turn, improve the policies and practices of the E Waste management.

Hence, to attain this main objective, following are the sub-objectives which can be formulated -

- Highlight the customer awareness towards E-Waste management.
- Highlight the customer attitude towards E-Waste management.
- Suggest solutions based on customer usage patterns in the light of E-Waste management.

Another soft objective is to encourage survey respondents to properly dispose of their E-Waste, keeping in mind methods of E-waste disposal procedures.

1.3. Scope of Research

The scope of this research can be classified in to the following -

- Geography - The survey was conducted within Delhi. The respondents have been classified, as per residential location, into North Delhi, South Delhi, East Delhi, West Delhi and Central Delhi.
- Sample Size - The sample size of population is 100. The survey was conducted with limited resources in which population was profiled on the basis of Age, Residential Location, Marital Status, Family Type, Education Qualification, Nature of Accommodation, Employment Type and Annual Income.

1.4. Concluding Remark

This chapter focused on establishing the existing E-waste management processes and issues with the current system. Focus was shed on objectives and scope of research. The next chapter focusses on the literature reviewed for conducting the survey.

CHAPTER 2

1 LITERATURE REVIEW

2.1. E - Waste Management in India

Considerable growth has been witnessed in E-waste and a major factor has been multifold in nature. Some of the factors which stand out are IT revolution, socio-economic development, innovations in technology, rise in consumer demand, rapid technological changes resulting in short product life cycles and large discounts for consumption. An average greater than 6.8 kg of E-waste is being produced for each living human being, which means at least 6 billion mobile phones are currently being operated in the world; as per The United Nations Environmental Program. One can understand the gravity of the E-Waste crisis.

The growing Indian economy has transformed in the past two decades. One of the beneficiary has been the electronics industry which has emerged fast growing sector in terms of production, internal consumption and export. This has resulted in an increment in terms of electronics usage in the country. Considering the fact that electronics have a very limited lifespan; it is inadvertent that there will be a major contribution towards E-waste.

Importance of E-waste in India in regards to volume and toxicity can be estimated in terms of a growth rate of 7-10% per annum. With such drastic growth rates, current generation of Indians are under a great threat as it can be detrimental to their lifespan and can also create great environmental changes which can be detrimental to the future of this planet. This estimation of growth rate is definitely on the higher side when compared to many developing nations in the world. These estimations are very important in nature and should not be taken lightly as they are a true indicator of the gravity of the situation of E-waste in India and all other nations. Many of the world leaders are simply ignoring this facet of E-waste and concentrating on improving their economies in the form of single way thrust of technology. Around 400,000 tons of E-waste is being produced in India alone on an annual basis. Along with Africa, India is listed as one of the biggest dumping grounds in the world as many factors like cheap labor and non-existence of stringent regulations have made it easier of India

to be marked among the top in the list. It is a matter of few years that we start to see the adverse effects of this major ignorance around the world.

2.2. Current E-Waste Management Practices

One of the biggest challenges to human society will be the sustainable management of the ever growing E- waste around the world. Management of E-waste is for sure a difficult task and reason for it being difficult include various factors such as its handling, socio-environmental repercussions, cultural changes and monetary factors, etc. Along with the quantity of E-waste, the volume of toxicity is also a pertinent cause of concern. Majority of E-waste consists of heavy metals (e.g. mercury, lead, and cadmium and hexavalent chromium) and organics pollutants (e.g. polychlorinated biphenyls, diphenyl ethers, and brominated flame retardants). Hence, E-waste management is a significant challenge, both in regards to quantity and toxicity.

A great challenge lies in front of developing countries in E-waste management, as the burden of domestic generation and illegal imports from developed countries is too large for them. A great amount of pollution and hazardous health techniques are currently adopted by such countries to tackle E-waste. Authorized recycling institutions are collecting only 3% of the actual E-waste being generated in the country. Collection of E-waste accompanied by various other processes like transportation, separation, disintegration and extraction of crucial metals are being carried out by these sectors. All these processes are being carried out through cheap labor with no skill levels and in addition to that they are exposed to hazardous elements of this process which contributes no less to the pollution around us.

To develop sustainable strategies for handling E-waste and to formulate awareness raising campaigns around the country, it is extremely important to understand the major loopholes in the existing system and at the same time it is equally important to understand the consumer behavior in terms of E-waste management and disposal in a particular country. Considering the diversity among the various states in India and its citizens, there are various factors which correspond to the consumer attitude and awareness in our country. In India, most of the time people have strong attachments to their household items which results in storage within homes or if they ever decide to part ways with their bought products they tend to make it a point to earn something out of it. This is the very basic nature of the Indian consumer. One of the most cited and accepted Extended Producers Responsibility (EPR) has been a dire failure in terms of achieving its objective for which it was formulated. It has been a long time now that leaders take an action to implement in the most suitable manner according

the fabric of our consumer's behavior. Hence, it is very important to formulate sustainable strategies for E-waste management in our country, tailored to its needs.

2.3. E- Waste Management Policies in India

'The E-waste (handling and management) Rules, 2011' and 'The E-waste (management) Rules, 2016' have constituted EPR model for making sure sustainable E-waste management practices. As per the 'E-waste (Management) Rules, 2016', "Extended Producer Responsibility means responsibility of any producer of electrical or electronic equipment, for channelization of e-waste to ensure environmentally sound management of such waste." Still, proper regulation of EPR has remained a major challenge which is due to certain unique nature of E-waste management system in India. For example, Indian consumers believe it is better to sell obsolete and broken electronics to the nearest scrap dealers for a certain amount instead of following EPR principles defined by the country. No one wants to pay for E-waste management in India; be it consumers or the producers. Major players have been the nearest scrap dealers in the vicinity, who are ready to pay something in this process of E-waste management. In developed countries the behavior has been vice versa where both consumers and producers are equal stakeholders in this process in terms of the payment. Certain recycling fees is charged from them which is kind of a tax or a fee which is in turn used for the treatment of E-waste in proper manner as defined by the regulatory authorities.

2.4. Concluding Remark

With high growth rates of E-waste in India, it has become a major challenge for the policy makers and the E-waste management entities to tackle the ever growing waste of electronics and hazardous calamities which accompany them. Moreover, the influence of consumer behavior and attitude towards electronics has a great effect on the manner in which policies are formed and processes are implemented at ground level. A major thrust has to be given to awareness and attitude of consumers towards E-waste management and its impact on their generations and the upcoming generations. The aim of this survey is to highlight the factor of consumer awareness and attitude towards E-waste management which can help to suggest the possible solutions to formulate policies targeting the specific consumers.

CHAPTER 3

2 RESEARCH METHODOLOGY

3.1. Introduction

The focus of this chapter is on the research methodology used for this study. A detailed process adopted to implement this methodology has been explained. Design of the research along with target population, instruments of research, data collection parameters and analysis methods are presented as sub sections to explain the same.

3.2. Research Design

This study used a Descriptive Survey research. Visual aids such as graphs and charts are used to aid the reader in understanding the data distribution and hence offer a better clarification on algorithmic trading, and which helps in creating a clear image on the effectiveness and decision to use it based on the market impact.

3.3. Data Collection

Primary data has been used for this research, which was collected using questionnaire-based survey form along with the statistics published across magazines and business newspapers on the relevant topics. The data collected during researches that had been conducted earlier on the same has also been made use of to analyses and monitor different aspects related to the topics.

The questionnaire broadly consisted of 3 Sections -

- Personal Information of Respondent
- Product Utilization Mapping
- Consumer Behavior towards Electronic Purchase and Usage.
- Consumer Awareness regarding Government Policies.

3.4. Validity and Reliability

To achieve content validity, parameters used to evaluate included a variety of factors associated with E-Waste Management. Reliability has been ensured by minimizing errors in the sources of measurement like data collection bias and efforts have been expended in collecting information from trusted sources.

3.5. Data Analysis

The data has been analyzed using the below techniques: -

- Pie and Bar Charts
- Power BI for Data Visualization.

CHAPTER 4

3 EMPIRICAL ANALYSIS

4.1. Demographic Information of Respondents

Section A of the questionnaire attempts to obtain the demographic information of the different respondents. Analysis reveals that out 100 respondents around 62% are in the age bracket of 25 to 34 as shown in Figure 1. Majority of the respondents belong to the North Delhi region and East Delhi region, followed by other regions as shown in Figure 2.

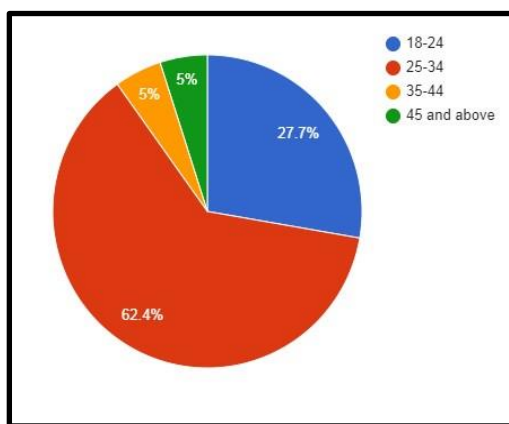


Figure 1 – Age

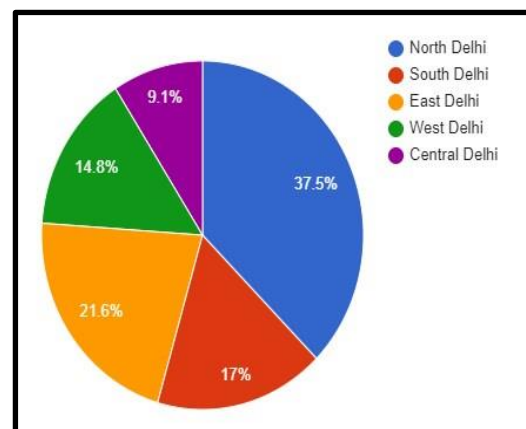


Figure 2 - Region

Around 72% of the respondents are not married as shown in Figure 3. Further analysis shows that, around 78% of the respondents are having nuclear family and only 8% are living alone, as shown in Figure 4.

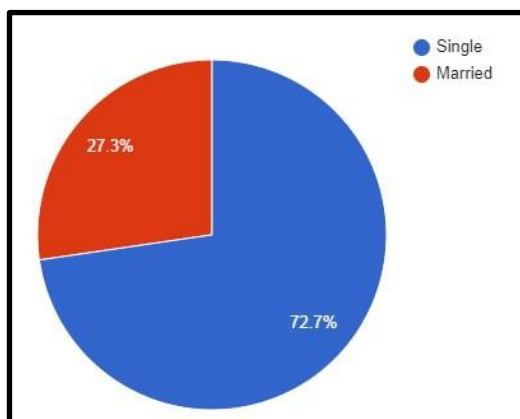


Figure 3 – Marital Status

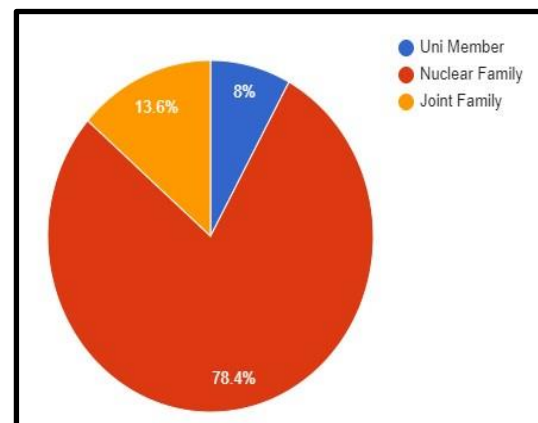


Figure 4 – Family Type

Around 60% of the respondents are graduates, around 30% are having professional degrees, 7% have diplomas and 3% are educated up to higher secondary as shown in Figure 5. Around 77% have their own homes in Delhi, and rest are living in rented accommodations as shown in Figure 6.

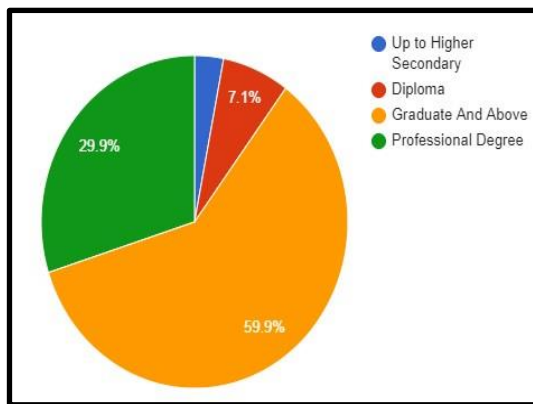


Figure 5 – Education Status

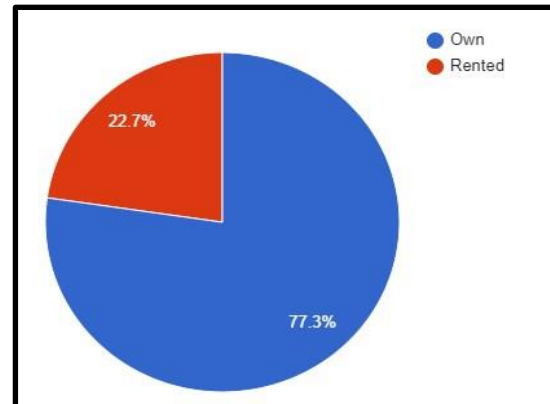


Figure 6 – Accommodation Type

Around 44% of respondents are working in private firms, 30% are not working and 10% are working in government, as shown in Figure 7. Further analysis on annual income per annum, reveals that around 40.9% are earning up to 5 lakhs INR, 29% is earning in the bracket of 5-10 lakhs INR, 23% is earning in the bracket of 10-15 lakhs INR and only around 5% earn above 15 lakhs, as shown in Figure 8.

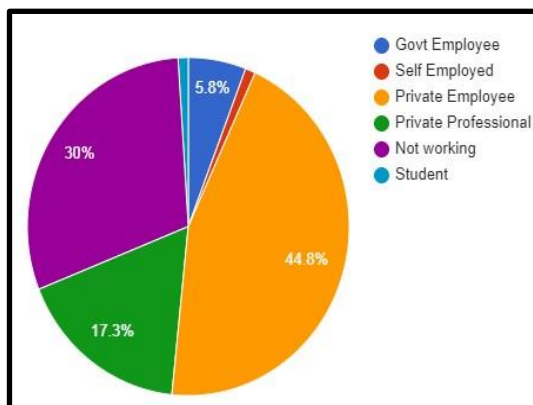


Figure 7 – Employment Type

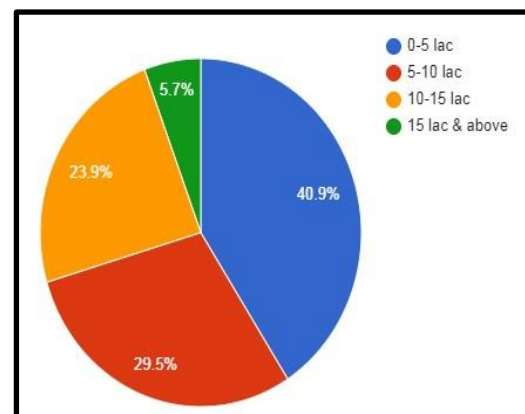


Figure 8 - Income

4.2. Most Used Electronic Products in Delhi

From the product utilization mapping, it is clearly visible that most used electronics by Delhi citizens are mobile phones, accessories, television and refrigerator. Other electronic items like fitness tracker, printer and digital camera are the least used. This can be shown in Figure 9.

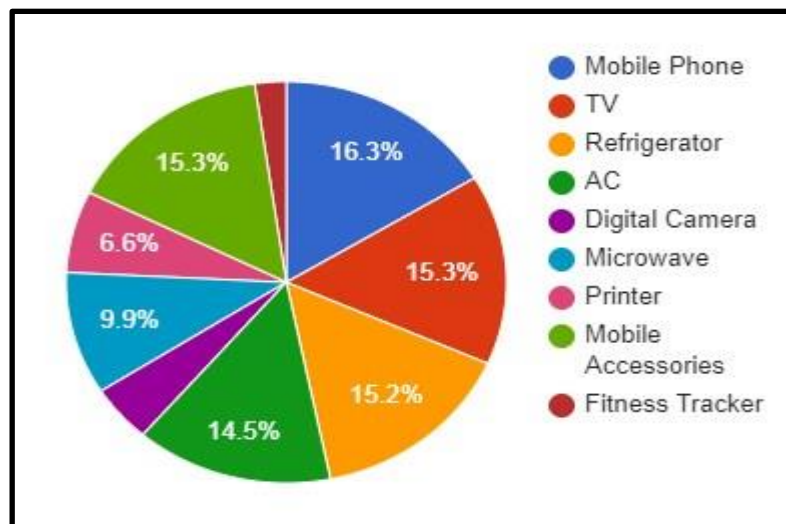


Figure 9 – Most Used Electronics in Delhi

4.3. Replacement Rate of Electronics in Delhi

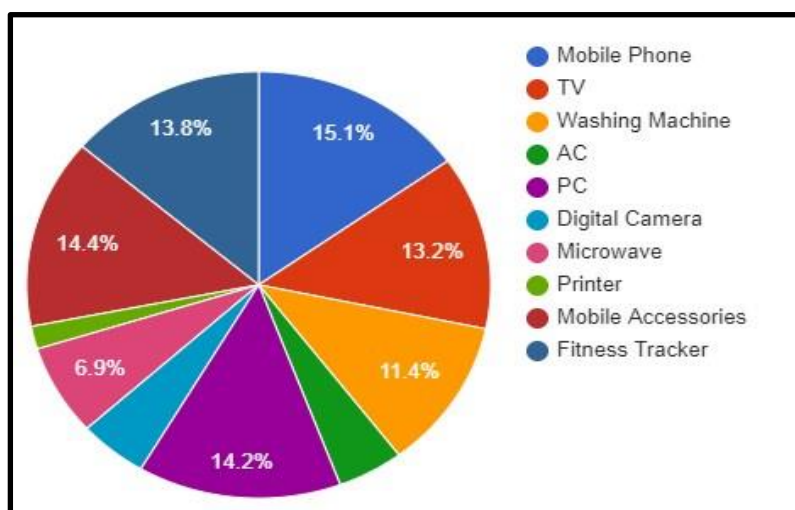


Figure 10 – Replacement Rate of Electronics

From the survey conducted, it has been clear that the rate of replacement among Delhi citizens is highest for mobile phones, which stands around 15.1% among all the electronic items included in the

survey. Mobile accessories are the next most replaced at around 14.4%. The least replaced electronic items in Delhi households are personal computer hardware's like printers, which stand at 1.7%.

4.4. Eagerness to Replace Electronics in Delhi

The eagerness to replace on a scale of 5 is the most for mobile phones and fitness trackers, which is around 17.3 % and 17.2 % respectively. They are followed by computers, digital cameras and television at 14.7 %, 12.9 % and 10.7 %. The least eagerness to replace was shown for Microwave which was at 1.1 %, as shown in Figure 11.

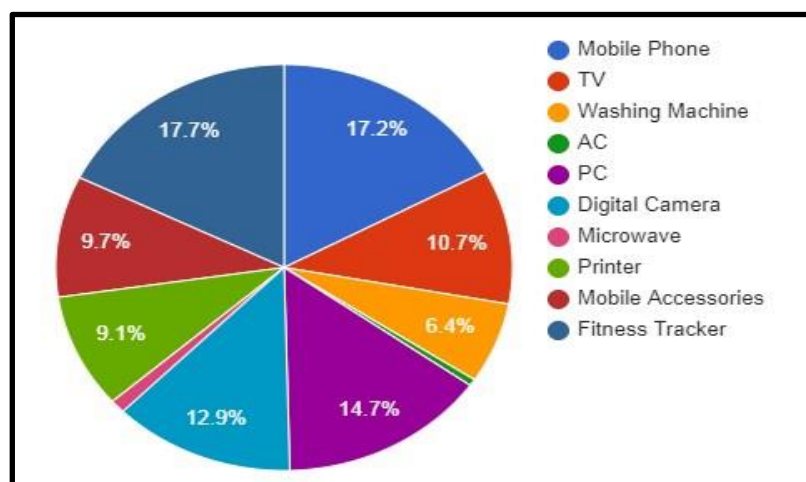


Figure 11 – Eagerness to Replace Electronics

4.5. Electronics Used for Least Years in Delhi

The survey mapped the products which will remain with customers for the least amount of time by classifying the years for which they intend to keep as 1-3 years, 4-10 years and more than 10 years. As per the survey results it has been found that the mobile phone accessories and mobile phones are the electronic items intended to be kept for the least amount of time with the respondents among all the electronic items listed in the survey. Almost 25 % of the consumers intend to keep the mobile phones and accessories for a period of 1-3 years only. As per survey results, 20.4 % respondents intend to keep using fitness trackers for a period of 1-3 years only. Washing machine is the only electronic item which falls the least in the bracket of 1-3 years, as shown in Figure 12.

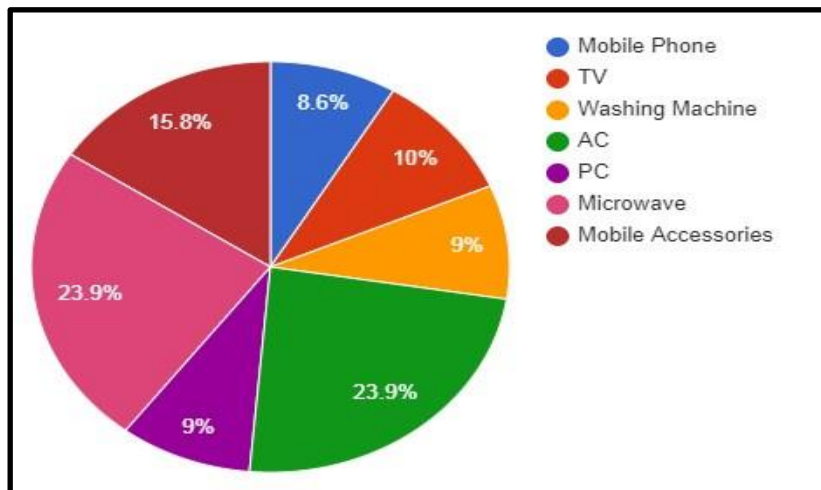


Figure 12 – Electronics Used for Least Years

4.6. Products More Likely to be Repaired in Delhi

As per the survey results, households in Delhi are more likely to repair, rather than discard, air conditioner and microwave. As shown in Figure 13, around 23.9 % respondents would like to repair them rather discard them. Mobile phones are most less likely to be repaired compared to other electronic items in Delhi households.

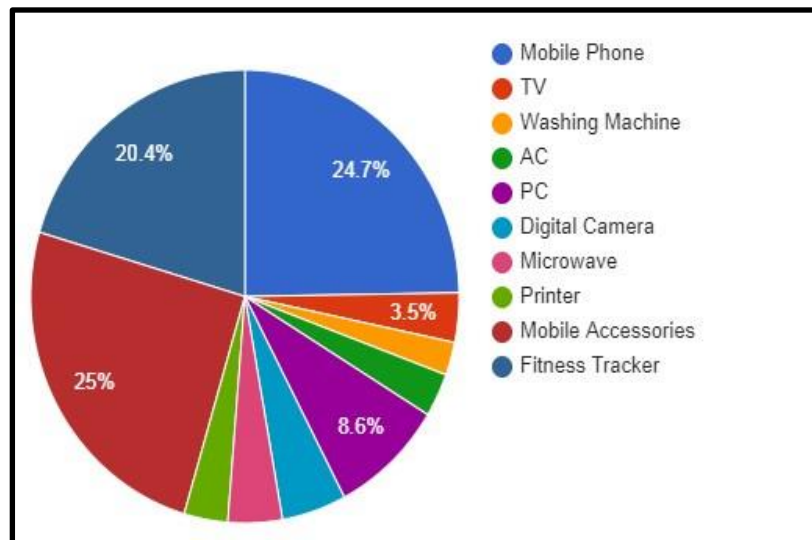


Figure 13 – Products more likely to be repaired

4.7. Products Disposed Off in Working Condition

As shown in Figure 14, almost all the electronic products are in working condition when they are disposed off.

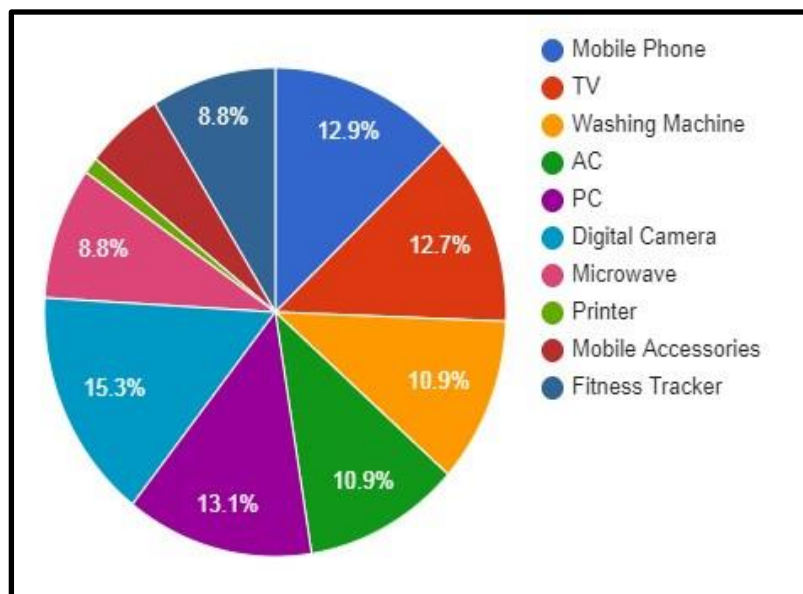


Figure 14 – Products disposed off in working condition

4.8. Electronics Stored in Delhi Households Instead of Being Discarded

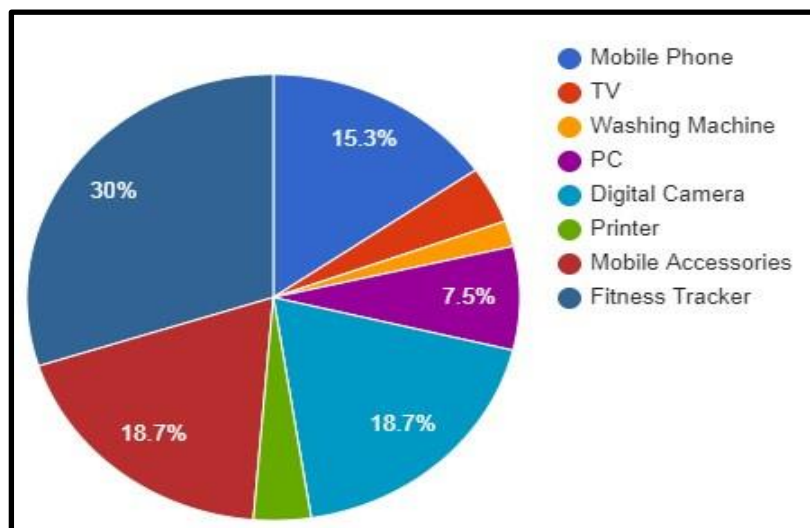


Figure 15 – Electronics stored instead of discarding

As shown in Figure 15, electronic items like fitness trackers, mobile phones and mobile accessories are mostly stored in the house rather than discarding them or selling them. 30 % of respondents are

storing the fitness trackers at their homes, followed by mobile phones by around 18.7 % and computers by 7.5 %.

4.9. Electronics Exchanged on E-Commerce in Delhi

As clearly visible in Figure 16, 93.3 % respondents consider mobile phones can be exchanged on E-Commerce platforms and 6.7 % consider air conditioners to be exchanged on E-Commerce platforms, when they go for a new one. No other product is being considered for exchange on such platforms and this can be due to low visibility or no offers for any other kind of electronic products on the popular E-Commerce platforms.

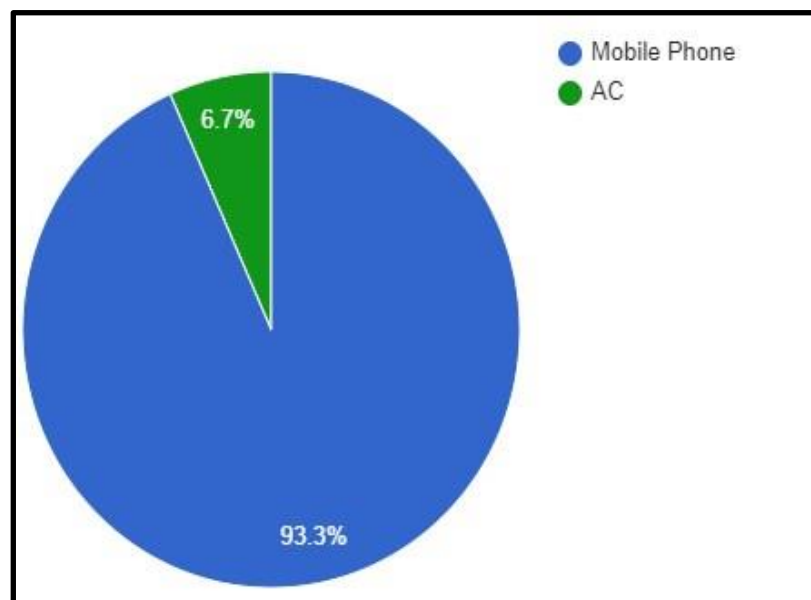


Figure 16 – Electronics exchanged on e-commerce

4.10. Factors Influencing the Purchase of Electronics

As part of survey the factors which influenced the purchase of electronics in Delhi households were categorized in to the following -

- Necessity
- New advanced features
- Status symbol
- Increase in income
- Advertisements
- Offers and discounts

As per the survey results 88.6 % of the respondents purchased the products out of necessity. Offers and discounts influenced 39.8 % of the respondents to purchase the electronic products they have as shown in Figure 17.

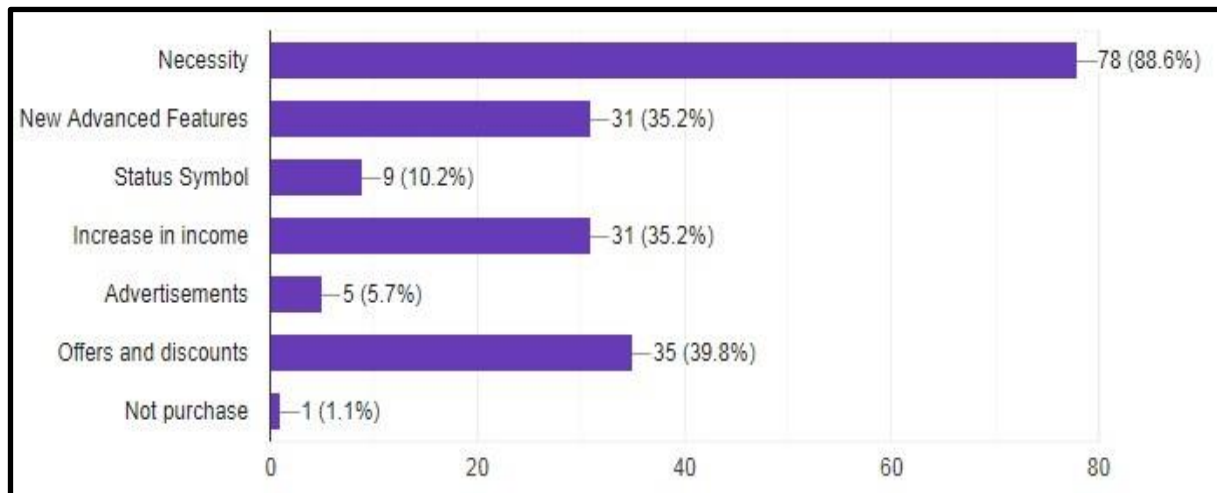


Figure 17 – Factors influencing purchase of electronics

4.11. Average Annual Expenditure Willing To Be Spent on Electronics in Delhi

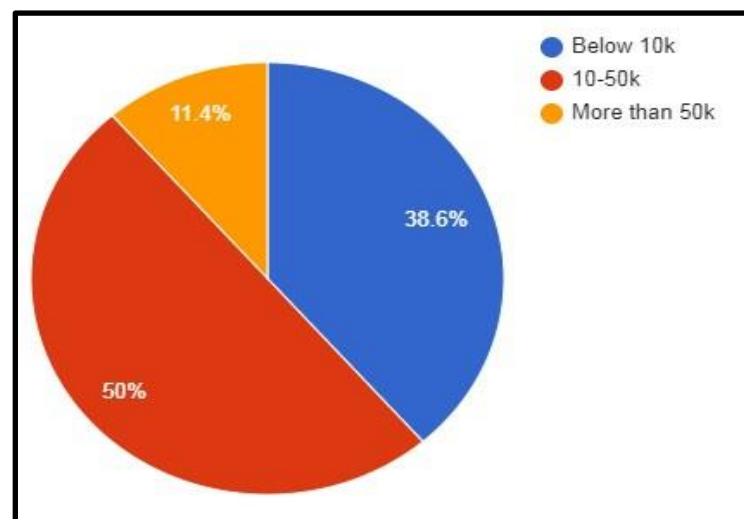


Figure 18 – Average annual expenditure spent on electronics

As per the survey results, it has been observed that 50% of the respondents are willing to spend more than 50,000 INR annually on electronics items, 38.6% are ready to spend below 10,000 INR annually and 11.4% are willing to spend more than 50,000 INR.

4.12. Consumer Attitude Towards Recyclable Nature of Electronics in Delhi

As per Figure 19, only around 38.6% of respondents care about the electronics they purchase to be recyclable in nature, rest 61.4% of respondents do not care whether the electronics they are purchasing are recyclable in nature or not.

This shows the attitude of consumers towards the electronic items they buy and signifies the fact that great deal of importance is not given to the necessity of the product being recyclable in nature. This can be stemming from the non-awareness of the importance of the issue of E-waste management.

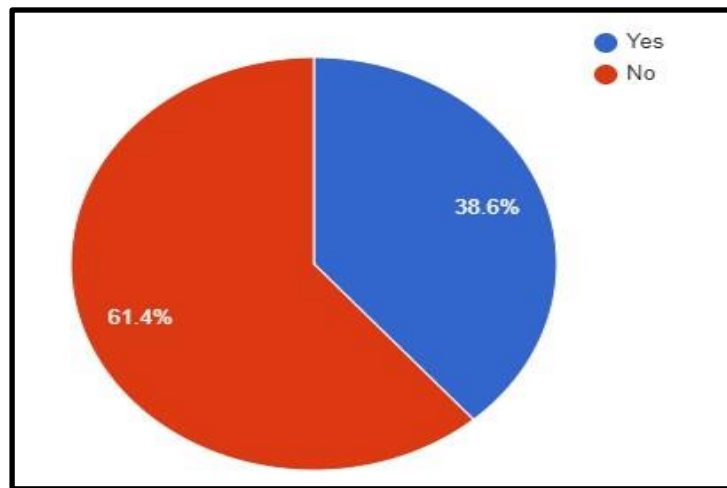


Figure 19 – Consumer attitude towards recyclable nature of electronics

4.13. Consumer Awareness about Recycling Scrap Dealers

Survey results have revealed that only 14.8% of the respondents are aware about scrap dealers who are performing recycling procedures and rest 85.2% are not aware. This clearly shows that the majority of consumers are not having much awareness regarding how scrap dealers deal with the electronic items which they dump, and this may be due to no awareness regarding this major issue.

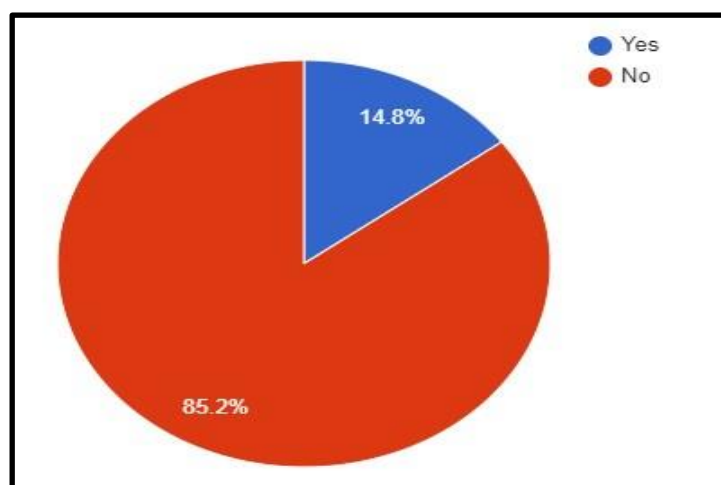


Figure 20 – Consumer awareness about recyclers

4.14. Consumer Awareness about E-Waste Start Up

90.9% of the respondents were not aware about any E-waste startups in their vicinity. Only 9.1% of the respondents were aware of E-waste startups as shown in Figure 21.

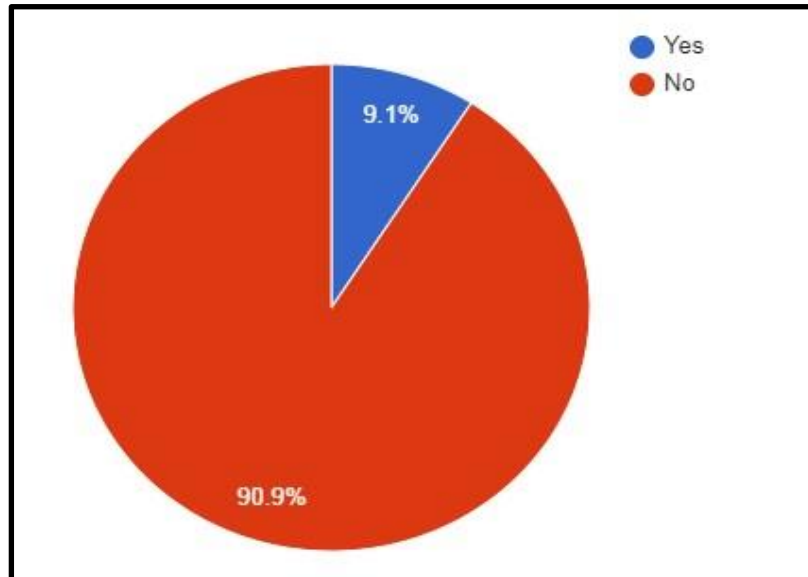


Figure 21 – Consumer awareness about e-waste start ups

4.15. Consumer Awareness about Any Government E-Waste Initiatives

As per the survey results, around 35% of the respondents are aware about the government initiatives in regard to E-waste. Still, around 64% of the respondents are still not aware about such initiatives from the government.

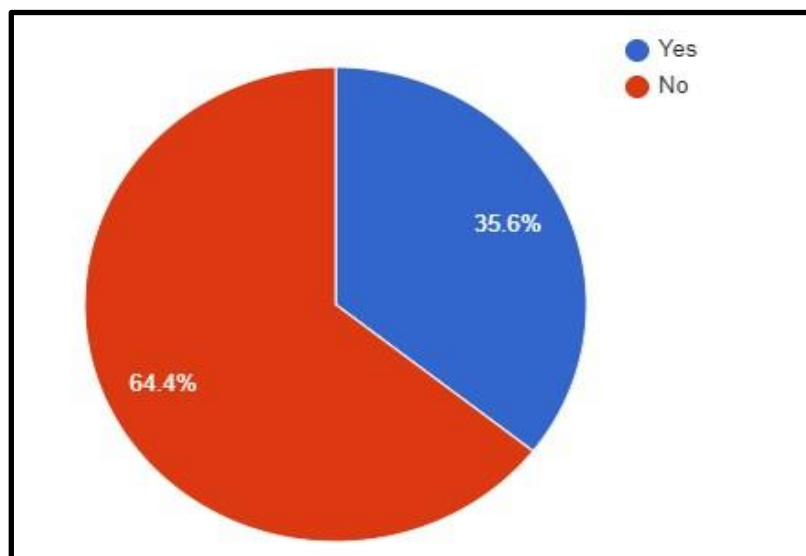


Figure 22 – Consumer awareness about government e-waste initiatives

4.16. Consumer Awareness about E-Waste Handling Rules

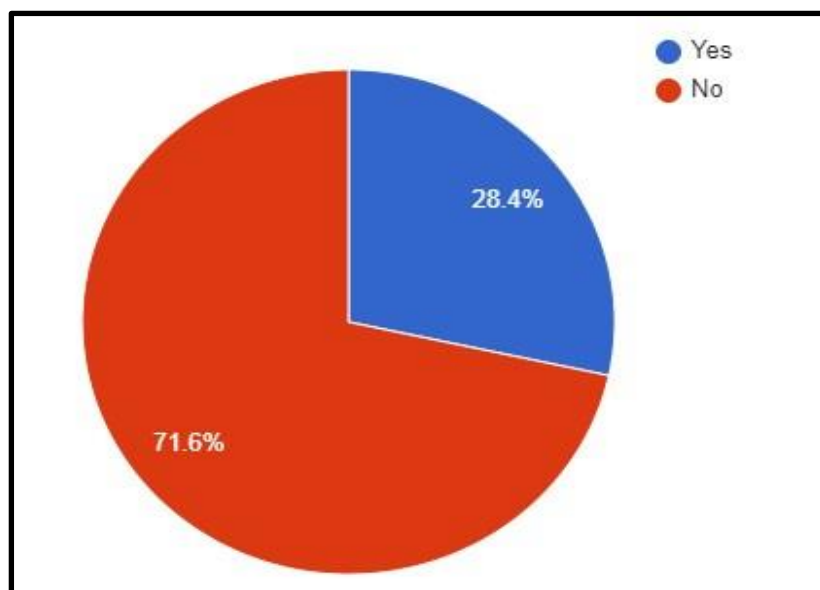


Figure 23 – Consumer awareness about e-waste handling rules

As per the survey results, 71.6% of the respondents are not aware of the E-waste handling rules defined by the government, as shown in Figure 23.

4.17. Consumer Awareness about Any Door to Door Initiative by Municipal Council

None of the respondents are aware of any kind of door to door service for E-waste management by Municipal Council of Delhi.

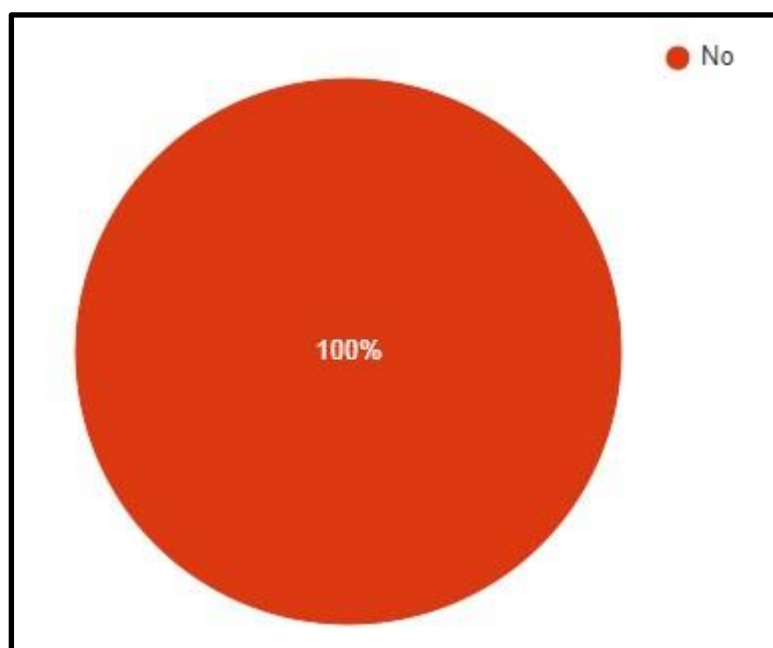


Figure 24 – Consumer awareness about MCD initiatives

4.18. Eagerness to Replace Electronics among Ages

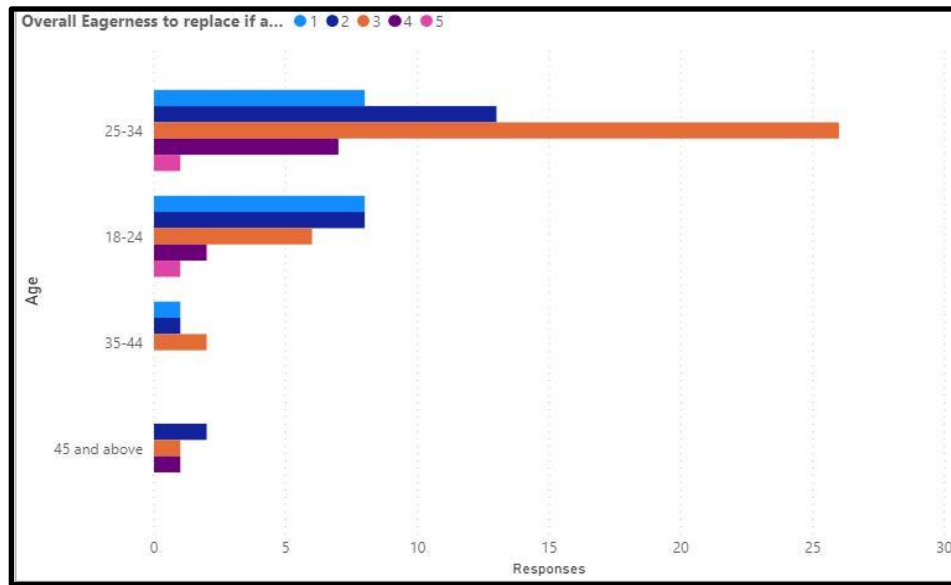


Figure 25 – Eagerness to replace electronics among ages

As shown in Figure 25, most eagerness to replace the electronic items in case of an emergence of new technology was found in the age bracket of 18-34. Respondents in the age bracket of 35-44 are not much eager to replace in case a new technology appears. The data was visualized by mapping the ages with overall eagerness scale through Power BI.

4.19. Concluding Remarks

The above survey results aim to showcase the consumer awareness and attitude towards the major issue of E-waste management in Delhi through demographic profiling of the respondents, product utilization mapping and consumer awareness about the E-waste initiatives by the government or any private firms. The empirical analysis also highlights the gaps and areas where the government and the concerned authorities can work in order to increase the awareness among the consumers and the attitude of the consumers. Some of the highlights of the survey are as follows -

- 60% of users don't care about recycling.
- More than 75% of users are not aware of the initiatives.
- More than 75% of users are not aware of E-waste rules.
- Nearly 90% of users are not aware of recycling agents nearby.

CHAPTER 5

5 Conclusions

5.1. Recommendations

The issue of E-waste is an immediate concern as it can lead to big environmental issues which can endanger human health. It is no less an issue that India is currently lagging behind in managing its e-waste management problems.

Indian citizen are not at all aware of the hazardous nature and the calamities associated with E-waste. Hence, the most important matter of concern is the awareness among the consumers. Only awareness is not enough, the attitude needs to be changed as well through various possible incentives as it is very inherent to Indians to be motivated through the various discounts and incentives on offer. If reasonable prices are provided to the consumers for used electronics, there can be a major shift in the attitude of the consumers. The unskilled workers of the unorganized sector needs to be trained and mad aware of the hazardous proportions of the E-waste. Proper collection procedures will establish the process of the reverse cycle from consumers to ultimate goal of recycled goods.

Incentives can be formulated for the recyclers as well to ensure that they become pro-active in their attempts to collect the E-waste. A dedicated media team can be established to make the young and old consumers aware about E-waste through social media like Facebook and other media options like a dedicated website for propagating the information regarding the E-waste across the regions. Tax rebate policies must be formulated to encourage consumers and producers alike. A concept of value on return must be encouraged in kirana stores which sell plastic items as is the case in European countries; wherein customers stand a chance to earn something on returning plastic products.

5 R's can be followed to improve the entire process even further -

- Recognize – The awareness among the consumers must be spread regarding the unnecessary storage of electronics being on no use. Hence, they must be encouraged to sort it out as soon as possible.
- Reduce – Consumers must be encouraged to reduce the purchase of unnecessary products; rather ensure upgradation of the existing products.
- Refurbish – Encourage the consumers to use refurbished product or to refurbish their products, which can be sold to those who need it more.
- Reuse – Obsolete products must be donated to those who need it more through a network of NGOs.

- Recycle – Producers must be encouraged to use a good percentage of recycled materials in producing new products.
- Focus should be on building environment friendly products which can be easily recycled and upgraded whenever needed. Building such easy modular designs can go a long way in achieving the goal of reusing the commodity. The ability to upgrade to new technology in the same device can help change consumers attitude and make them think twice before discarding them. Campaigns must be run in schools and colleges to make the next generation aware of the importance of E-waste management. A circular economy where a reverse flow exists from the consumers to producers to recyclers can go a long way in restoring the damage done to environment due to E-waste.

5.2. Limitations and Further Research

I believe that with further refinements in this research will increase the efficiency and effectiveness of overall project delivery and end product. Since, the research was done in limited time available there are several limitations to this survey. Some of the points which can be improved further are as follows-

- The survey was conducted through Google Forms which is not as customizable as other paid survey tools like SurveyMonkey or any other for that matter.
- The survey was too long to answer and could have been made shorter with precise questions.
- The survey does not cover the lower sections of society who are not living in residential areas. Covering the lower strata will ensure better distribution of the data points to be analyzed.
- The survey also needs to be improved in terms of the parameters and data points. Further research on each question of the survey and under expert guidance, we can improve the questions and data points.
- The number of respondents are less and can be expanded with more time at hand.
- The study could be carried out using Focus Group methodology as well and the results can be made more precise in nature.
- Furthermore, the other side of the story can be captured by creating a survey for the existing recyclers in the market. This can give a more wholesome picture regarding the issue at hand.
- An extension of this survey can result in new government policies and an analysis of the same to refine the consumer awareness and attitude in Delhi.
- Similar surveys can be carried out in other metro cities and can definitely help in the charter of a nationwide planning.

5.3. Concluding Remarks

Social media must be utilized to spread awareness about the issue of E-waste. Influencer marketing and smart marketing strategies must be adopted to fuel the information spread across as many eyes and ears as possible. Every platform which is involved in selling these electronic items must be involved in getting the information about the importance of E-waste management and disposal methods across to the consumers. A proper disposal system which can guide the consumers on how to dispose off the E-waste being generated and be a one stop platform for all their queries is important. Ad campaigns and popular entertainment mediums must make it a top priority to inform and spread awareness among the consumers. Youngsters and kids must be taught about this from young age and should be earmarked to be the trendsetters in the society which can bring in a massive shift in the consumer awareness and attitude towards the process of E-waste management.

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Annexure

Questionnaire

A Study of Customer Attitude and Awareness towards E Waste Management

Skip to question 1 *Skip to question 1*

Personal Info

1. Age *

Mark only one oval.

☐ 18-24

☐ 25-34

☐ 35-44

☐ 45 and above

2. Residential Location in Delhi * *Mark only one oval.*

☐ North Delhi

☐ South Delhi

☐ West Delhi

☐ East Delhi

☐ Central Delhi

3. Martial Status * *Mark only one oval.*

☐ Married

☐ Single

4. Type of Family * *Mark only one oval.*

☐ Uni Member

☐ Nuclear Family

☐ Joint Family

5. Educational Qualification * *Mark only one oval.*

☐ Up to higher secondary

☐ Diploma and others

☐ Graduate and above

Professional Degree

6. Nature of Accommodation * *Mark only one oval.*

☐ Own

☐ Rented

7. Type of Employment * *Mark only one oval.*

☐ Govt Employee

☐ Business/Self Employed

☐ Private Employee

☐ Private Professional (Doctor, Engineer etc.)

☐ Not Working

☐ Other: _____

8. Annual Income * *Mark only one oval.*

☐ 0 to 5 lac

☐ 5 - 10 lac

☐ 10-15 lac

☐ 15 lac and above

Note – Below questions are for one product only and the same structure has been utilized for other products.

Product Utilization Mapping

9. Do you own a Mobile Phone? *

Mark only one oval.

☐ Yes

Skip to question 10

☐ No

Skip to question 20

Nature of Purchase

10. Did you purchase this product as

Mark only one oval.

☐ New Product *Skip to question 11*

☐ Replacement of existing product *Skip to question 14*

As A New Product - Mobile phone

11. Eagerness to replace it if a new technology appears

Mark only one oval.

| | | | | | |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|
| 1 | 2 | 3 | 4 | 5 | |
| Very Low | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very High |

12. Eagerness to replace if a new updated model of the same product is launched in the market

Mark only one oval.

| | | | | | |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|
| 1 | 2 | 3 | 4 | 5 | |
| Very Low | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Very High |

13. How long would you stick to this product?

Mark only one oval.

☐ 1 - 3 years

☐ 4 - 10 years

more than 10 years

As a Replacement - Mobile phone

14. How many years later did you replace the old product with the new one?

Mark only one oval.

☐ Before 1 year

☐ 1-2 year

☐ 2-3 year

☐ 3-5 year

☐ 5 and above

15. Had you been provided an option to repair the old product for which you bought this one as a new product, would you have repaired it?

Mark only one oval.

☐ Yes

☐ No

☐ Maybe

16. If answer to the previous question is No – If the margin of amount would have been nominal between repair and buying of new product, would you have repaired it ?

Mark only one oval.

☐ Yes

☐ No

☐ Maybe

17. If answer to the previous question is No– What was the reason for replacement?

Mark only one oval.

☐ Beyond Repair

☐ Outdated

☐ New features

18. What was the condition of the gadget while discarding?

Mark only one oval.

☐ Broken

☐ Working Condition

☐ Beyond Repair

☐ Other: _____

19. Option Adopted to dispose the product

Mark only one oval.

☐ Store it in house

☐ Dispose it in dustbin along with the other waste

☐ Donate to Friends, relatives

☐ Return to Seller in exchange for new product

☐ Handover to scrap dealer

☐ E-Commerce Exchange Offers

☐ Company Exchange

☐ Government E-Waste disposal scheme

☐ Other: _____

Electronic Gadgets Utilization Behavior and Awareness

130. Which all electronic products out of the below exist in your household?

Check all that apply.

☐ Air Conditioner
—

☐ Refrigerator
—

☐ Headphones/Earphones
—

☐ Mobile accessories (Charger, USB cable etc.)
—

☐ Tablet
—

☐ Printers
—

☐ Straightener
—

☐ Dryer
—

☐ Mouse
—

☐ Induction Devices
—

131. Purchase of gadgets are influenced by

Check all that apply.

☐ Necessity

—

☐ New Advanced Features

—

☐ Status Symbol

—

☐ Increase in income

—

☐ Advertisements

—

☐ Offers and discounts

—

Other: ☐

—

132. How much are you willing to spend on electronic gadgets in a year on an average?

Mark only one oval.

☐ below 10k

☐ 10-50 k

☐ more than 50 k

133. While purchasing a product do you care if that product is recyclable or not?

Mark only one oval.

☐ YES

☐ NO

134. Have you checked/aware whether scrap dealers recycle the E-Waste properly?

Mark only one oval.

☐ YES

☐ NO

135. Do you know any registered recycler in your area?

Mark only one oval.

☐ YES

☐ NO

136. Are you aware of any E-Waste startup near your vicinity?

Mark only one oval.

☐ YES

☐ NO

137. Are you aware of any Government initiative for E-Waste?

Mark only one oval.

☐ YES

☐ NO

138. Are you aware of E-Waste management handling rules defined by the Government?

Mark only one oval.

☐ YES

☐ NO

139. Are you aware on any kind of door-to door collection initiative from NDMC? *Mark only one oval.*

☐ YES

☐ NO

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