Title of the Thesis is E-waste Recycling of Dhaka City

By Md. Shaheen Iqbal Chowdhury, Hasan Marup Parbeg, Md. Ariful Islam, Md. Jahid Hasan, Md. Hossen Ali, Rahul Debnath

A thesis submitted to the Department of Civil Engineering in partial fulfillment for the degree of Bachelor of Science in Civil Engineering



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Section: 13A

Semester Year: Summer-2021

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BOARD OF EXAMINERS

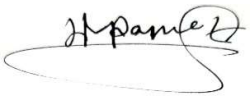
The thesis titled e-waste (electronic waste) recycling in Dhaka city Submitted by Md. Shaheen Iqbal Chowdhury Id: BCE1801013127, Hasan Marup Parbeg Id: BCE1801013184, Md. Ariful Islam Id: BCE1801013054, Md.Jahid Hasan Id: BCE1801013187 Md. Hossen Ali Id: BCE1801013105 and Rahul Debnath Id: BCE1801013054 Session 13A, Summer-2021 which has been accepted as satisfactory in partial fulfillment of the requirement for the degree of BACHELOR OF SCIENCE IN CIVIL ENGINEERING on 20th September, 2021

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DECLARATION

It is hereby declared that except for the contents where specific reference have been made to the work of others, the study contained in this thesis is the result of investigation carried out by the author. No part of this thesis has been submitted to any other university or other educational establishment for a degree, diploma, or other qualification.

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Dedicated

to

“This thesis has been dedicated our parents

and teachers*”*

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ABSTRACT

The study aims at assessing the current status of e-waste management and proposing a policy framework for improving e-waste Recycling in Dhaka City. Three independent variables (institutional preparedness, legal framework and citizens' awareness) have been analyzed in order to identify their relationships with the dependent variable such as the level of efficiency of e-waste management.

The study primarily used a survey method: a) a survey has been conducted to the citizens to know their level of awareness on e-waste equipment and their disposal system, b) a semi-structured interview has been directed to the service providers in order to assess their level of education, training, responsibility and skill, c) Extant literatures and policy documents have been reviewed extensively to develop an understanding to the mandate and functions of government and non-government institutions to assess the capability of the government official. In addition, some private business workshops have been observed for gaining practical knowledge of e-waste management. The study also examined (Dhaka North &South City Corporation, and their capacity in managing e-waste.

The study finally identifies some systems to develop products from the e-waste. The citizens should be made aware of hazard of e-wastes with the support of print and electronic media. Economic incentive mechanism could inspire consumers to transfer used electronic equipment to the registered vendors after expiry of the life of the equipment. Imposing device mechanism (technology standards) process might also be a control mechanism to regulate incineration and informal recycling of the discarded electrical equipment. Recycling centers and e-waste dumping landfill (places) should be located in a specific area for controlling environmental hazards.

Keywords: Institutional preparedness, citizens' awareness, institutional infrastructure, institutional capacity, e-waste recycling.

TABLE OF CONTENT

ABSTRACT 7

LIST OF FIGURES 09

LIST OF TABLES 10

CHAPTER 1 111

INTRODUCTION 11
- 1.1 Background and Motivations 11
- 1.2 Research Objectives and Overview 111
- 1.3 Organization of the thesis 111

CHAPTER 2 132

Literature Review 133
- 2.1 Introduction 133
- 2.2 Content/Companis E-Waste 134
- 2.3 Summary 135

CHAPTER 3 166

Methodology 166
- 3.1 Introduction 166
- 3.2 Methodology Overview 166-19
- 3.3 Summary 20

CHAPTER 4 21

Case Study 21-25

CHAPTER 5 266

Results and Discussion 266
- 5.1 Introduction 266
- 5.2 Specific Aim 1 267-29
- 5.3 Summary 30

CHAPTER 6 31

Conclusions and Future Works 31
- 6.1 Conclusions 31
- 6.2 Limitations and Recommendations for Future Works 32

REFERENCES 33

APPENDIX 34-44

LIST OF FIGURES

1. Fig. No. 2.2(1) Solid waste dumping place-Jattrabari ……14
2. Fig. No. 2.2(2) Land fill site Amin bazar ……15
3. Fig. No.3.2.1 (3) Elephant road Market……...16
4. Fig. No.3.2.2 (4) E-waste recycling company Azizu……...17
5. Fig. No.3.2.3 (5) Elephant & Nimtoli road recycling Processing……17
6. Fig. No.3.2.4 (6) Land fill site Amin bazar…….18
7. Fig. No. 3.2(7) Reclining process of e waste of Dhaka……...19
8. Fig. No. 3.2(8) E-Waste Collect different area …….……..19
9. Fig. No. 3.2(9) Cell phone Waste in Elephant Road in Dhaka.....20
10. Fig. No.4.0 (10) Azizu recycle & e-waste system…….22
11. Fig. No.4.0 (11) E-waste recycling process (Azizu recycle & e-waste system)..…. 23
12. Fig.No.4.0 (12) E Waste Recycling Flow Chart…….. ……....24
13. Fig. No. (13) Azizu e-waste company ltd (On spot disposal System)……. 25
14. Fig. No.5.1 (14) E Waste Recycling Flow Chart ……. ……29
15. Fig. No.6.1 (15) Proposed e-waste recycling plant (Gold refining process)…….30
16. Fig. No. (16) Elephant road e-waste collection shops (Recycle process)……. 33
17. Fig. No. (17) Elephant road e-waste collection shops Recycle process……..…….34
18. Fig. No. (18) Repairing market …….35

LIST OF TABLES

1. Table-5.1 Life span and weight of electronic equipment…….26

2. Table-5.2 Dhaka City status and projection of e-waste…… 27

3. Table-5.3 Revenue calculation for recycling of 1-ton computer with Printer (PC) e-waste…28

CHAPTER 1

INTRODUCTION

1.1 Background and Motivations

The first section of the Introduction Chapter contains the background and motivation of the research where the research topic is introduced. The importance and goal of the research have also been stated in this section. The section answers several questions. What is the problem? Why is it important? Why was the study undertaken? This section may contains sub-sections.

Bangladesh is enjoying a rapid economic growth with emerging market for consumers of electric, electronic gadgets, home appliances. These demands have created a circumstance of increasing amounts of locally produced electronics products and increasing demand for re-using these products. Equipment is largely refurbished and recycled in semiformal and informal sectors. Reuse or recycling of equipment's as well as dumping are creating risk these days. These electronic wastes may cause environmental and health hazards. At present, there are lack of awareness and information gap on e-waste hazards is enormous in Bangladesh.

1.2 Research Objectives and Overview

The overall objectives of the item to understand e-waste recycling of Dhaka city.

The specific objectives of the research should also be presented in this section.

1. Estimate of the e-waste generation in Dhaka City
2. Characteristic of e-waste.
3. Identify Recyclable parts of e-waste for revenue generate.
4. Identify recycling chain of e-waste.

1.3 Organization of the thesis

This Chapter Does Backend and understand of the objective of the report.

The whole thesis is has been organized into six chapters. It establishes/ identifies the knowledge gaps which need to be fulfilled regarding/ to assure the reuse or recycling of equipment's as well as prohibition of random dumping that are creating risk these days.

Chapter 2: Literature Review.

This Chapter Does With Calculated Future of E Waste Recycling of Dhaka City.

E-waste is a valuable resource and a hazardous threat to human health and the environment at the same time.

Chapter 3: Methodology.

In this Chapter Methodology For Doing The Resource Has Been Described.

Chapter 4: Case study: E Waste Processing Recycling of industry

Azizu e waste and Jr recycling company has Been Described Live in This Chapter as a Case Study.

Chapter 5: Results and Discussion.

The Results /Output of The Research Activing Has Been In This Chapter Illustrated.

The survey was used for collecting quantitative primary data with structured questionnaire.

Data collected was sorted, organized, conceptualized, refined, and interpreted using methods drawn from the constant comparative analysis techniques.

Chapter 6: Conclusions and Future Work.

Conclusions and recommendations for future work has been stated / described in This Chapter

CHAPTER 2

Literature Review

2.1 Introduction

We are / a study focusing in Dhaka city, to examine the trend of usage of electronic devises/gadgets and what's been done during end of these equipment's, what hazards are been created from these e-waste, what are the current practice of dumping and what rules are there for dumping this sludge. Finally, this study has tried to identify the level of awareness regarding these e-waste and way forward to reduce environmental hazards

Type of e-waste for user category

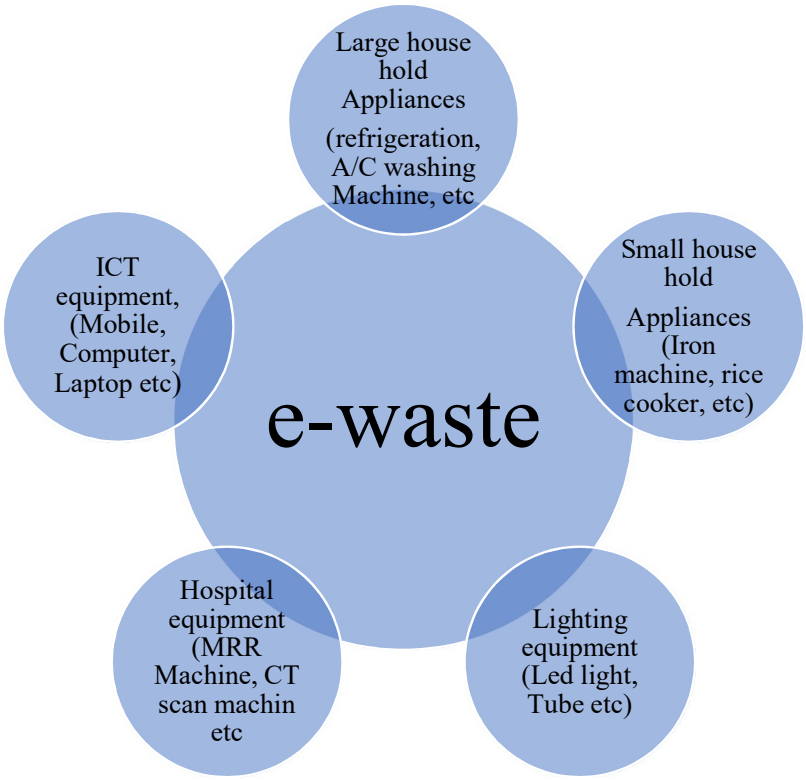


Fig.No.2.1(1) Type of E-Waste for User Category (Source: Hazardous Waste (E-Waste) Management Rules 2021 (SRO No. 18-Act / 2021), Page No-8760)

2.2 Content/Companies of E-Waste

The study is limited to four electronic products: desktop PC, laptop PC, cell phones and Television. There are many types of electronic gadgets that are contributing to e-wastes. But these four electron items are most frequent used. The research is conducted in three city corporations (Dhaka North City Corporation, Dhaka South City Corporation), KIIs of government officials are taken to investigate the scenario of policy implementations and legal framework. The findings were further validated by KIIs of scholars and NGOs. Interviews of LGI representatives are not taken for shortage of time and not having direct involvement yet in e-waste management.

In Bangladesh there is no specific generation & e-waste management yet not to be formulated for the pilot project. No inventory data of e-waste generation is available. Generally, common people's level of awareness towards e-waste generation and its impact is unknown. To dispose of e-waste technological preparedness needs to measure to handle e-waste management. Responsibility of stakeholder (consumer, producer) should be identified and needs to active participation by financing to reduce e-waste.



Data Source: Solid waste dumping place-Jattrabari (Fig.No.2.2(1)



Data Source: Land fill site Aminbazzar (Fig.No.2.2(2)

2.3 Summary

This chapter presented all the previous literature to-date about analysis Dhaka city projection of e-waste and situation of e-waste preliminary management This chapter presents on Earlier Research on E-waste Management bodies in Dhaka city and his plan this chapter briefly describes about Significance of the Study Scope of the study Rational of the Study Initiative of private entrepreneur to management e-waste Increasing environmental pollution. This chapter also describes about direction of managing of e-waste& e-waste recycling system. However present situation there is no e-waste found land field site under DSCC or DNCC.

CHAPTER 3

Methodology

3.1 Introduction

The research will conduct both in quantitative and qualitative methods. The best Strategy to understand management is a combination of process tracing and qualitative methods. Data sources is including secondary published materials, grey document review but researcher will also conduct interview with Key Informant, semi structured interview and observation on storing, collection dismantling, segregation process, incineration, land filling, institutional function and capacity

3.2 Methodology Overview

1) Market visit/ shop:

The first chapter finish product wholesale market Elephant road Multiplan and IDB Building are notable. The repairing centers/ shops of these markets are on different floors. Computer collect waste and e-waste from laptop repair centers.





Data Source: Elephant road Market,Fig.No.3.2.1(3)

2) Industrial visit:

E-waste recycling company Azizu was visited. It includes using a combination of the following methods; interview (both questionnaire and semi-structured open-ended), site visit, which provided the key primary data.





Data Source: E-waste recycling company Azizu,Fig.No.3.2.2(4)

3) Visit to Recycling point:

The e-waste are available at various shops in the market opposite elephant road. In these shops e-waste computer, laptop, different purses are separated they come one day a week to buy e-waste. They come in contact with them before they come and buy in kg. The valuable were collected from them (PCB board) and others, and later sent to Singapore and Hong-Kong.




Data Source: Elephant & Nimtoli road recycling Processing,Fig.No.3.2.3(5)

4) Land filled site visit:

A land fill of solid waste are mowtail in Dhaka south City Corporation and Amin bazar in Dhaka North City Corporation. Where e-waste are land filled more than 5% to 10% Bangladesh have no separated land fill for e-waste.



Land fill site Aminbazzar, Fig.No.3.2.4(6)

1) Data calculated:

According to a recent study by Azizu Bangladesh is the first largest e-waste Producer and its e-waste generation is expected to annually grow at 30 present to touch 5.2 million tons (Mt) per annum by 2020 as against the percent level of 1.8 million metric tons.

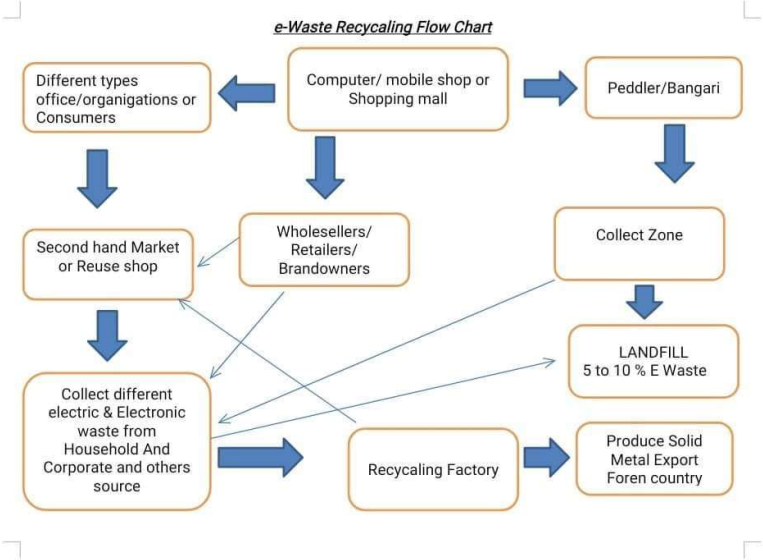


Fig.No.3.2(7) –Reclining process of e waste of Dhaka



E-Waste Collect different area, Fig.No.3.2(8)

E-waste parts collected step by step

The raw materials categorized as high environmental risk are often subject to material taxes. The purpose of such taxes is to encourage manufacturers to shift towards more environment-friendly parts or components. In some cases, consumers assume the responsibility of e-waste management by paying deposit while purchasing a product and then receiving a refund known as deposit or refund schemes when returning the post-consumption product.



Data Source: Cell phone Waste in Elephant Road in Dhaka, Fig.No.3.2(9)

3.3 Summary

This chapter presented all the previous literature to-date about analysis Dhaka city projection of e-waste and situation of e-waste preliminary management this chapter presents on Earlier Research on material composition of e-waste. This chapter briefly describes about e-waste management: time for a reboot Processing & Recovery System of e-waste. Maintain or Reduce of E-Waste Data and methods Research Methodology Therefore, a Summary of the above conventional/ nonconventional definition derives following components/ features of E-waste.

CHAPTER 4

Case study

At present, e-waste shop owners' associations can easily set up e-waste chains collectively. E-waste can be sold anywhere in the mobile or computer market and the price is set in kg.

I want to talk to them by collecting e-waste from Wholesale Mark's repairing center / shop, bringing it to the store, segregating it or separating the parts by parts, but they don't want to talk so much, they are very busy. Nimtali Bazaar in Old Dhaka has been visited and various shops have been talked to. They collect old goods on lease from various government and non-government organizations. After separating e-waste, all the purses that are good later, such as motherboard, PCB board are exported to other Singapore-Bangkok

At present, he works in e-waste management in two or three organizations in Bangladesh. Notable is Azizu Recycling Company And JR Enterprise. Azizu e-waste Recycling Company between the two companies has about 3 acres of vertical space and the capacity to recycle 15 tons of e-waste per day. Every day four to five tons of e-waste is received. Azizu Recycling Company gets more e-waste from the telecommunication sector. e-waste from telecommunication companies at their own expense. Occasionally factories are closed due to shortage of e-waste. The company was established by bringing training from Singapore. They have not yet made a good quality product. The entire e-waste recycling process could not be established. They do this with the help of local and foreign machines, but they have not yet set up machines to separate the latest types of metals from metal and export the obtained metal to Singapore. Azizur recycling company currently does the manual separation and cuts into small pieces with the help of machines. However, they have been trying to make plain sheet materials but have not succeeded yet. The company has a future plan to separate each metal from the mixed metal through chemical treatment.

Field research was conducted for collecting primary data. Bothe primary and secondary data were collected in the field research. It includes using a combination of the following methods; interviews (both questionnaire and semi-structured open-ended), site visit, which provided the key primary data.

Procedure of e-Waste Recycling

The information and communication technology sector has witnessed unprecedented growth in the last decade across the world. Increased penetration of electronics in everyday products and increased adoption of electronics products by people have fueled this tremendous growth. Increased consumer demand has also resulted in increased investment in product innovation, leading to shorter life-cycle of products.



Data source: (Azizu recycle & e-waste system), Fig.No.4.0(10)

This project report provides a brief overview of e-waste recycling business requirements

E-waste, needless to say, represents an enormous environmental hazard. However, it also presents huge opportunities for entrepreneurs willing to take the plunge. According to a recent study by Azizu, Bangladesh is the fifth largest e-waste producer and its e-waste generation is expected to annually grow at 30 per cent to touch 5.2 million metric tons (MT) per annum by 2020 as against the present level of 1.8 million metric tons. This, in turn, represents a huge business opportunity in e-waste recycling. This project report provides a brief overview of e-waste recycling business requirements

E-waste recycling process

E-waste recycling is highly labor intensive and involves several steps starting from waste collection to final material processing in order to obtain the desired recycled products or raw materials for reuse.



Data source: E-waste recycling process (Azizu recycle & e-waste system), Fig.No.4.0(11)

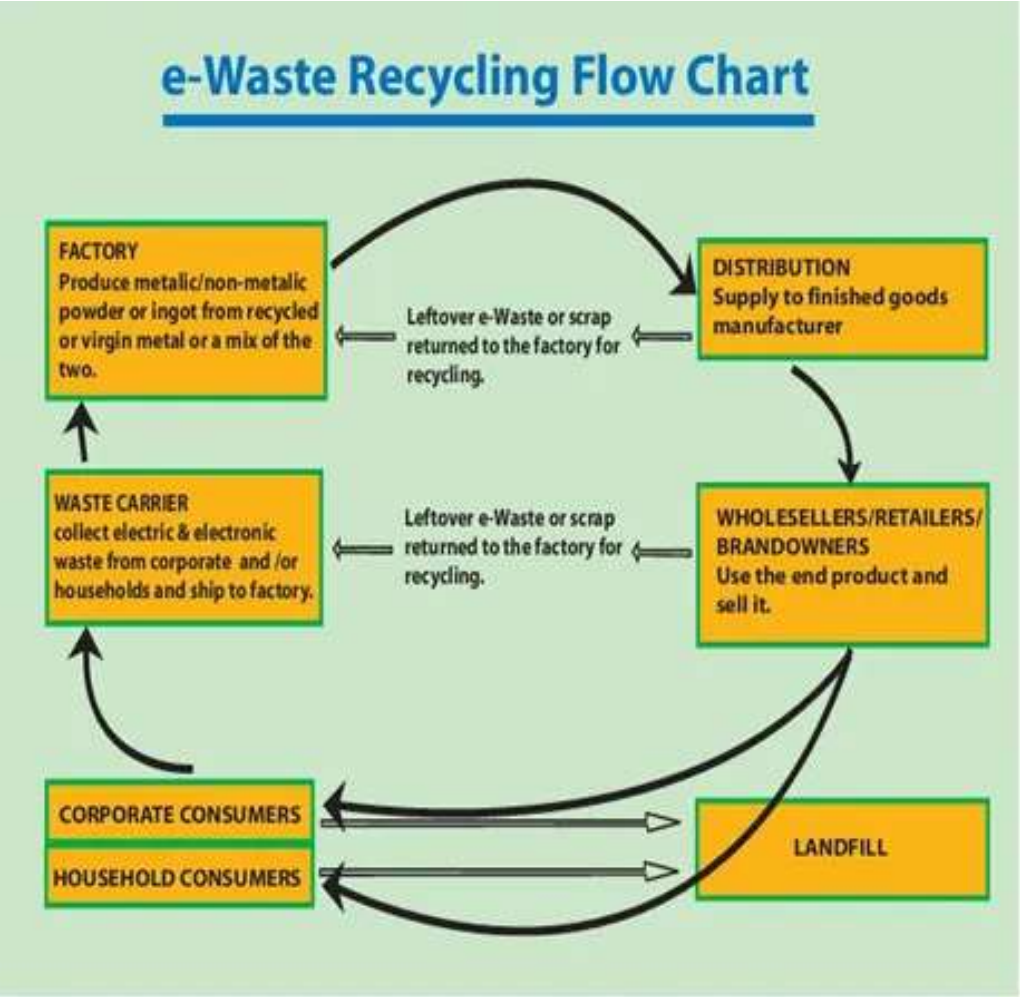


Fig.No.4.0(12)- E Waste Recycling Flow Chart.



Data Source: Azizu e-waste company ltd.(On spot disposal System), Fig.No.4.0(13)

Our Company is working since 2013 for a green Bangla and to fulfill the wish it has strengthened the disposal. We consider the issue of disposal of electronic waste where electronic waste, e-scrap, and electrical scrap are involved including surplus, obsolete, broken, electrical, or electronic devices. Azizu is taking care of proper on-spot disposal because improper disposal of electronic equipment contains dangerous toxic that harms the human body

CHAPTER 5

Results and Discussion

5.1 Introduction

This chapter presents the findings of the research. The discussion on the results can be/ has been presented in this chapter also. The discussion of results can/has also been presented in a separate chapter. If/ Incase of the findings are/being distinct enough, the results can/has been be presented in more than one chapter also. The results should/has been organized as per the specific aims mentioned in Chapter 1.

5.2 Specific Aim 1: E-Waste Generation Rate

The Life Cycle of E Waste and Weight of e-waste has been show in Figure Table 5.1
The Generate Rate of e-waste of Dhaka City has been started at Table 5.2 Up to 2020
(Source: macrotrends Bangladesh)
However generate of e-waste has been estimated flow 2021 is 17.46 Mt/Day

Table-5.1 Life span and weight of electronic equipment (Source: UNEP and UNU 2009).

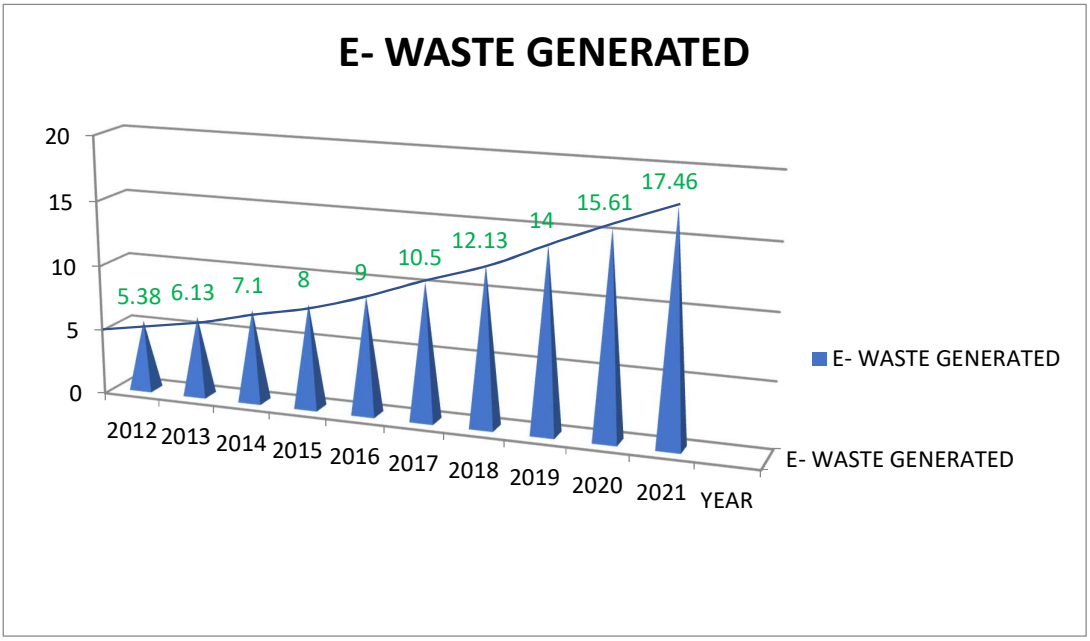
Item	Mass of Item(kg)	Estimated life (years)
Desktop Computer with monitor	18.80	5-8
Laptop computer	2.15	5-8
Cell phone	0.1	4
Printer	10	5
LED TV 32-inch flat screen	11-14	5-13
50-inch TV	15-25	5-13
25-inch CRT TV	45	5-13

The generate of E Waste for 2021 has been Exacted for 17.46 MT/Day

Table –5.2 Dhaka City status and projection of e-waste (Source: macrotrends Bangladesh)

Year	E-waste generated(Mt)/day	Population (million)	E-waste generated (kg/ inch.)	Comments
2012	5.38	15.8	0.5	Rapidly increase
2013	6.13	16.38	0.5	
2014	7.10	16.98	0.6	
2015	8.00	17.59	0.6	
2016	9.00	18.23	0.6	
2017	10.50	18.89	0.7	
2018	12.13	19.57	0.8	
2019	14.00	20.28	0.9	
2020	15.61	21.06	0.9	
2021	**17.46**	**22.58**	**1.035**	**Estimated**

Data source: macrotrends



The diagram e-waste graph shows that e-waste is increases rapidly from 2020.

- E-waste generated (Mt)/day (2021year)
  (15.61-14.00)+15%=1.85
  (1.85+15.61)=17.46
  * Population (million), 2021
  (21.6-20.28)+15%=1.52,
  (1.52+21.06)=22.58
  * E-waste generated (kg/inch)
  (0.90+15%)=1.035

2. Characteristic of e-waste: E waste of different product Computer, laptob PCB has different components. However Table shows different constitution of one ton e-waste for PCB Board.

Metal	Weight of metal recovered (in gm or kg/ton of PCB)	Source
Gold (gm)	390	IndigoEdge
Palladium (gm)	90	
Silver (kg)	1.5	
Copper (kg)	190	
Lead & tin (kg)	31	
Aluminium (kg)	145	
Other metals obtained (per ton of PCBs)	(Assumption)	Business Setup For e-Waste Recycling

It may be weighted the e-waste PCB board cause From Desktop, Laptop and Cell Phone, However e-waste for TV, LED TV, LED monitor has been Included from because minimum value for recycle by replacing picture tube on display may be replaced/repair.

3. Identify Recyclable parts of e-waste for revenue generate:

Revenue generated for e-waste from PC has been estimated as below on basis on present market value.

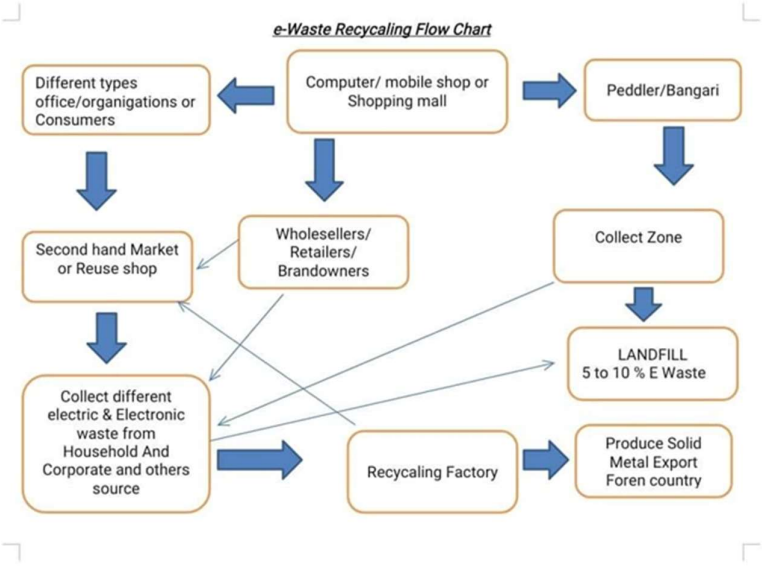
Table-5.3 Revenue calculation for recycling of 1-ton computer with Printer (PC) e-waste

Revenue generation by PGMs Recovered per ton of PCBs				
Metal	Weight of metal recovered (in gm. or kg/ton of PCB)	Per unit market rate (gm. or kg) price (15^{th} September 2021)	Total (BDT)	Assumption
Gold (gm.)	390	4,211.70	16,42,563.00	This is new business opportunity and employment generation in Bangladesh
Palladium (gm.)	90	5,844.88	5,26,039.20	
Silver (kg)	1.5	61,395.07	92,092.60	
Copper (kg)	190	504.60	95,874.00	
Lead & tin (kg)	31	270.28	8,378.68	
Aluminum (kg)	145	119.48	17,324.60	
Other metals obtained (per ton of PCBs)	(Assumption)		11,600.00	
		Total BDT=	**23,93,872.08**	

* PC e-waste: 1 ton
* Number of PCs: 53 (assuming that each PC with printer weighs 18.80kg)
(PC-6 kg, Monitor with Keyboard & mouse and others cable-3.80, Printer-9kg.

4. Identify recycling chain of e-waste:

The whole recycling chair of e waste if we describe 1st we visit computer/mobile shop or shopping mall. The different types office /organization or consumers come in the market and buy computer/mobile, than this is go to second hand market or Reuse shop. It also buy wholesalers Retailers/Brand-owners. At nest they collect different electrical and electronic waste from household and corporate and others source. In other side this types of products are buy peddler/bangari shop kippers. They collect and storage huge amount of computer/mobile .Then they sell the item in recycling factory. 5% to 10% of e waste are land filled and other useable parts and solid metal are export form country.



Findings: We are already visit solid waste landfill site but no fund significant disposal of e-waste. E-waste is mainly using recycling.

Fig:5.1(14) E Waste Recycling Flow Chart.

5.3 Summary

This chapter presented all the previous literature to-date about Findings of Target Electronic Item Consumptions and e-Waste for DSMA Environmental/ Health Effect Variables and Measuring Indicators from Theoretical Sources. Potential effects of e-waste materials: awareness on e-waste management ownership of selected electronic gadgets Selected electronic gadget used by respondents Awareness regarding health and environmental issues. And this chapter briefly about in the earlier, many electronic goods were designed in a way that it made monetary sense to repair them when they broke. Now, it is often low-priced to discard malfunctioning user electronics and change them with fresher and more technically advanced products.

CHAPTER-6

Conclusions and Future Works

6.1 Conclusions

This chapter presents the overall conclusion and recommendation for future works. At first, brief what we/you've done in the research and what is the major contribution. This presented a summary of contributions with a focus on achievements, new observations, interpretations and broader implications of results discussion on the results can be presented in this chapter also. The discussion of results can also be presented in a separate chapter. If the findings are distinct enough, the results can be presented in more than one chapter also. The results should be organized as per the specific aims mentioned in Chapter 1.

An e-waste management plan (pilot) can be set up through the Department of Environment considering the environmental and health risks for the implementation of SDG Goal-13. Here are two suggestions:

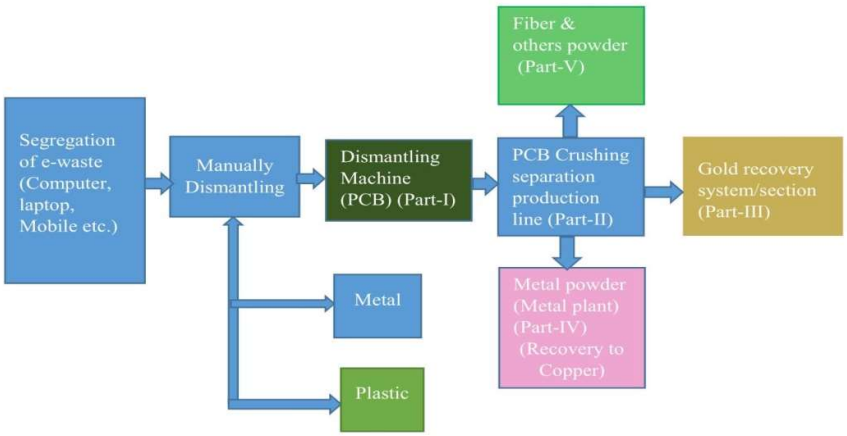
Option-1

Govt. To Govt. e-waste management plan can be set up through investment and technology share of Japanese / South Korea / Singapore / Hong Kong or any other country.

Option-2

Bangladesh Computer Samity can be given the responsibility to set up and manage an e-waste management plan with all facilities for land and infrastructure for complete recycling of 5 tons per day Capacity in government institutions or government land. However, in this case, the business model can be through rent-based / revenue share.

The proposed of e-waste recycling plant (Gold refining Process) has been shown is Fig: 6.1 (15)



Proposed e-waste recycling plant (Gold refining process)

6.2 Limitations and Recommendations for Future Works

This section summarizes the limitation of your/my studies and how these can be eliminated. This chapter presented all the previous literature variables/indicators, Sources of data and data analysis of the study Potential effects of e-waste materials: Data collected was sorted, organized, conceptualized, refined, and interpreted using methods drawn from the constant comparative analysis techniques, Quantitative and qualitative methods was used to collect and analyze data. Classify, maintained-use system developed, and this chapter briefly about E-waste recycling process opportunity of e-waste by The Reduce, Reuse, Recycle, and Removing is the basic R's approach is very perfect for industrial reuse to make the whole thing environment-friendly alternatives in dealing with the growing generation of product and its e-wastes vis-a-vis its impact on health, economy and natural ecosystem of the universe.

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An overview of e-waste recycling operation (Source: Indigo Edge)

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Data source: Books, Articles, Journals, Newspaper clippings

Source: macrotrends Bangladesh

Law and Acts(DoE): Hazardous Waste (E-Waste) Management Rules 2021 (SRO No. 18-Act / 2021)

APPENDIX

Field Research

Field Level Questionnaire Survey

The survey was used for collecting quantitative primary data with structured questionnaire. A semi structured questionnaire was also developed to collect data from the key informant. The field level questionnaire survey focused on usage of electronic gadgets, citizen's knowledge and attitudes to e-waste, practice of e-waste disposed, health and environmental issues, and e-waste management. Data collection was done at the institutional level that operates collection, transportation and disposal activities both in the public sector and at the community level.



Data Source: Elephant road e-waste collection shops (Recycle process). Fig.No.16

Appendix-A.

Television in Dhaka City there is no manufacturer of television. They are all assemblers. apically who are involved in television business either they are importers or retailers or repairers. While surveying, most of the importers introduced themselves as retailers and repairers as well. They do not confess that they are assemblers but varieties of television sets are stored insides the shops though they hang brand name signboards.

Key Informant Interview

To complement available information on the secondary literatures, semi-structured interviews and email exchange were used to substantiate available information on e-waste. Key informants came from various organizations such as government agencies, private organization, non-government organization, trade bodies, academic scholar, nongovernment organizations, electrical and electronics companies, dismantling companies and shopping malls involved in e-waste market.



Data Source: Elephant road e-waste collection shops Recycle process. Fig.No.17

Appendix-B.

The interviews were conducted following a semi structured format and involved a series of open-ended questions. Professional from policy formulation and implementation organization, Academic scholar, experts on waste management, members of NGOs, trade organization were taken interview as key informant. According to their expertise structured question ware prepared. For questionnaire survey, face-to-face interviews were thought to be more reliable for obtaining accurate information from respondents, as they hailed from a wide range of backgrounds and had different educational levels. This also helped to ensure that all questions were answered and that the answers were recorded in a consistent manner. Most of the questions utilized the checklist approach in order to reduce ambiguity and to facilitate quantitative analysis.

Appendix-C.

Institutional Case study:

Case study method gives opportunity to look into an issue very closely. Case study is accepted as a very effective method for in-depth understanding on an issue. It helps to analyze and explore complex issues (Azizu 2021) In case studies both qualitative and quantitative data are analyzed. Azizu 2021) observed that case study explains processes and outcomes of an issue through 'complete observation, reconstruction and analysis of the cases under investigation' (Azizu 2021). The institution have been chosen by considering number of population, probability of ICT use Therefore, these has taken as a institutional case study. Mainly officials of these institution are target population. Random sampling have been used to determine. Semi structure interview had conduct to understand the institutional infrastructure, its capacity for managing of e-waste.



Data Source: Repairing Market ,Fig.No.18

Field and Site Visits

Field visits were conducted in various locations such as identified dumping ground for e-waste, unloading point of second-hand electronics, e-waste markets and junk shops, dismantling center and informal recycling. The biggest unloading points of second-hand electronics are the Fatullah, Dholikhal and Mirpur and iterant dumping sites of e-waste can also be found within the periphery Chittagong port area Considering the Engagement in e-waste management and high use of e-devices and volume of e-waste Collected areas for questionnaire survey were selected areas where people are highly likely to use e-devices and where the e-wastes are collected together fromdifferent parts of the cities. In Dhaka, DoE office Agargoan, Atomic Energy Commission, Dhaka Northand South City corporation area specially Banani, Gulshan, Tajgaon, Elephant Road, Nimtali, Gulistan, Dolaikhal, Golapbag, Mirpur, Islambag were visited.

Industry type: Small /Medium /Large

If you want to start an industry first, you have to start small or medium. Moreover, the industry has to start with all the e-waste from which precious metals are available and the market value is very high.

Appendix-D.

Department of Environmental (Law and Acts): Hazardous Waste (E-Waste) Management Rules 2021 (SRO No. 18-Act / 2021)

Environmental/ Health Effect: We are of the opinion that if e-waste is not managed properly, the following problems may arise- Arsenic (As), Barium (Ba), Beryllium (Be), Cadmium (Cd), Lead (Pb), (Mercury (Hg)

Azizu Recycling & JR e-Waste company Limited Questionnaire Survey Feedback for Future Work

SL No	Questionnaire	The answer
1.	How &Why Identify E-Waste?	Azizu Recycling & E-Waste Company Ltd is very capable to identify in Bangladesh because it is important as the Scrap electronic waste (e-waste) is a global epidemic. As locally& internationally the awareness grows, all types of organizations like governments, non-governments have begun acknowledging the strain that e-waste is placing on our planet. Along with government azizu recycling & e-waste company ltd has taken measures to solve the problem. As we live in the age of digital dispensation, thus the amount of consumer electioneers waste continues to grow.
2.	Why is Electronics Recycling Important?	We believes Electronic recycling also ensures that data is properly destroyed, materials are appropriately recovered and reused, and businesses have a paper trail to document the proper disposal of their assets. What it really comes down to is our responsibility to preserve and protect the environment for future generations.
3.	What do you collect e-waste?	We collect mainly computer machines, including printer, scanner, refrigerators, air conditioners, televisions and computer products viz. computers (i.e. desktops, laptops and tablets), printers, scanners and monitors.
4.	How do you classify E Waste?	Type 1- Major appliances (refrigerators, washing machines, dryers etc.) Type2–Small appliances (vacuum cleaners, irons, blenders, fryers etc.) Type 3 – Computer and telecommunication appliances (laptops, PCs, telephones, mobile phones etc.) Type 4 – Consumer electronics (video and audio equipment, musical instruments)

SL No	Questionnaire	The answer
		Type 5 – Lighting devices (incandescent light bulbs, fluorescent tubes, gas-discharge lamps etc.) Type 6 – Electrical and electronic tools (drills, saws, gardening devices etc.) Type 7 – Toys, leisure (electronic toys, models, sports equipment) Type 8 – Medical devices (all medical equipment with the exception of implants) Type 9 – Monitoring devices (detectors, thermostats, laboratory equipment etc.) Type. 10 – Vending machines
5.	How much e-waste is available every day?	Management: Everyday average 4-5 tones e-collect
6.	How do you recycle process?	Dismantling: Removal of parts, containing dangerous substances (CFCs, Hg switches, PCB); removal of easily accessible parts containing valuable substances (cable containing copper, steel, iron, precious metal etc.
7.	What's in the latest e-waste?	Have a Metal
8.	What kind of metal is there?	Ferrous & non-ferrous metals
9.	Are all parts separated by machine?	No, it is done manually
10.	What are the effects of e-waste?	Yes, specifically with lead, if released into the environment can cause damage to human blood, kidneys, as well as central and peripheral nervous systems.
11.	Is there another e-waste company in Bangladesh?	Yes, In the name of JR
12.	What is the name of DOE's project?	Best project

SL No	Questionnaire	The answer
13.	Does Azizu E-Waste Company have e-waste to work with every day?	There is not much time.
14.	Is there any plant to separate the metal?	No
15.	Azizu how to get the metal?	Was sent to Singapore.
16.	How much space is required for e-waste discharging of 4-5-ton capacity?	1 acre of land is required
17.	1 Acre of land is required	Steel structure or factory shed.
18.	What is the type of infrastructure?	Steel structure/Factory shed
19.	How much floor value height is required?	About 3 stored equal height.
20.	What can be the size of the shed?	100m*45m or 100m*100m three Shed.
21	Are all the machines of Azizu Recycling foreign?	No, own country and foreign machine.
22.	Why is it important to dispose of e-waste properly?	When e-waste is tossed into landfills, these chemicals leach into the soil, polluting the ground water as well as the air. Electronics are made of components that contain valuable raw materials. Recycling old devices saves energy. Additionally, reusing electronics helps other, less-fortunate people in your community.

Analysis

Data Analysis and Presentation

Data collected was sorted, organized, conceptualized, refined, and interpreted using methods drawn from the constant comparative analysis techniques, Quantitative and qualitative methods was used to collect and analyze data. Data on questions that are quantitative in nature such as number of discarded device, quantities of waste handled was analyzed using Microsoft word where charts and tables were generated. Qualitative data, mainly obtained from interviews and document analysis, was categorized to allow for meaningful analysis. Quotes, individual remarks and case illustrations built from interviews were used to further lend valuable support to data. Public policy data and information were subjected to content analysis.

Mapping of the Study

Data to be collected was aimed at addressing the study objectives. With regard to the first objective on evaluation of existing policies and regulatory framework governing e-waste management, primary data and secondary data were collected with the aim of determining gaps in existing legal, policy and regulatory frameworks in waste management, institutional mandates and framework for sustainable development, the level of involvement all stakeholder in e-waste management. In relation to the second objective on examining how e-waste is handled in manufacturing and processing industries, primary and secondary data were collected to determine the levels of stakeholder responsibilities on matters of e-waste management, evaluate effect of poor e-waste handling to the environment, how e-waste is disposed and determines how e-waste is handled in manufacturing and processing industries. In relation to the third objective on examining critical challenges constraining e-waste management in manufacturing and processing industries, primary data was collected to evaluate level of compliance on environmental legislation by industries, effectiveness of monitoring and policy implementation the relevant key stakeholder, safety concerns during e-waste handling in manufacturing industries. A mapping of objectives, variables or indicators, data sources used in the study and analysis techniques of the data is presented below.

 # Table: Mapping of objectives, variables/indicators, sources of data and data analysis of the study

S.L	Objectives	Variable/indicators	Source of Data	Data analysis
1.	To Examine the present status of e- waste management system in Dhaka City	Approaches of e-waste disposal E-waste collections and transportations Roles of various stakeholders in e-waste management Determine constrain of e-waste disposal	Books, Articles, Journals, Newspaper clippings, E- waste collectors, dismantler and citizens Site visit	Qualitative analysis Interview Field visit
2.	To identify the legal framework and institutional preparedness of e- waste management in Dhaka city	Existing legal framework in e- waste management Institutional preparedness for enforcement of e-waste management Effectiveness of various policies in addressing e-waste.	Constitution of Bangladesh, Ministry of Forest and Environment, Commerce, Industries, ICT and Local Govt. Division, DoE, BTRC, BAERA, City Corporation	Qualitative analysis
3.	To understand the roles and cooperation of various stakeholders involved in Sustainable e-waste management.	Institutional framework and institutional capacity, roles various stakeholders	Ministry of Forest and Environment, Commerce, Industries, ICT and Local Govt. Division, DoE, BTRC, BAERA, City Corporation Books, Articles, Journals, Newspaper clippings	Qualitative analysis Interview KI
4.	To understand the level of awareness on e-waste of the citizens.	Citizens Awareness	Web Survey through e-mail and Field survey by hand	Quantitative Analysis

Data source: Books, Articles, Journals, Newspaper clippings

Opportunity/ Business Setup for e-Waste Recycling:

E-waste is doing a very sensible job for a green Bangladesh as well as the world. The project is the basis of moral responsibility to create a green environment. We believe in the basic R's Approach in the management of EEE products in particular and its optimal use of E-waste.

The Reduce, Reuse, Recycle, and Removing is the basic R's approach is very perfect for industrial reuse to make the whole thing environment-friendly alternatives in dealing with the growing generation of product and its e-wastes vis-a-vis its impact on health, economy and natural ecosystem of the universe.

Maintain e-waste the integration of systems that will lead to higher efficiency and lessening of transmission loss which will improve the efficiency of the product and at the same time will increase the life span of the product.

E-waste recycling is highly labor-intensive and involves several steps starting from waste collection to final material processing (Fig. 1) in order to obtain the desired recycled products or raw materials for reuse.

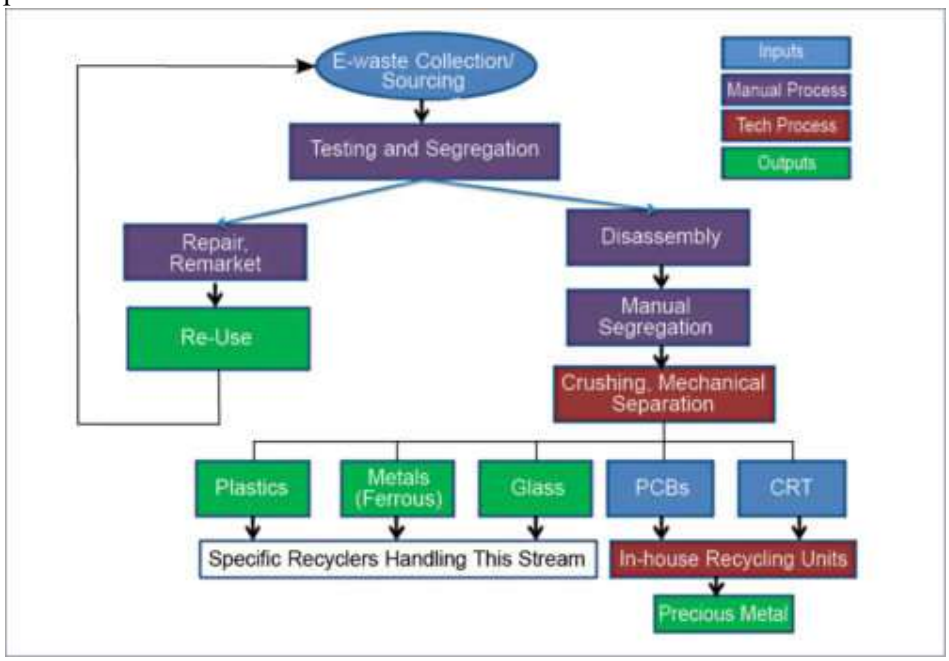


Fig. 1: An overview of e-waste recycling operation (Source: Indigo Edge)

Different types of e-waste materials and processes used for their management are laid out in Table 1. The different valuable metals obtained after processing are given in Table

Revenue calculation for recycling of 1-ton computer with Printer (PC) e-waste

E-waste is a rich source of metals such as gold, silver, and copper, which can be recovered and brought back into the production cycle. There is significant economic potential in the efficient recovery of valuable materials in e-waste and can provide income-generating opportunities for both individuals and enterprises.