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1 **Title Page**

2 **The journey from *products* to *waste*: A pilot study on perception and**
3 **discarding of electronic waste in contemporary urban India**

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Abstract

During the recent past, electronic waste (E-waste) has emerged as a major category of toxic waste in both global North and global South. Particularly, the emerging economies such as India is a major contributor to the E-waste volume in the world today. Accordingly, we attempted to carry out this study to evaluate the journey of equipments from ‘electronic products’ to ‘electronic waste’ in the city of New Delhi in India. The purpose was to carry out an exclusive pilot study with the potential to replicate the same at a larger scale in major Indian metropolis which are mostly the hubs of intense E-waste generation. The case of mobile phones (both smartphones and feature phones) was considered as the key representative. A structured questionnaire survey was carried out with 334 purposively selected respondents in the city of New Delhi. Among several other noteworthy findings, we observed that there exists a gap among purchase behaviour of mobile phones, awareness on E-waste and disposal behaviour of these phones. For instance, the relatively high knowledge/awareness about E-waste is yet to be reflected in consumers’ responsible purchase and disposal behaviour. We argue that creating awareness among citizens is central to a sustainable E-waste management system and effective policy instruments.

Keywords: E-waste; New Delhi; India; Disposal; Perception; Policy

1. Introduction

Today, Electronic waste (E-waste) or Waste Electrical and Electronic Equipments (WEEE) signifies a major global environmental crisis owing to its hazardous consequences to human health and the environment. Our ever-increasing reliance on electrical and electronic equipments (EEE) in day-to-day lives coupled with the subsequent end-of-life waste result in this new challenge in the form of E-waste (Abdelbasir, Hassan et al. 2018). Both the marketing and technology of the electronic products are subjected to rapid growth, resulting in a set of consumers who are attracted to constantly substituting their electronic goods and gadgets with newer models and technologies (Pandebsie, Indrihastuti et al. 2019). There is a functional lifetime of each EEE and consequently, E-waste is generated from the obsolete electronic products after a certain period of time (Borthakur and Govind 2018). E-waste is an interesting category of waste from perspective of ‘resources’ and their conservation. For instance, while the persistent build-up of E-waste is a threat to our ecosystem, it also contains substantial amounts of rare earth elements, precious metals and base metals with vast economic potential (Khayyam Nekouei, Pahlevani et al. 2019). Thus, proper recycling and reuse of this category of waste contribute to conservation of natural resources and abating pollution (Abdelbasir, Hassan et al. 2018). Ensuring responsible E-waste disposal behaviour among consumers and creating adequate public awareness could aid in this context where increasing volume of waste is sustainably managed with the least possible environmental burdens (Borthakur and Govind 2017).

An important aspect in managing E-waste effectively involves determining the generation and flow of this toxic stream of waste. Andrade, Romanelli et al. (2019) suggested that the over-all amount of EEEs placed on the market is extensively considered as an approach towards approximating both the global and national flow of E-waste. Further, total E-waste generation could be monitored by factors such as the high obsolescence rate of different electronics product categories, the subsequent volume of E-waste formally collected/recycled and other such determinants (Andrade, Romanelli et al. 2019). Although the exact amount of E-waste generated is difficult to estimate, Tansel (2017) argues that it is indeed experiencing an exponential increase over the past decades. With an average of over 6 kg per person, each year approximately 50 million metric tonnes of E-waste is generated worldwide which is ‘equivalent to the weight of 5,000 Eiffel Towers’ (Parajuly, Kuehr et al. 2019). Accordingly, it is essential to recognize the set of

stakeholders in both the E-waste generation and management chain for its successful management (Borthakur 2015). The community, producers and government are, for instance, the vital actors having significant stakes towards responsible E-waste management (Pandebezie, Indrihastuti et al. 2019). A comprehensive effort with intense engagement of these stakeholders at all levels could help in situating responsible management mechanisms.

In India, E-waste has emerged as an apprehension necessitating immediate consideration both from the research and policy perspectives. Today, the country is one of the largest generators of E-waste in the world. With a volume of 1641 kilo tonnes generated each year, the huge population size of the country is accountable for its amplified share in the global E-waste generation over the years (Kumar, Holuszko et al. 2017). Although the generation of E-waste in the country is rising rapidly, the management initiatives and ongoing practices are far from adequate to ensure a sustainable approach towards dealing with the both domestically generated and imported E-waste (Borthakur and Govind 2019). Only a handful of E-waste is collected and recycled in India out of the enormous volume generated each year, with practices of landfill and incineration still very much prevalent in the country (Ravindra and Mor 2019). The current recycling of E-waste in India is dominated by the informal sector with enormous environmental, health and safety implications. Majority of the countries in the global North ship up to 80% of their E-waste illegally to the global South, where ‘hundreds of thousands of informal workers’ are engaged in processing of this waste (Awasthi, Zeng et al. 2016). The informal recycling sector keeps flourishing in countries like India owing to the excellent network of waste pickers, their door-to-door collection mechanism and predominant consumers’ disposal behaviour. As argued by Dasgupta, Debsarkar et al. (2017), three factors – 1) usage patterns of different electronic equipments, 2) generation of E-waste and 3) its disposal – together shape an intricate issue where consumers choose to attain some kind of benefits from the disposal pattern like recycling or reuse. Addressing all these three factors is essential to ensure responsible E-waste management mechanisms in a country like India.

Considering the complexities associated with E-waste management in India, this paper is an attempt to understand how E-waste is perceived in urban India and what are the disposal preferences of the urban consumers in the country. We evaluate the journey of electronic equipments (taking into account the example of mobile phones) from ‘products’ to ‘waste’ considering the factors which shapes a consumer’s electronic equipment’s purchase and E-waste

disposal behaviour. We argue that adequate understanding of this endeavour from *product* phase to *waste* phase is instrumental in devising effective E-waste management strategies in India.

2. Significance of the study, theoretical underpinning and methodology

2.1. Significance

In order to comprehend the significance of the study, let us consider the growth of internet and mobile phone markets in India. A report by Mckinsey Global Institute titled “Digital India: Technology to transform a connected nation” realized in March 2019 revealed that with 560 million internet subscribers in 2018, India is one of the fastest-growing and largest markets for digital consumers¹. Both the market and usage of mobile phones have observed unprecedented growth in the country in the recent decade. The smartphone market in India grew 14.5 percent in 2018 with shipment of 142.3 million units². Not only smartphones, feature phone market also experienced considerable growth during this period. For instance, feature phones shipment grew even at a similar pace like smartphones at 11 percent, with more than 185 million units in 2018³. Moreover, studies show that adolescent and young adults from the age group of 11 to 24 are the largest users of smartphones in the current global distribution of smartphone usage. This group accounts for 72% of the current smartphone usage (Davey and Davey 2014). This finding is particularly significant in Indian context where the last census data (of 2011) in the country revealed that there were nearly 850 million wireless subscribers in India as of 30 June 2011, against a total national population of 1.2 billion (Watkins, Kitner et al. 2012). Considering the remarkable market growth of mobile phones during the last few years and the popularity of the e-commerce sites, this figure is expected to rise substantially by the next census data of the country in 2021. **It has been estimated that personal devices such as mobile phones, tablets, personal computers etc.**

¹ See:

<https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/Digital%20India%20Technology%20to%20transform%20a%20connected%20nation/MGI-Digital-India-Report-April-2019.ashx>

² See: <https://economictimes.indiatimes.com/tech/hardware/indian-smartphone-market-expands-14-5-pc-in-2018-idc/articleshow/67957147.cms>

³ <https://www.news18.com/news/business/india-smartphone-market-expands-10-in-2018-fastest-among-major-markets-report-2014017.html>

contribute to 82% of India's E-waste⁴. As the world's second largest smartphone market, cheap mobile phones act as 'a big culprit in India's E-waste problem'⁵.

Taking into account the facts mentioned above, we decided to concentrate on mobile phones as the representative of E-waste and focus on respondents in the age group of 18 to 22 in our study. This is the generation of youth which was born and brought up after the economic liberalization of India. Unlike the older generation, most of them are familiar with information technology (IT) and IT devices (including mobile phones) since a very young age to the point that these devices become imperative to their identity and in their personal lives. Accordingly, it is interesting to see the pattern of their purchase of mobile phones, awareness and disposal behaviour. Considering the fact that this generation will be the most integral part of the economic, social and political sphere of the country in the coming decades, it is important to study and analyse their behaviour for devising effective E-waste management and policy frameworks.

As we have considered mobile phones as the representative of electronic equipments, we attempted to observe the use and disposal pattern of the same among the urban youth population. The penetration of mobile phones in the world today seems way larger than most other electronic equipments. This is particularly true for an emerging economy like India which has an enormous Information and Telecommunication Sector and a large lucrative consumer market. Mobile phone is one of the most common electronic equipments in the country and unlike a refrigerator or a washing machine, it has already found its way to the remotest part of the country. Thus, assessing consumers' awareness and disposal behaviour in the context of mobile phones are important for sustainable E-waste management in India. We believe that a study on the capital city of New Delhi would certainly help developing a roadmap for sustainable management of E-waste from mobile phones in other parts of the country. Further, the household storage of obsolete mobile phones is a major concern confronted by both the Global North and the Global South. Mobile phones are rich in precious and valuable metals. If extracted appropriately, it has potential to reduce the environmental impacts of extraction of natural ores. Obsolete mobile phones could be an essential part in urban mines and contribute to a circular economy in India. For this, it is imperative to

⁴ See: <https://www.downtoearth.org.in/blog/waste/e-waste-day-82-of-india-s-e-waste-is-personal-devices-61880>

⁵ <https://qz.com/india/1161447/theres-an-e-waste-crisis-lurking-behind-indias-boom-in-cheap-phones/>

166 evaluate the consumers' responses to the E-waste generated from these phones so that management
167 strategies and policy initiatives could be drafted and undertaken.

168 169 **2.2.Theoretical underpinning: The concept of a 'Disposable Society'**

170 Presently, there is an evolving trend in the social commune towards a 'disposable society',
171 characterized and influenced by planned obsolescence and linear production (Bissaillon 2008).
172 Planned obsolescence is essentially a business tactic where the obsolescence of a particular product
173 is already planned since its production phase, which aid the producers to shorten the replacement
174 cycle of the product and generate longstanding sale capacity (Lobontiu 2013). It is typically beheld
175 as a business trick towards encouraging consumers to purchase more and more products (de
176 Oliveira Rafael 2013). Planned obsolescence is considered as a prime factor for increasing waste
177 generation in the world today. Similarly, unlike a circular economy, in a linear production, various
178 products are manufactured, used and subsequently discarded, creating large volume of waste. This
179 linear production, which is still dominating in the world, together with planned obsolescence
180 contribute largely to a 'disposal society'. As stated by Holmes (1997: 136):

181 — Modern society has developed as a "throw-away" culture, with disposable products
182 permeating every aspect of our lives. This disposable culture generates its own problems –
183 including the mass of the throw away items, their biodegradability compared to non-
184 disposable items, and the potential for cost. With expensive items, the concept of
185 disposability is also expensive.

186 Human society is increasingly getting characterized by a process where considerable quantity
187 of products being pursued, produced, obtained and used are not envisioned to be everlasting and
188 definitely not built and designed to endure the tests of time (Skipworth 2019). Mobile phones are
189 perfect examples. In the previous section, the market and penetration of mobile phones are already
190 discussed. In a disposable society of an emerging economy, the lucrative market and planned
191 obsolescence prompt individuals to purchase newer models regular intervals, subsequently,
192 contributing to the E-waste volume. Although a major attribute of the Global North as of now, in
193 this paper, we assess whether urban India is moving towards a disposable society or already the
194 behaviour of the urban youth characterizes such a society.

2.3. Methodology

Accordingly, a structured questionnaire was formulated and circulated among purposively selected respondents in the city of New Delhi. The formulation of the questionnaire was influenced by and built upon on our own previous research experience on the topic (for instance, see: Borthakur and Govind, 2019). The in-depth presentations and discussion on E-waste during the 7th International Conference on Sustainable Solid Waste Management took place from 26th June to 29th June 2019 at Heraklion, Crete in Greece also helped us refine and validate the questionnaire. The survey was carried out through hard copy distribution of the questionnaires to 350 respondents among which we received effective responses from 334 respondents. The reason for a higher response rate is the fact that as it is a pilot study, we had first carried the survey out with respondents known personally to the authors. Together, both the authors have (had) been based at New Delhi for considerable time in their lives and thus, have decent social contacts. These familiar respondents helped us identifying additional respondents. Thus, it is a kind of respondent driven snowball sampling. Again, as it is a pilot study, we restrained ourselves from extensive distribution of the questionnaires to a larger audience. We circulated the questionnaires among the audience where there was a probability of getting maximum responses. The study was concentrated on respondents in the age group of 18 to 22.

Each of the question in the questionnaire was explained individually before asking the respondents to fill up the same. We made sure to convey it to the respondents that there is no right or wrong answer to the questions in the questionnaire in order to ensure that truthful answers to the queries could be achieved. We consciously decided not to ask for the name, address etc. of the respondents in the questionnaire so that their identity remains completely anonymous. In majority of the cases, we tried to gather a few respondents together and distribute the questionnaire among them. Instead of directly asking them to hand over the answered questionnaires, we asked the respondents to submit them in a particular place in order to further ensure that we cannot identify the responses of a particular person. The informed consent forms (given to the respondents as a part of the survey) and questionnaires were asked to submit separately. Thus, a complete anonymity was maintained throughout the study. This research will act as an important pilot study for similar research on perception and disposal of E-waste in major metropolis in India.

224 Considering the experiences of this study, similar initiatives at a larger scale could be undertaken
225 in the near future in the country.

227 3. The survey: Results and discussions

228 3.1.The lifespan of mobile phones

229 In the past 20 years, the booming consumer electronics industry has been rapidly changing the
230 economic and social landscape with the electronic industry becoming the largest and the most
231 flourishing industry in the world (Li, Zeng et al. 2015). Consequently, the use of electronic
232 products has observed a massive increase across the globe with mobile phones being an integral
233 part of this growth story. For instance, in 1970, there was no mobile phones in the world while
234 today we have more than 6 billion units (Romer 2015). The growth of electronics including mobile
235 phones is particularly significant in the emerging economies, especially in countries like China
236 and India. These countries have huge consumer bases for mobile phones. During our survey, more
237 than 50% of the respondents (that is 182 respondents out of 334) said that they change their mobile
238 phones between 1-3 years (See: Figure 1). We have reasons to believe that these are primarily the
239 respondents who use a smartphone, for smartphone users replace handsets after an average of only
240 2 years (Zink, Maker et al. 2014). However, as mentioned in the previous section, India has a large
241 and growing market for feature phones as well. The feature phones have a longer average lifespan
242 than the smartphones. We observed that many of our respondents still use a feature phone although
243 most of them are looking forward to substituting it with a smartphone soon. These feature phone
244 users are primarily the ones who said during the survey that they use their mobile phones beyond
245 4 years. They constitute 26.94% of the total respondents.

Figure 1: Lifespan of the mobile phones

Source: The Authors, 2019

3.2.Major reasons for replacement/new purchase

During our study, we attempted to document the major reasons for replacing of an electronic equipment or purchase of a new one. We considered this as a multiple-choice question because we observed that often, it is difficult for the respondents to single out the sole reason for purchase of a new phone. Providing a few possible options and asking the respondents to select up to three most relevant options ease the situation for the respondents to a great extent. As suggested by Figure 2, maximum of 167 out of the total 334 respondents, constituting exactly 50% of the survey sample, mentioned that they purchase new products when the older one becomes non-functional. This signifies that another 50% of the respondents could not identify themselves well enough with this situation and probably prefer to purchase new phones while the older ones are still functioning. Discarding of the mobile phones well within their functional lifespan has emerged as a major issue in the world today. While a mobile phone could have a potential lifespan of over 10 years (Ohnmacht, Thi Thao et al. 2018), it is very unlikely in the present-day world that anyone would use his/her phone for that long. For instance, the average lifespan of mobile phones in Australia and Japan is estimated to be approximately between 2 to 2.6 years (Golev, Werner et al. 2016), it is 23 months in Hong Kong (Deng, Giesy et al. 2017) and in general, between 12 and 24 months in most of the developed countries (Ohnmacht, Thi Thao et al. 2018). Today, such short lifespans

of mobile phones are restricted not only to the developed countries alone with emerging economies such as India, China and Nigeria record considerable decrease in the life of the phones in their respective countries (Ohnmacht, Thi Thao et al. 2018).

Nearly 40% of the respondents (135 out of 334) said the un-repairability of their products as a reason for purchasing of a new phone while more than 37% of the respondents (125 out of 334) believe that considering the cost of repair, it is wiser to purchase a new one. Both of these responses could be linked together and seen through similar lens. With the remarkable expansion of consumer electronics market in India in the recent past, the prices of electronic products including mobile phones have observed a constant decline over the years. The e-commerce sites of the country have an ever-increasing consumer base with offers on electronic products almost every single day. The competitive price of mobile phones in these sites acts as an incentive for the consumers to purchase a newer mobile phone without exploring the potentials of its possible repairability. Unlike a few years back, the repair market for electronic products is dwindling in the country and a substantial share of E-waste generation could be attributed to this factor. In many cases today, the repair shops themselves are also the sellers of electronic products and they advise the consumers against repairing the electronic products. It is because of the decreasing difference between the cost of repair and the purchase of a new product. This is also influenced by the attraction of consumers for new products having newer features as suggested by more than 37% of our respondents (127 out of 334).

Figure 2: Major reasons for purchase of new mobile phones

Source: The Authors, 2019

3.3. Common reasons for malfunctioning of the mobile phones

Figure 3 illustrates the major reasons for the malfunctioning of the mobile phones. Around 54% (181 respondents out of 334) had suggested the problem with the battery as a major cause associated with their mobile phones. This is particularly true for the smartphone users. While there are over one billion smartphones out of the world's total 4 billion mobile phones, the experience of the users has been and will continue to be strictly restricted by the smartphone's battery life in spite of such a remarkable acceptance rate of the same by the consumers (Ding, Wagner et al. 2013). Existing research suggests that the users value the life of the battery of their smartphones (Hosio, Ferreira et al. 2016) and thus, malfunctioning of the batteries acts as a major stimulus among our survey respondents to purchase new phones. Approximately 42% of our respondents (140 respondents out of 332) mentioned problems with the software as a reason for malfunctioning of the mobile phones. This set of respondents again are the users of the smartphones. The software and battery performance are interlaced because, an error in the software results in a fast draining of a smartphone battery.

Figure 3: Common reasons for malfunctioning of the mobile phones

Source: The Authors, 2019

3.4.Methods of disposal

Figure 4 explains the prevalent methods of disposal of E-waste within our study sample in New Delhi. Over 50% of our respondents (168 out of 334) mentioned that they keep their out-of-use or obsolete mobile phones stored at home. The storage of mobile phones in households is a global phenomenon today where the consumers are reluctant to dispose of their phones due to factors such as inadequate information/awareness on proper methods of disposal, data security concerns etc. Conducting a study in the UK, authors Wilson, Smalley et al. (2017) found that ‘mobile phones that are kept by the user are hibernated for longer than they are ever actually used as primary devices’. In a recent study conducted by us in the Indian city of Bangalore revealed that more than 59% of the respondents keep their obsolete mobile phones (and computers) stored at home (Borthakur and Govind 2019). Most of the people in India have no information on responsible disposal of their electronic equipments including the mobile phones. Further, electronic equipments are also considered as a kind of commodity with some inherent values which causes a

reluctance among the consumers to dispose it off quickly. The prices of the electronic products are relatively higher than many other commodities and the consumers constantly consider them to be valuable even if not any longer used. Referring to the higher price of the smart phones, even a few well-salaried consumers in the city of Bangalore were found to be very hesitant to get rid of their obsolete phones (Borthakur and Govind 2018).

Around 45% of the respondents (151 out of 334) said that they give their mobile phones for free to someone, may be to their siblings, relatives, friends or others. This is a very common socio-cultural phenomenon in the country where the mobile phones often find second- or even third-hand users among the acquaintances before finally being discarded as a 'waste'. Sometimes handing over the products take place across the income chain, for instance, mobile phones are frequently passed to the people farther down this chain. As a country characterized by the presence of a major informal waste recycling sector, it is rather expected that 30% of the respondents prefer to sell their mobile phones to the scrap dealers or 'kawariwalas' at certain cost. The omnipresent idea of considering obsolete electronics including mobile phones to have some worth encourage this behaviour among the consumers to sell them at a price. It is evident in Figure 5 where more than 71% of our respondents (239 out of 334) stated that they consider their obsolete mobile phones to still have certain value. The consumers always expect certain kinds of financial incentive while discarding their recyclable waste in India including E-waste. This worth also encourages the consumers to give their mobile phones to stores while purchasing a new one where it is very likely that the consumers get some financial benefit out of it. Mostly it consists of a kind of exchange offer where giving back the older mobile phone results in a discount in the newer one. On a positive note, the perceived worth of the mobile phones restricts the consumers to dispose it with other household wastes. Only 4.7% of our respondents (16 out of 334) mentioned that they consider disposing mobile phones with household waste. As a country struggling with the management of all kinds of waste and still very much stressed in creating responsible waste disposal behaviour among consumers, the supposed value of obsolete electronic products could be attributed as the only reason for separating this category of waste from others.

Figure 4: Methods of disposal of mobile phones

Source: The Authors, 2019

Figure 5: Perception of obsolete electronics: Waste vs. Valuables

Source: The Authors, 2019

3.5. Willingness to repair and recycle

Figure 6 represents the willingness of our respondents to repair/recycle their mobile phones. Over 68% of our respondents (229 out of 334) exhibited their willingness to repair/recycle their phones while also admitting that it requires a kind of cost and benefit analysis, especially while deciding to 'repair'. Sometimes the cost of repair and purchase of a new mobile phone have negligible price difference which makes the second option a more viable one. In a competitive market such as India and a competitive sector such as electronics, this is a common phenomenon. Although the respondents exhibited their willingness to recycle their mobile phones, more than 88% of them (295 out of 334) stated that they have no knowledge about the presence of any E-waste recycling company in their city (See: Figure 7). As the city of New Delhi does have a few E-waste recycling companies, this shows the lack of awareness on the consumers' end because of inadequate dissemination of relevant information. With ever-decreasing lifespan of electronic products and especially that of the mobile phones, creating public knowledge on recycling companies becomes central towards ensuring responsible E-waste management. Both the government and the producers should work together to guarantee this information dissemination.

Figure 6: Willingness to repair/recycle

Source: The Authors, 2019

Figure 7: Knowledge about recycling companies

Source: The Authors, 2019

3.6. Knowledge about E-waste

While assessing the respondent's knowledge about E-waste, we started by asking if they consider their obsolete mobile phones to contain harmful constituents and thus, hazardous. As illustrated in Figure 8, 64% of our respondents (214 out of 334) rightly considered their waste mobile phones harmful. On the contrary, 34.7% of our respondents (116 out of 334) do not think that mobile phones are damaging to the human health or the environment. Complementing this finding, 68.2% of the respondents (228 out of 334) have heard about E-waste and have knowledge about this category of waste, while 31.7% of the respondents (106 out of 334) have never heard the term (Figure 9). Internet including social media is the most prominent source from which the respondents heard or got to know about E-waste (Figure 10). This shows that social media could play a pivotal role in creating mass awareness on an important issue such as E-waste. Within our study sample, there still exists a large group of more than 30% respondents who are uninformed both about E-waste and its harm (Figure 8 and Figure 9). This group needs to be educated about the same and internet could play a larger role in this context. Nevertheless, more than 87% of our respondents (292 out of 334) did not know about India's E-waste (Management) Rules, 2016. This

is a significant concern in need of urgent attention as this rule guides both producers and consumers on sustainable management of E-waste at their respective ends. Lack of awareness on such rules aids in maintaining an undesirable E-waste disposal mechanism especially among consumer citizens. As a consequent, it is very likely that the problem of E-waste would keep on intensifying rapidly in the coming decades.

Figure 8: Are obsolete mobile phones harmful?

Source: The Authors, 2019

Figure 9: Have you heard the term 'E-waste'

Source: The Authors, 2019

Figure 10: The source from which the respondents heard about E-waste

Source: The Authors, 2019

Figure 11: Knowledge about India's E-waste Rules (2016)

Source: The Authors, 2019

4. Conclusion

During the recent decades, E-waste has established itself as a major category of waste with detrimental consequences to our ecosystems. Although considered as a major apprehension in the global North at the outset, it has subsequently established itself as a prominent toxic waste stream in the global South too. Today, emerging economies such as India is a major contributor to the E-waste volume in the world. Accordingly, we attempted to carry out this study to evaluate the journey from ‘electronic products’ to ‘electronic waste’ in the city of New Delhi in India. New Delhi is one of the largest cities in the country and thus, could act as a model towards carrying out similar studies in other Indian metropolis. We have taken into account the case of mobile phones as the representative of E-waste. Taking evidence from the available literatures which say that majority of the smart phone users today are urban youths, we have considered the respondents in the age group of 18 to 22. This is the group of the Indian citizens born and brought up after the economy opened up, when the IT Revolution was already a full-fledged phenomenon in the country and thus, electronic and telecommunication products have been integral part of their day-to-day lives from the very beginning. This is also the group of youth who will be instrumental in India’s environmental footprint in the near future and thus, assessing their consumption and disposal behaviour is essential towards devising E-waste management and policy instruments.

As a country with a huge mobile phone user base (both smartphones and feature phones), approximately 50% of the smartphone users mentioned that they change their phone every 1 to 3 years. While exactly 50% of this survey sample stated that they purchase new products when the older one becomes non-functional, another 50% of the respondents could not identify themselves with this situation and probably prefer to purchase new phones while the older ones are still functioning. This decreasing lifespan of mobile phones and the increasing incentive to purchase new devices before the functional life of the older one is completed signify a disturbing trend. It indicates a shift towards a disposable society which is yet to be evident in the context of India. If continues at the current rate, this trend will aid in generating more and more E-waste volume in the near future and will intensify the already intense E-waste issue. Majority of the respondents keep their mobile phones stored at home due to their perception of certain worth of their obsolete electronic products and inadequate awareness about safe and responsible disposal. This perceive worth is probably a major factor which restricts the country’s attributes towards a disposable or

throwaway society. Further, considerable majority of the respondents were willing to repair/recycling their E-waste, however, they do not have any knowledge about the presence of any recycling company in New Delhi. The willingness to repair/recycle is a constructive characteristic of the study population towards refraining it from being a disposable society. This attribute of the Indian consumers should be adequately addressed and encouraged by the policymakers for sustainable management interventions. Additionally, the toxicity from mobile phones and knowledge about E-waste look common among more than 60% of our respondents. However, an overwhelming 87% of our respondents have no knowledge about India's E-waste (Management) Rules, 2016.

Overall, there exists a gap among purchase behaviour of mobile phones, awareness on E-waste and disposal behaviour of these phones. These three factors should be addressed comprehensively by the research and policy community of the country towards ensuring responsible E-waste management in India. For instance, the knowledge/awareness about E-waste is yet to be reflected in consumers' purchase and disposal behaviour. The awareness on E-waste is not translated into responsible purchase behaviour or prolonging of the lifespan of electronic products, particularly mobile phones. This is evident from the overwhelmingly decreasing lifespan of electronic products which is a major cause of concern in a country already laden with massive E-waste generation. We argue that this gap should be addressed adequately by the government of the country through formulating effective policy responses.

As a pilot study carried out within a restricted timeframe, the study does have certain limitations. Nevertheless, we had tried to overcome the same by carefully selecting the respondents, ensuring maximum participation of the selected respondents and obtaining as authentic answers as possible to our questions by individually explaining the questions of the questionnaire. This study is a part of a larger research plan with an aim to carry out an extensive study in New Delhi with a much broader audience. This pilot study was conducted to check the feasibility of our proposed future research agenda and to ensure the validation of the questionnaire formulated. We have reasons to believe that the current research will act as a guiding map for us while carrying out our future endeavours. Further, not only for our own individual research, this pilot study could provide important insights to researchers working on similar areas in other countries and contexts.

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