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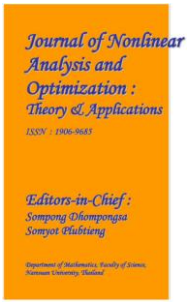

THE FLOW OF WEALTH FROM E-WASTE IN GREATER MUMBAI

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Abstract
E-waste which is generated out of electronic gadgets or processes and contains harmful and precious chemicals and metals. When handled very well, it is a wealth generating sector for the ones involved. In India e-waste management is majorly at the hands of the informal sector workers who collect the waste from various areas and sell it to earn their daily bread. The present study aims to understand the nature of e-waste collection and management industry in the study area, to explore the opportunities for the people involved in the sector and to understand the impacts of the occupation on their socio-economic and health status. The research methodology is systematically designed to build a questionnaire with the help of literature review from secondary sources and conducting a detailed survey using interview and observation methods. The data has been analyzed using MS-Excel and IBM SPSS software and represented accordingly. The major findings of the study indicate that informal the e-waste collectors collect enormous amounts of e-waste, segregate them and sell the precious parts to earn their livelihood to the nearest recycling company. Pregnant women and children are involved in the entire process which affects their mental and physical health. It is therefore recommended that the legislation be strengthened, the sector be formalized, ergonomic hazards be curbed in several ways, awareness be spread and education be provided to their children. To conclude, it can be said that e-waste sector is a promising sectors which needs a systematic intervention to perform better.
Keywords: e-waste, management, wealth generation, women and children, health

INTRODUCTION

As one of the largest and most populous cities in India, Mumbai generates a substantial amount of electronic waste, comprising discarded computers, smartphones, and other electronic devices. This e-waste, often improperly disposed of, poses environmental hazards due to toxic components. However, amidst this challenge, a parallel economy has emerged. Informal sectors engage in the collection, dismantling, and extraction of valuable materials from e-waste. Precious metals like gold, silver, and copper are reclaimed, contributing to a flow of wealth within these informal networks. While this practice aids in resource recovery, it also raises concerns about worker safety and environmental sustainability. The challenge lies in finding a balance between harnessing the economic potential of e-waste and implementing sustainable practices to mitigate its adverse environmental impacts.

REVIEW OF LITERATURE

[1] Participation of women as daily wage labourers in Mumbai's e-waste sector is very high. [2] The informal sector in e-waste management has long been recognised and it is evident that the informal sector is at utmost danger of experiencing the various effects of e-waste recycling. Therefore, it is advised that researchers take up the issue seriously and seriously assess the health impact of e-waste and find solutions for the same. [3] 95% of India's e-waste is recycled in the informal sector, characterised by labyrinthine grey market networks. This leads to an increased precariousness for the labour force comprising the informal e-waste sector. [4] The author has examined the role of informal sector in e- waste management in India with special emphasis on the National Capital Region. It

highlights India's role in global e-waste generation, recycling and transfer and concludes that India has a large share in the global e-waste market. [5] Mumbai is at the first position among the top 10 cities in India with respect to generation of e-waste. [6] The researchers have highlighted that the total quantity of WEEE generated in Mumbai is very high, yet there is not much action taken by the Maharashtra Pollution Control Board (MPCB) to manage it well.

RESEARCH GAPS

- Absence of micro level analysis of the e-waste sector in the study area
- Geospatial e-waste flow tracking
- Socio-economic analysis of e-waste workers

RESEARCH OBJECTIVES

- To analyse the socioeconomic conditions of the informal e-waste workers in the study area
- To provide an overview of the awareness, scale and health risks of the informal e-waste workers in the study area
- To understand the flow of e waste in the study area
- To give practical solutions to improve the conditions

RESEARCH HYPOTHESIS

H1= All workers in the informal e-waste recycling sector are migrants
H1o= Not all workers in the informal e-waste recycling sector are migrants
H2= All workers and bystanders are suffering from one or more health problems due to exposure to e-waste
H2o= Not all workers and bystanders are suffering from one or more health problems due to exposure to e-waste

RESEARCH METHODOLOGY

Coverage

The area chosen for the research is Greater Mumbai. Its latitudinal extension is from 18^0 East to 19^0 East and longitudinal extension is from 72.82^0 North to 73.00^0 North approximately. There are 24 wards in Greater Mumbai. The area comprises of Mumbai District and Mumbai Suburban District. The Arabian Sea borders it on the south and west, the Ulhas River on the north, and Thane Creek on the east. It serves as both the financial and state capital of Maharashtra. It is a significant industrial centre for the entire country. The area is under the management of Municipal Corporation of Greater Mumbai and is one of the largest (administrative area) municipal corporations of the country. The total area of Greater Mumbai is 437.71 sq. kms.

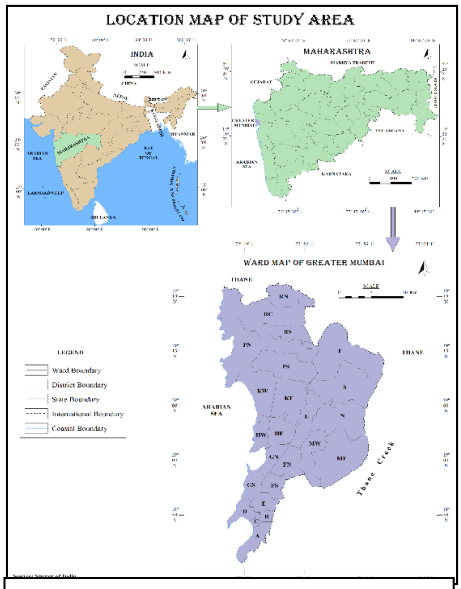


Figure 01: Location of Study Area

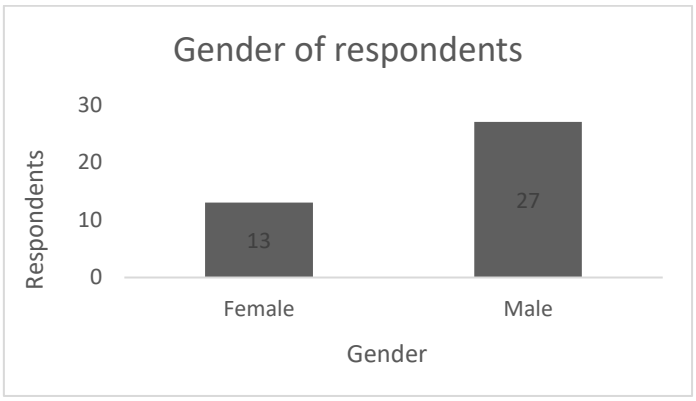
Data Collection

The tool used for collection of data is a close-ended questionnaire prepared using Google Forms for the ease of data collection and storage. The method used is survey method. The total number of samples is 40. The respondents are spread across the city.

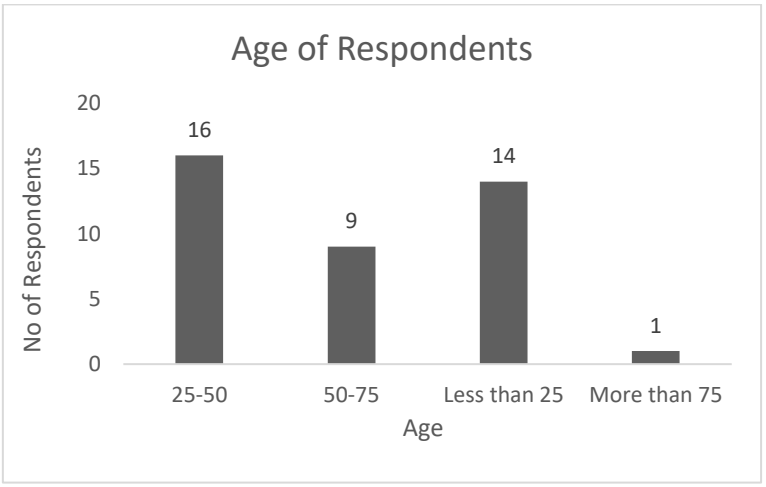
Data Analysis

The data has been analyzed using software like QGIS v. 3.16, MS-Excel and IBM SPSS 21 software. The same has been represented using maps, figures and charts.

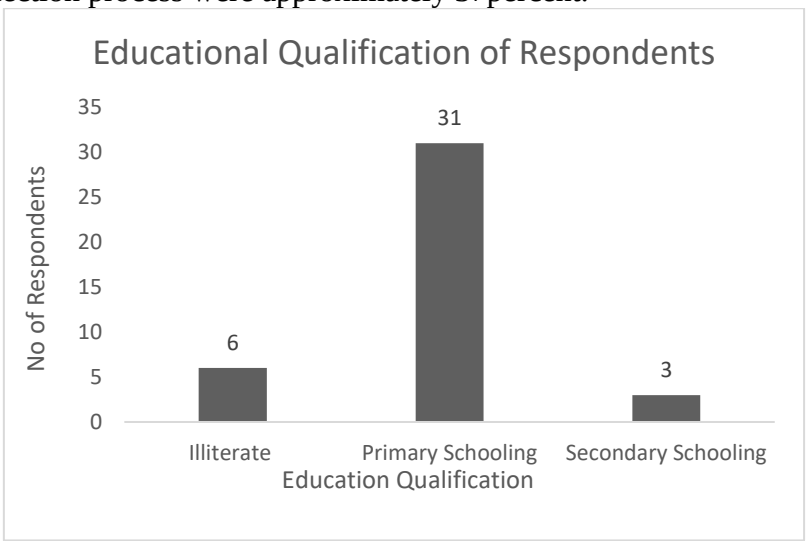
RESULTS, ANALYSIS AND DISCUSSION



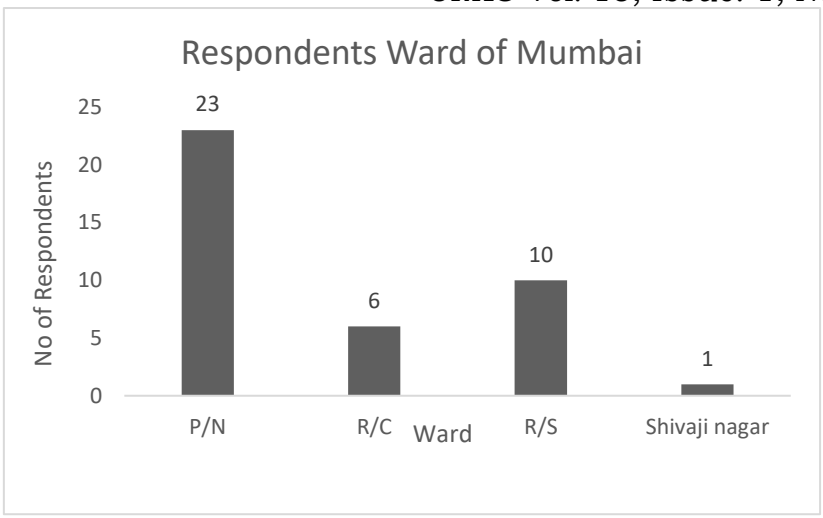
E-waste collection process involves more physical power hence more male labours are hired compared to female counterpart. In the above graph too it was observed that, male respondent were twice the female respondent.



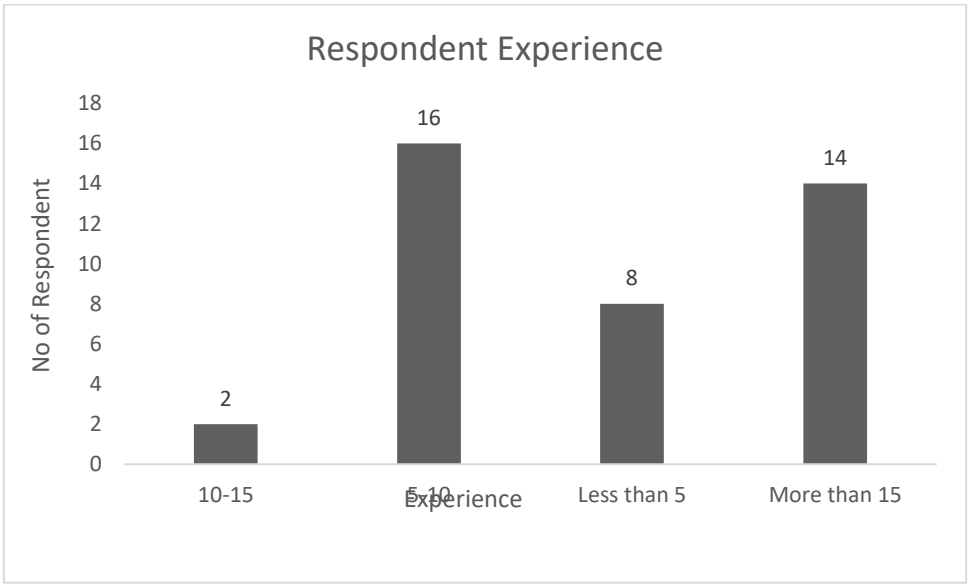
It was observed that, approximately 75percent respondents were less than 50 years. Youngsters involved in the collection process were approximately 37percent.



It was observed that 77.5 percent of respondents sample had either completed their basic primary level schooling or took dropout during their primary level schooling. 15 percent of the respondents were illiterate and the rest studied till secondary schooling. It can be easily seen that most of the people involved in e-waste collection have poor educational background.



It is observed that 57.5 percent of sample were collected from P/N ward and 25 percent were from R/S wards and the rest sample were collected from R/C ward. Collecting sample from different wards helps to find more convincing results which becomes very important in policy making and scheme implementation.



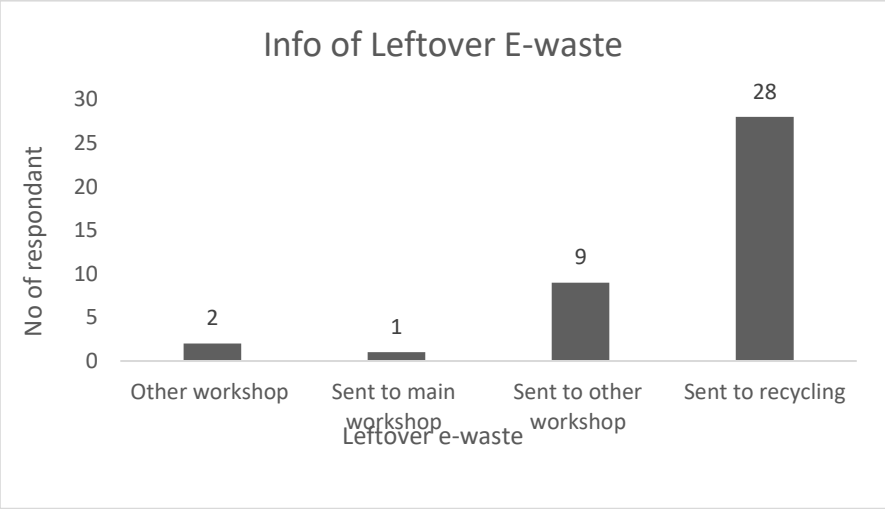
It is observed that 40 percent of Respondents were having 10 or more years of experience in this field of E-waste segregation and 20 percent of respondents were having less than 5 years of experience which highlights this sector is barrier free for the new comers.

It is observed that 65 percent of E-waste were transported or brought from local workshop which highlights a systematic hierarchical chain of e-waste collection. Also, it is observed that 32.5 percent of e-waste are collected and brought by local people which depicts the poor socio-economic condition of people.

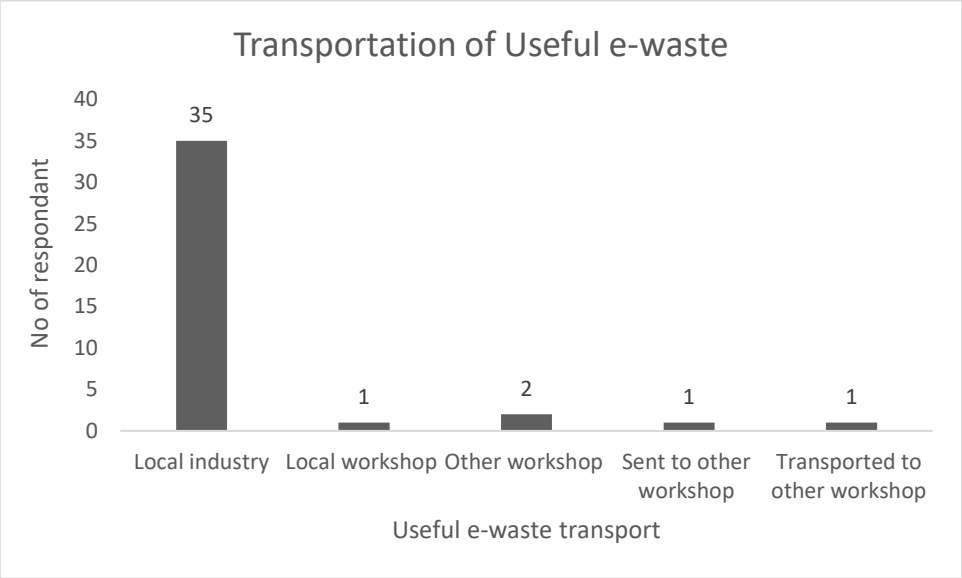
Table 01: E-waste Collection information of Respondents

Row Labels	Count of Could you please share info regarding its collection?
1kg =30Rs 30 people are involved in collection Also some particular parts of computer Waste comes from other work shop	1
Buy e-waste in quantity wise	1
Collection of e-waste by roaming in road side	1
Driver	1
Help in segregation	19
Help in transportation	2
Helps in segregation	1
Local people collect by picking the e-waste in morning from roadside nearby auto garage	1
Local people come and sell the e-waste	1
People sell in quantity in workshop and after that it it transported to this workshop where segregation activities starts	1
People sell in quantity wise	1
Picking from roadside	1
Roadside and buyed from people in quantity wise	1
Roadside collection and buyed in quantity	1
Roadside collection and segregation	2
They collect all sort of e-waste and bring it to me	1
Transport e-waste via tempo	2
Transported by tempo	1
Transported by vehicle	1
Grand Total	**40**

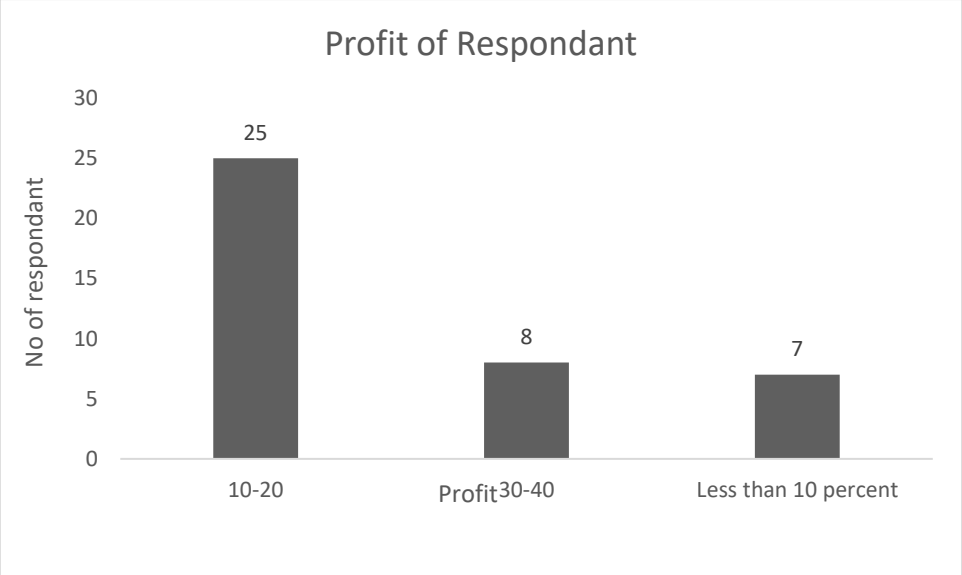
It's clearly observable that 47.5 percent of respondents are involved in segregation activities which highlights the importance of it. As we know after proper segregation only one can send it for further processing or recycling.



It is observed that 70 percent of e-waste is sent for recycling where either it's raw form or components are reused again. 22.5 percent respondents have sent these e-waste in other local workshop where further segregation is performed.



It is observed that 87.5 percent of e-waste are transported to local workshop for further processing and transformation making it in a reusable form.



It's clearly observable that 62.5 percent of respondents have profit margin of 10 to 20 percent and 20 percent of respondents mentioned about high profit during field survey which portray better profit margin in this sector.

Table 02: Reasons for high profit

Row Labels	**Count of If High profit, what is its reason?**
Better driving skills	1
Better performance	1
Better segregation	2
Better segregation and high value	1
Better segregation and quantity determine profit	1
Collected in large quantity	1

e-waste are sold in quantity at higher price	1
Experience and better segregation	1
High daily quantity e-waste collection	1
High daily wage	1
High quantity	1
High quantity collection	1
Increase in e-waste collection	1
Old traditional business	1
Quality and unitorm e-waste in segregated form	1
Rising E-waste in quantity wise	1
Selling in bulk quantity	1
Sold at higher price after segregation	1
Some time high depends on quality of segregation	1
Traditional business and experience	1
Working in monthly salary mode	1
Grand Total	**22**

It is observed that there are multiple reasons like proper segregation of e-waste, selling it in large quantity, etc. Also, it is observed that 42.5 percent respondents weren't satisfied with profit margin they received in this e-waste collection sector.

Table 03: Reasons for low profit

Row Labels	**Count of If low profit, what is its reason?**
Low price in market	1
Low productivity	1
New	2
New in field	1
New in field	2
New in field and low productivity	1
Poor e-waste components and non uniformity in collection	1
Grand Total	**9**

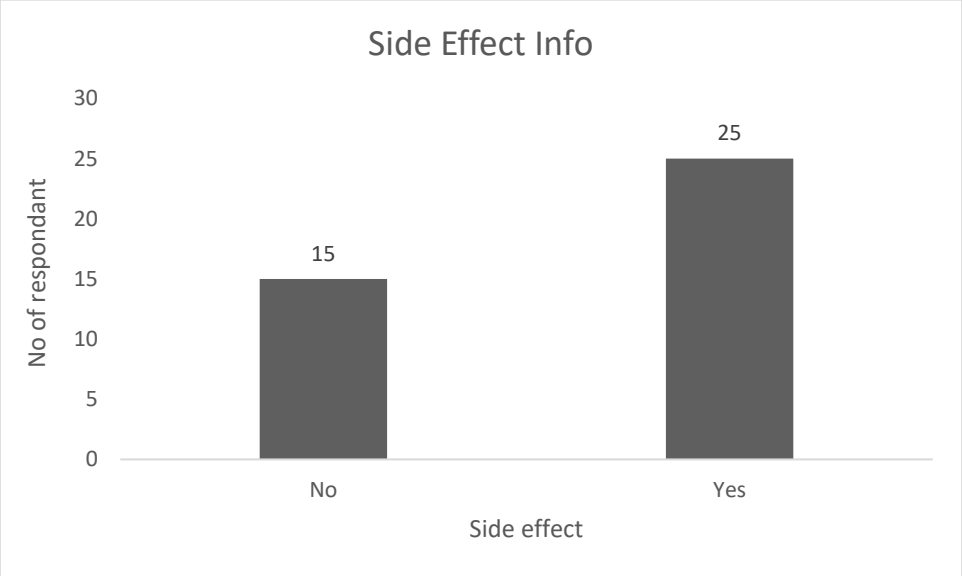
It is observed that fresher face the challenge of low payment due to being beginner in this field. Also, poor segregation of e-waste led to low profit.

Table 04: Hazardous chemical information

Row Labels	**Count of Hazardous chemicals involved in it**
Cancer causing components are their but nothing serious to worry about.	1
Dont know	1
Dont know	2
Don't know	15
Flame retardant, lead, cadmium etc	1
Flame retardant, lead, mercury, cadmium	1
Flame retardant, mercury	1
Lead and lithium	1
Lead and lithium is common	1
Lead, cadmium, lithium, mercury	1
Lead, lithium	1
Lithium	5
Lithium in battery	1
Lithium ion	1

Lithium is common	1
Lithium, mercury	1
Lithium, mercury, lead	2
Lithium-ion	2
Many chemicals are involved but no idea	1
Grand Total	**40**

It is observed that 50 percent of respondents didn't had any idea regarding its harmful negative effects which affects their health. And many respondents knew about the lithium and mercury which is maintained components in battery making and other electrical parts.



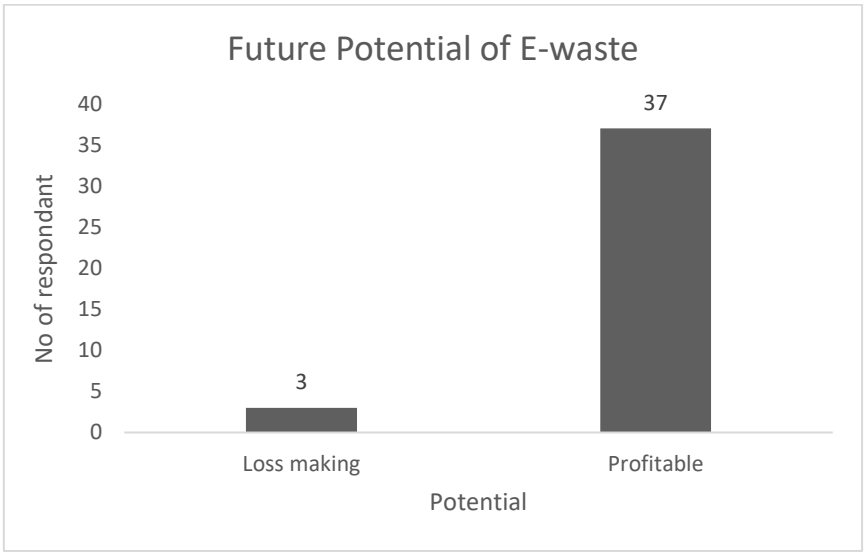
It is observed that 62.5 percent of people faced some sort of side effects while collection and segregation of these e-waste.

Tale 05: Common side effects

Row Labels	**Count of Could you please share some common side effects?**
Fungal infection in hand, headache.	1
Breathing problem, headache and fungal infection	1
Breathing problem, headache, hand infection	1
Fever , headache is common	1
Generally breathing problem, weakness	1
Hand infection	3
Hand infection, breathing problem	1
Hand infection, fever, weakness	1
Hand infection, jaundice, cough	1
Headache	7
Headache and breathing problem	2
Headache and fever	1
Headache and hand infection	1
Headache and nausea	1
Headache is common	1
Headache, fever	1
Headache, fever	1
Mild headache, vomit and nothing serious	1

Mild symptoms of headache and fever	1
No effect	1
No idea	2
No idea	6
No symptoms	1
Take leave due to fever, headache, tiredness.	1
Weakness	1
Grand Total	**40**

It's clearly observable that , the Respondents involved in these e-waste sector didn't had much idea regarding its effects on their health. Some common side effects are as follows- headache, nausea, fungal infection and and weakness.



93.5 percent of respondents mentioned about better future profit margin in this field due to rise in technological evolution and e-waste components.

RECOMMENDATIONS

The socio economic condition of the e waste collectors needs to be improved by formalising the sector. Through this, their income would increase and they will get an identity. It will further help them to achieve an elevated standard of living including better food, clothing, education, healthcare, happiness, and social life. Awareness camps, educational camps, healthcare campaigns, free distribution of ergonomic stuff, free education for children, access to clean water, environment and equality can help a great way in the best development of the informal e waste workers in the city of Greater Mumbai.

CONCLUSION

The study concludes that maximum people engaged in e waste sector are very skilled in their work. But, since their work is not recognised, they face problems like poor wages, lack of safety equipment, engagement of children, insufficient income, poor standard of living, unhappiness and many more challenges. To curb the challenges they face, t is important that government, NGOs and individuals join hands to help them elevate their quality of life. From the study it is observed that the e waste flows ultimately to the recycling plants in maximum cases through the hands of informal e waste collectors and to the dump yard or at the banks of rivers in few cases which is also through the hands of the informal e waste workers. To conclude it can be said that wealth actually does not generate wealth for all those involved but only for those who create the products which becomes e waste in no time.

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