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RECYCLING REGIME, ENVIRONMENT, AND EXCLUSION OF ELECTRONIC SCRAP WORKERS IN DELHI

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Abstract

In recent years, the Indian e-waste sector has undergone a process of formalisation through the implementation of E-waste Management Rules (2016), leading to the creation of what I call recycling regime. The upper and middle classes, along with NGOs and industry actors, are frontrunners in thinking about e-waste policies. They were prompted by a twofold motive: the desire for a “world-class”, clean, and pollution-free city; and seizing business opportunities by extracting value from e-waste. Rather than replacing the State, they co-opted the State so that it would legislate to safeguard the environment, and address toxicity and health problems associated with e-waste. Recycling regime relies on formalisation processes embedded in multiple technologies – technicity, capital-intensive facilities, certifications, authorisations, and licences – that work together to exclude the “informal” sector from the e-waste governance system. Recycling technologies act as “technologies of domination” that further contribute to sidelining the “informal” labour of scrap workers or *e-kabadis*, who as Muslims already find themselves on the margins of society. However, the recycling regime fails to safeguard the environment in the end as e-waste trickles down back to the informal sector via authorised actors.

Régime de recyclage, environnement et exclusion des travailleurs du secteur des déchets électroniques à Delhi

Résumé

Le secteur indien des déchets électroniques a connu un processus de formalisation ces dernières années, grâce à la mise en œuvre de règles de gestion des déchets électroniques (2016), ce qui a conduit à la création de ce que nous appelons le « régime de recyclage ». De fait, les classes moyennes et supérieures, les ONG et les acteurs de l'industrie, qui sont les premiers à avoir réfléchi aux politiques en matière de déchets électroniques en Inde, ont été poussés par une double motivation : le désir de voir émerger une ville de « classe internationale », propre et non polluée, et la saisie d'opportunités commerciales par l'accaparement de la valeur des déchets électroniques. Ne se substituant pas à l'Etat, ces acteurs l'ont toutefois coopté afin qu'il légifère en faveur de la protection de l'environnement et qu'il s'attaque aux problèmes de toxicité et de santé liés aux déchets électroniques. Le régime de recyclage repose sur des processus de formalisation intégrés dans de multiples technologies – technicité, installations coûteuses, certifications, autorisations et licences – qui fonctionnent ensemble pour exclure le secteur « informel » du système de gouvernance de ces déchets électroniques. Les technologies de recyclage agissent comme des « technologies de domination » qui contribuent à mettre à l'écart le travail « informel » des ferrailleurs ou des *e-kabadis*, qui se trouvent déjà en marge de la société en raison de leur appartenance à la communauté musulmane. En définitive, toutefois, le régime de recyclage ne parvient pas à protéger l'environnement car les déchets électroniques finissent par retomber dans le secteur informel par l'intermédiaire d'acteurs autorisés.

Recycling Regime, Environment, and Exclusion of Electronic Scrap Workers in Delhi

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Following the implementation of the latest E-Waste (Management) Rules 2022, which came into effect in the summer of 2023, this article delivers a timely ethnographic reflection on the accomplishments of e-waste legislations so far. The country produced around 3230 kt of e-waste in 2019,¹ a large part of which is processed and recycled in the Delhi National Capital Region (or Delhi-NCR), one of the biggest e-waste recycling hubs of the country, according to the Association of Chambers of Commerce and Industry of India (Assocham). It is also part of the global electronic waste circuits between Europe, North America, and Asia.

Electric and electronic discards across the world are officially designated as waste electrical and electronic equipment (WEEE), and commonly subsumed under the term “electronic waste” or e-waste. With increasing electronic and electrical equipment (EEE) coming into the waste streams, the Indian government embarked on a process of formalisation² through the framing and implementation of E-Waste Management Rules in 2011, which have since been revised three times to widen their scope. This article argues that regardless of the introduction and streamlining of the role of formal/authorised organisations in the sector, the regulations have failed to bring about any significant change in the environmental impact of e-waste, a task they had initially set themselves.³ The labour and skills of informal e-waste workers that I will call

¹ Vanessa Forti, Cornelis Peter Baldé, Ruediger Kuehr, Garam Bel, “The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential”, United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR)– co-hosted Sustainable Cycle s (SCYCLE) Programme, ITU & ISWA, Bonn/Geneva/ Rotterdam, 2020, 74, https://ewastemonitor.info/wp-content/uploads/2020/11/GEM_2020_def_july1_low.pdf

² Stefan Laser, “Why Is It so Hard to Engage with Practices of the Informal Sector? Experimental Insights from the Indian E-Waste-Collective”, *Cultural Studies Review*, 22 (1), 2016, pp. 168-195.

³ See also, Ankita Rastogi, “Formalisation Experience of E-waste Recyclers of Moradabad”, *Economic and Political Weekly*, 56 (8), 2021, pp. 1-13.

e-scrap dealers or e-kabadi remain essential. In doing so, the article extends the learnings of the solid waste sector in Delhi⁴ to the case of e-waste. Studies on solid waste management criticise policies that essentially promote large centralised, mechanised and technical systems such as waste-to-energy plants, at the expense of the existing traditional recycling sector. It also locates itself in scholarship⁵ that challenges environmental injustice narrative that paints a deplorable picture of toxicity and environmental hazards of e-waste reprocessing sites, and labour in the Global South, without looking into the nuances of place-specific recycling practices. It also emphasises the regional and local dimensions of e-waste flows, with extensive circulation of electronic discards between various conversion hotspots in the country, where the contribution of scrap workers is under-studied.

This article reflects the preliminary findings of a multi-site ethnographic research on e-waste undertaken in the scrap markets of Delhi, Uttar Pradesh, and Jaipur in North India. In Delhi, the fieldwork was concentrated in two neighbourhoods in Shahdara and North East Delhi that I call Janta Market and Shanti Market respectively.⁶ I spent three field trips of a total of four months in 2017, 2019 and 2021, mainly “following the thing”⁷ and “following the action”,⁸ studying e-waste as site multiple.⁹ Additionally, I collected life histories of informal e-scrap dealers. This allowed me to examine multiple connections between various discarded items, actors, and different sites, like supply networks in other cities, scrap neighbourhoods, and second-hand markets within the city as well as the buyers from nearby satellite towns. I also studied the role of government policies and institutions, intermediaries, producer responsibility organisations (PRO) and collection centres, and recyclers, amongst others. A total of 40 interviews were conducted with scrap dealers, scrap labour, recyclers, refurbishers, state officials, researchers, activists, etc.

The article is divided into three sections, each with two subsections. The first section sets the conceptual framework of this article through the concept of recycling regime. It looks at the global debates on e-waste, tracing the development of the categories of recycling and e-waste, and outlines the conditions and origins of the E-waste Management and Handling Rules in India. It also focuses on the different stakeholders involved, and their respective interests. A salient feature is the neoliberal backdrop of a clean, pollution-free city, which guides the framing of the Rules, voluntarily leaving out the informal e-waste sector that has a long history of scrap

⁴ Seth Schindler, Federico Demaria and Shashi B. Pandit, “Delhi’s waste conflict”, *Economic and Political Weekly*, 47 (42), 2012, pp. 18-21; Rémi de Bercegol and Shankare Gowda, “A new waste to energy nexus? Rethinking the modernisation of waste services in Delhi”, *Urban Studies*, 56 (11), 2019, pp. 2297-2314; Dana Kornberg, “Garbage as fuel: pursuing incineration to counter stigma in postcolonial urban India”, *Local Environment*, 24 (1), 2019, pp. 1-17.

⁵ Josh Lepawsky, “The changing geography of global trade in electronic discards: Time to rethink the E-waste problem”, *Geographical Journal*, 181 (2), 2015, pp. 147-159; Nicky Gregson and Mike Crang, “From waste to resource: The trade in wastes and global recycling economies”, *Annual Review of Environment and Resources*, 40, 2015, pp. 151-176.

⁶ All names have been changed and assigned pseudonyms to protect the identity of respondents.

⁷ George E. Marcus, “Ethnography in/of the world system: The emergence of multi-sited ethnography”, *Annual Review of Anthropology*, 24, 1995, pp. 95-117.

⁸ Josh Lepawsky, Grace Akese, Mostaem Billah, Creighton Conolly and Chris McNabb, “Composing urban orders from rubbish electronics: Cityness and the site multiple”, *International Journal of Urban and Regional Research*, 39 (2), 2014, pp. 185-199.

⁹ *Ibid.*

collection and treatment in urban areas. The second section outlines how the rules impact the informal e-scrap workers, who try to counter the challenges and the deepening competition from the authorised recycling sector. To do so, they distance themselves from both the terminology of recycling and pollution, and instead identify themselves through the neutral term of *kabad* (scrap). The final section provides some suggestions to achieve a more sustainable e-waste value chain, involving a better integration of e-scrap dealers.

RECYCLING REGIME: ENVIRONMENT, ECONOMY AND EXCLUSION

I draw on Gille's concept of "waste regimes",¹⁰ to describe the process of formalisation in the Indian e-waste sector, leading to the creation of what I call recycling regime. As Gille has argued, any economy has its specific ways of identifying, defining, organising, and treating waste. In the Indian scenario, both recycling and e-waste are constructed categories, inspired from western models, set in a complex territory of unruly materiality anchored in city planning, economy, environmental safeguards, and morality. Recycling regime is rooted in the framework of pollution control and value-creation, and is understood as particular ways of recovering discarded material, as well as disciplining the individuals who interact with it. This was initiated through the process of formalising the e-waste sector, which eventually paved the way for expanding a new "recycling" industry across the country. Recycling was widely understood as integrating automated and high-end resource recovery technology. The turn to mechanised and technological solutions to India's e-waste problems requires companies to register with the Central Pollution Control Board (CPCB), and acquire authorisations and licences in order to secure waste flows. Formalisation is a common tool for States to document, legalise, and make legible e-waste collection rights on the ground. It is a top-down process inspired by western models, and undertaken through the drafting and implementation of the E-Waste Management Rules.

NGOs and advocacy groups, drawing on their transnational ties, and industry actors – like manufacturers of electronic products – were the frontrunners in framing the terms of the e-waste debates and rules. The recycling regime highlights that waste issues are connected to broader concerns of the upper and middle classes, the judiciary, NGOs and industry actors, which is far removed from what goes on on the ground. For the middle class and civil society, e-waste recycling is linked with broader environmental and human health concerns as well as the reputation of the city, which they strive to preserve through policy making. For the industry actors, the participation in rule-making is guided by future possibilities, and concerns of profit-making through the e-waste sector. Rather than replacing the State, they enlisted it for coming up with legislation to cash in on value from waste, safeguard the environment, and address toxicity and health problems associated with e-waste. As such, the recycling regime sidelines *kabadis* who process the majority of e-waste manually and outside of the authorised networks.

¹⁰ Zsuzsa Gille, *From the Cult of Waste to the Trash-Heap of History: The Politics of Waste in Socialist and Post-Socialist Hungary*, Bloomington, Indiana University Press, 2007.

E-Waste, Kabad and Scrapping

- **E-Waste: Dynamic Contested Category, Distinct from Solid Waste Stream**

In common understanding, e-waste is often thought to be recovered from solid waste streams. This confusion often stems from the fact that plastic and metals like iron are also to be found in solid waste streams. However, unlike plastic waste, which makes up a substantial part of the solid waste stream, the amount of e-waste recovered from the latter is not significant, as a robust system of collection run by small and big entrepreneurs coexists with the municipal collection system.¹¹ Moreover, the quality and type of plastic recovered from both streams is not the same. E-waste makes up only 2% of the solid waste stream, but represents 70% of the hazardous waste that ends up in landfills.¹²

There has always been a comprehensive culture of reuse and recycling coextensive with the municipal waste stream. This culture is an integral part of the global commodity markets, and has long been orchestrated by itinerant door-to-door collectors at the bottom end of the value chain. Commodities are either bartered, or sold to itinerant collectors for cash. For instance, households bartered their old copper and brass kitchenware to door-to-door collectors for new wares made of steel and plastic. Steel and plastic wares are also used as exchange in the fabric recycling industry. The barter system is graded according to the quality and demand of the clothes. Itinerant vendors, carrying a sack for the day's collection, give a shining stainless steel vessel, or plastic boxes in exchange for old and used clothes. Their efforts spawn various lucrative subsidiary businesses in the waste commodity system, notably in the second-hand clothes market, which upscales and refashions these into new textiles for exports, and in gold and silver bartering. Besides, it provides a livelihood for hundreds of traders from far-flung districts and small towns of the country.¹³

Several scholars have criticised the narrow definition of e-waste, which represents a certain determinacy in the object under observation and instead propose to focus on its on-goingness.¹⁴ Thus, this article studies e-waste as a dynamic, contested, and heterogeneous category, embedded in transnational and local waste and scrap metal flows. Moreover, e-waste is considered as a category separate from the solid waste stream. Following Peter Kirby and Anna Lora-Wainwright, I study e-waste "ethnographically in a more neutral (that is, less

¹¹ Throughout this article, I therefore refrain from using the term "scavenging" and "salvaging", which in the Indian context is often associated with waste pickers or rag pickers, and to designate the work of the informal e-waste sector.

¹² Banjot Kaur, "'Tsunami of e-waste' to hit the world soon, warns new UN report", *Down to Earth*, January 24, 2019 (www.downtoearth.org.in/news/waste/-tsunami-of-e-waste-to-hit-the-world- soon-warns-new-un-report-62958).

¹³ Lucy Norris, *Recycling Indian Clothing: Global Contexts of Reuse and Value*, Bloomington, Indiana University Press, 2010.

¹⁴ Julia Corwin, "'Nothing is useless in nature': Delhi's repair economies and value creation in an electronics 'waste' sector", *Environment and Planning A: Economy and Space*, 50 (1), 2018, pp. 14-30; Josh Lepawsky and Charles Mather, "From beginnings and endings to boundaries and edges: Rethinking circulation and exchange through electronic waste", *Area*, 43 (3), 2011, pp. 242-249.

alarmist and excoriating) manner”.¹⁵ While they prefer to use the neutral term of “scavaging” to avoid negative connotations associated with the actions of “scavenging” and “salvaging” in their study of e-waste recycling in China, in what follows, I use the term “kabad” (scrap) interchangeably to highlight the heterogeneous nature of e-waste.

Kabad is a generic term signifying scrap, junk, and discard in Hindi. It highlights an intentionality of disuse as well as offers a spectrum of value to choose from, ranging from components that can be easily reused, repaired, and refurbished to fetch higher prices, and items with low commercial value that are scrapped. It is a broader term not signifying waste, and includes anything that has value from salvaged and retrieved metals, and plastic material to components and parts utilised in reuse, second-hand, repair, scrap, and recycling economies. Last but not the least, kabad is equally a self-descriptive term used by kabadis themselves. To talk about informal e-waste, I add the prefix “e-” to kabad to distinguish between scrap dealers trading electronic items and scrap dealers dealing in discarded materials like plastic, paper, glass, and metal scrap retrieved from sources other than electrical and electronic items. The use of e-kabad also separates scrap work from garbage, trash, and waste – objects without value – but also symbolically from filth, a material that is considered socially or spiritually polluting, and thus stigmatising to the people and places that come into contact with it.¹⁶

The umbrella term of kabadi encompasses a host of specialised actors, variously known as raddiwala (used paper collector), lohewala (iron or metal collector), khaali bottlewala (empty glass bottle collector), panniwala (plastic bag collector), depending on the discarded material they collect. Kabadiwalas are material agnostic. They buy a range of materials – including plastic, paper, glass, metal, and electronics – that they deem sellable for reuse second-hand, as well as for large scrapping industries that act as material recovery facilities. Most of the kabad work takes place in the informal sector. Delhi is home to various kabad markets, such as glass in North Delhi, plastic in PVC market, Mundka,¹⁷ automobile scrap in West Delhi’s Mayapuri, phones in Old Delhi, e-scrap trade in Seelampur and Mustafabad, and across the Uttar Pradesh border.

Although it is difficult to pinpoint the historical evolution of this trade in North India, scrap traders in Jaipur informed me that it developed on the above model of collection in the 1980s with the scrapping of transistor radios to salvage iron magnets. In Delhi, scrap traders of Shahdara trace back their beginnings to the 1990s with the scrapping of ST-computers, coinciding with the development of another e-waste cluster in neighbouring Seelampur.¹⁸ E-scrap traders in Delhi are part of a wide range of actors involved in the procurement, transport, scrapping, and recycling of electronic discards, occupying varied positions in the waste economies.

The e-kabadi handling community consists of two kinds of e-kabad workers: itinerant and fixed. At the initiating step are door-to-door collectors called the pheriwala (one who makes

¹⁵ Peter Kirby and Anna Lora-Wainwright, “Peering through loopholes, tracing conversions: remapping the transborder trade in electronic waste”, *Area*, 47 (1), 2015, p. 5.

¹⁶ Kaveri Gill, *Of Poverty and Plastic: Scavenging and Scrap Trading Entrepreneurs in India’s Urban Informal Economy*, New Delhi, Oxford University Press, 2010.

¹⁷ *Ibid*; Rémi de Bercegol, Grant Davis and Shankare Gowda, *The People of Plastic. Living Waste*, 2020, 20 min, www.youtube.com/watch?v=fittZd0b714.

¹⁸ Aakansha Jain and Vinay Gidwani, “Community capital socio-spatial relations in Delhi’s seelampur e-waste market”, *Economic and Political Weekly*, 58 (8), 2023, pp. 62-67.

the rounds, itinerant buyer). The pheri (ambulant buying) could involve going to another city to source material or to move around within one's city streets buying recyclables from various source points: households, shops, hotels, and small businesses and offices. The local pheris either operate within a small radius restricted to one or two neighbourhoods, and largely cover fixed routes, or they could also cover various markets within a city. Pheri is a long and cumbersome process of collection, and can net a small haul of commodities. The pheriwala usually does not pre-process material as they lack storage space, limiting their role to sorting the various materials collected. The purchase is commonly sold to a neighbourhood kabadi shop. In many cases, the neighbourhood kabadi funds the pheriwala.

The fixed e-kabadi are spatially anchored in a neighbourhood, through a shop and/or godowns. They are referred to as aggregators by industry and institutional actors. They source large hauls of material from bulk consumers through public and private auctions, but also buy from the pheriwala. Moreover, they themselves can take up pheri. Larger e-kabadi pre-process the materials they collect – sorting, opening, dismantling, breaking, and segregating material parts – which are sold in bulk to metal traders, formal and informal processing facilities that turn recyclable materials into usable secondary materials that the manufacturing industry can use.

At the intermediate levels of the e-waste value chain are zonal segregation centres owned by semi-wholesalers, with big warehouses where the material is collected from small shops, baled and kept separately for dispatch to actors located at the top of the waste value chain such as recyclers, foundries or smelters. The bigger warehouses and foundries are largely owned by Hindu merchants. The e-scrap workers, I study, are also far removed from the waste collectors or rag pickers who collect recyclable materials from the streets or waste dumps.

Overlapping with the e-scrap trade are the reuse, repair and refurbishment economies.¹⁹ Based on their capacities, knowledge, and skills, scrap dealers try, as far as possible, to not “end” a material, but take out parts that can be reused or put back into the market. This could involve a variety of operations from sorting, disassembling, dismantling, to repairing and assembling. There is no formal hierarchy of jobs in the e-scrap trade, and many of the operations mentioned above could be taken up by any stakeholder in the chain. For instance, a scrap dealer could also hold a “recycler” licence and officially be recognised as a “recycler”. Moreover, they can also supply to the reuse and repair industry, or take up refurbishing work themselves.

Scholarship on waste in South Asia mentions the concentration of Dalit or former “untouchable” castes in the municipal systems, as in the works on sweepers in Benaras,²⁰ the Balmiki in Delhi,²¹ Paraiyars of Tamil Nadu,²² the Christian Chuhras of Karachi²³ and Faisalabad in

¹⁹ Mangesh Gharfalkar, Zulfikur Ali and Graham Hillier, “Clarifying the disagreements on various reuse options: repair, recondition, refurbish and remanufacture”, *Waste Management Resources*, 34 (10), 2016, pp. 995-1005.

²⁰ Mary Searle-Chatterjee, “The Polluted Identity of Work: A Study of Benares Sweepers”, in S. Wallmann (ed.), *Social Anthropology of Work*, London, Academic Press, 1979, pp. 269-286.

²¹ Vijay Prashad, *Untouchable Freedom: A Social History of a Dalit Community*, London, Oxford University Press, 2001.

²² Robert Deliège, “Caste without a system: A study of South Indian Harijans”, in M. Searle-Chatterjee and U. Sharma (eds), *Contextualising Caste: Post-Dumontian Approaches*, Oxford, Blackwell, 1994, pp. 122-146.

²³ Peter Streefland, *The Sweepers of Slaughterhouse: Conflict and Survival in a Karachi Neighbourhood*, Assen, Van Gorcum, 1979.

Pakistan.²⁴ Such systematic accounts of caste in the scrap and e-waste industry is new, and limited to the lower echelons of the scrap business. Hindus, Sikhs, and Muslims of various castes and class work in this trade. The Khatik belonging to the scheduled castes (SC) dominate the plastic scrap trade in Delhi,²⁵ the Sikhs and Hindu Punjabis form a significant population in the automobile junkyards in Mayapuri. The neighbourhoods that I concentrated on were predominantly Muslim, the majority belonging to the teli (oil pressers) caste, commonly known as Malik.²⁶ There are two other significant studies that underline the presence of Muslim kinship networks in the e-scrap trade.²⁷ That said, studies on the social dimension of both labour and traders in the upper reaches of the recycling value chains are practically absent.²⁸

Maliks are considered as the e-scrap business pioneers, having been involved in the scrap trade since the early 1990s, much before industry actors or the State became interested in electronic discards. One of the most popular Malik-dominated e-waste markets is Seelampur. Most e-kabadis got into the business at a young age, ranging between 10 to 15 years, and the most accomplished entrepreneurs today are now in the age group of 40-55 years. The kabad enterprises are established without large capital investment. Malik traders rely on a kin-based network, and “community capital”²⁹ for a business operated with few employees that is spread out across India. E-kabadis do not always hold the requisite firm registrations, licences and government permits. They are astute businessmen who were quick to assess that better economic opportunities lay in breaking electrical and electronic items than in dealing in scrap metal. In fact, I first learnt about the Malik caste, and their role in the e-waste hubs of Delhi through Malik e-scrap dealers that I met in Jaipur. They not only travel across the country to source material, but also set up businesses in parts of Gujarat, Delhi and South India. This is unlike the other Muslim castes (Pathan, Pinarey, Qureshi, etc.) in this trade that I have come across in other scrap work neighbourhoods in Delhi.

Although women and children are active in the scrap trade in Delhi, the scrap work in Janta Market and Shanti Market is male-dominated. Apart from one shop, where I came across three women involved in chheelney ka kaam (removing plastic casings to retrieve copper wire), and a Muslim e-kabadi informing me about women employees at a Sikh-owned plastic trading warehouse, I have not encountered women in the trade. Malik women mostly perform the traditional reproductive roles, staying away from working in the scrap business.³⁰ Even among the other Muslim caste groups in the scrap trade, women were not employed, and in the rare instances that they were, they typically worked from home, often balancing housework with scrapping work.

²⁴ Jo Beall, “Dealing with dirt and the disorder of development: Managing rubbish in urban Pakistan”, *Oxford Development Studies*, 34 (1), 2006, pp. 81-97.

²⁵ Kaveri Gill, *op. cit.*; Rémi de Bercégol and Shankare Gowda, *op. cit.*

²⁶ Gayatri Jai Singh Rathore, “Formality and informality in e-waste economies: exploring caste-class in urban land and labor practices”, *Urban Geography*, 41 (6), 2020, pp. 902-906.

²⁷ Ankita Rastogi, *op. cit.*; Aakansha Jain and Vinay Gidwani, art. cited.

²⁸ Kaveri Gill, *op. cit.*

²⁹ Aakansha Jain and Vinay Gidwani, art. cited, p. 62.

³⁰ *Ibid.*

With respect to waste flows, the Delhi e-waste markets are well integrated in the North-South and South-South trade networks, through which lucrative electronic parts travel from Europe and North America to India, where the bulk is dismantled, and a part makes its way to China for the extraction of precious metals from motherboards and chipsets.³¹ The flow of commodities goes hand in hand with the flow of capital. Chinese investors finance Indian recommerce platforms for used mobile phones through joint ventures. However, focus on transnational trade, be it North-South or South-South, diverts attention from local recycling practices within a particular recycling site, and its evolution over time.³²

For instance, Delhi traders could buy an electronic discard from the southern state of Kerala, dismantle it in Delhi, and sell some of its components farther away to clients in Moradabad for metal processing. Previously reputed for its brass industry, Moradabad today specialises in extracting precious metals like gold and silver from e-scrap.³³ The city does not receive the discarded electronic items in their intact state. A Centre of Science and Environment report estimated that about 50 percent of printed circuit boards (PCB) recovered from electric appliances ended up in the city.³⁴ E-waste workers in Moradabad buy PCBs from Delhi, Kolkata, Chennai, Bengaluru, and other parts of India. From Moradabad, the leftover components could further travel north to Haridwar for final processing, before making their way into the metal commodity market. Also, there is an extensive circulation of e-discards within the Delhi National Capital Region (NCR). Many e-scrap dealers that I have interviewed bought and sold discards locally from other scrap dealers: at the same market, from an e-scrap parking lot in Mustafabad, from Nehru Place (a market for second-hand and refurbished electronic products), from the circulation of products between Nehru Place and East Delhi markets.³⁵ They were further connected to buyers of used electronics or their working parts from North Delhi, and Ghaziabad and Noida in Uttar Pradesh.

• Recycling: Technological Solution for Controlling Pollution and Value Generation

The current understanding of recycling³⁶ emerged from 1960s and 1970s environmentalism. This positivist view has been problematised in academic literature through a Marxist framework.³⁷ The environmental movement enabled the enmeshing of physical and social forms of pollution. A historical analysis of the genesis of e-waste regulations by Soraya Boudia and Nathalie Jas

³¹ Jamie Furniss, "Alternative framings of transnational waste flows: Reflections based on the Egypt-China PET plastic trade", *Area*, 47 (1), 2015, pp. 24-30.

³² Peter Kirby and Anna Lora-Wainwright, *op. cit.*, pp. 4-6.

³³ Ankita Rastogi, *op. cit.*

³⁴ Centre for Science and Environment (CSE), "Recommendations to address the issues of informal sector involved in e-waste handling. Moradabad, Uttar Pradesh", New Delhi, 2015, <https://cdn.cseindia.org/userfiles/moradabad-e-waste.pdf>.

³⁵ See also Julia Corwin, *op. cit.*

³⁶ Recycling first appeared in the 1920s as a technical term for industrial processes like oil-refining.

³⁷ Rajyashree N. Reddy, "Reimagining e-waste circuits: calculation, mobile policies, and the move to urban mining in Global South cities", *Urban Geography*, 37 (1), 2016, pp. 57-76.

questions what it means to regulate an activity that has a polluting effect on the environment. The authors show that the globalisation of the issue of pollution went hand in hand with the globalisation of the production of electronic objects; as such along with a focus on toxicity, the rules also provided a framework for the creation of international markets.³⁸ These market caters to the reprocessing of pre- or post-consumer “waste” for use in new products.³⁹ Recycling is seen as a loop-closing element in a product’s lifecycle as it turns useless things into that which has value. In other words, it offers resources by redirecting streams of matter into something circular, which would otherwise have to be produced with high energy and resource inputs. Certainly, it prevents negative environmental impacts that would have ensued from the disposal of products. It is perceived as an answer to keep waste out of landfills – which are already saturated – and as an alternative solution to incineration. But this is only a part of the entire story.

Beyond pollution control, the circular economy narrative further allowed the Global North countries to secure resources that are not found on European and American soils, but are necessary for manufacturing new electronic products. In this narrative, e-waste is classified as an “urban mine” that becomes a supply source of metals like aluminium, gold, silver, and rare earth through the implementation of recycling technologies and the valuation of extracted materials. Not having real solutions to deal with e-waste, cities are then required to learn to make them economically valuable. Urban mining was also advanced as an argument against dumping. With the crisis of rare earths in 2010-2011, recycling became the principal technology to recover material. When it was realised that even vastly improved recycling rates would not be sufficient to retrieve required metals, there was a shift from recycling to reuse introduced under the 3R-imperative: reduce, reuse and recycle.⁴⁰

Indian legislation borrows the same terminology and ideas in the rules, and e-waste management is largely associated with the broader terminology of “recycling”⁴¹ in both common and institutional parlance. In his article on the formalisation of the e-waste sector, Stefan Laser points out that in Indian regulations sustainability is attributed to a specific technical model of “recycling” that focuses on shredding and chemicals.⁴² The increased focus on technological and technical inputs in the regulations is also linked to the fact that recycling is a growing business opportunity. The rules outline “recycling” as a technological process to “retrieve precious, semi-precious metals including rare earth elements and other

³⁸ Soraya Boudia et Nathalie Jas, *Gouverner un monde toxique*, Paris, Editions Quae, 2019.

³⁹ Arne Finn Jorgensen, *Recycling*, Cambridge, MIT Press, 2019.

⁴⁰ The 3R imperative is unevenly implemented across the world. While in Europe most countries adhere to these principles, the US does not adhere to “reduction” due to a shared belief in policy circles that it would hamper economic development. Elsewhere, these categorisations are considered too vague, and there are debates over whether more nuanced hierarchies with shorter loop options like ‘redesign’, ‘refurbish’, ‘repurpose’, should be included or not. The existing imperatives allow multiple industries dealing in electronics and electrical goods to retain the highest possible value of resources over multiple product life cycles, without having to worry about pollution licences.

⁴¹ Recycling is a polysemous term. Therefore, to avoid confusion between its common usage and its technical use, where recycling refers to an institutionally conceived process of reprocessing electronic discards, I use inverted commas to refer to the latter: “recycling”.

⁴² Stefan Laser, *op. cit.*, p. 180.

useful recoverable materials” from discarded electronic and electrical items or their parts in “facilities” as elaborated in the guidelines of the CPCB made in this regard.⁴³

In this respect, the Ministry of Electronics and Information Technology (MeitY), through the Make in India (2014) initiative, focuses on the development of both manufacturing and “recycling”. However, the Indian perspective differs from the western models in its emphasis on the use of indigenous technology to simultaneously tackle pollution and increase electronics production and exports. This aims to support the industry in manufacturing and “recycling” items locally, and gradually decrease the dependency on foreign-made electronic components, products, and technology. A NASSCOM review of India’s tech industry projected a revenue growth rate of 15.5% in 2022 – the fastest in a decade, attributed to increased global spending as the pandemic triggered digital transformation.⁴⁴

This vision of “make in India for the world” aims to promote domestic manufacturers of electronic products and equipment that are labelled as “Indian champions” under the programme. In the mobile phone sector companies such as Lava, Micromax could be referred to as Indian champions. The increased focus on domestic manufacturing then brings up the question of supply of raw materials. Interviews with industry actors like recyclers and PROs confirm that even though the government plans to import raw materials and parts in the initial phase of the Make in India initiative, gradually the recycling sector could become the main source to procure material.

Despite an increasing coverage of national e-waste policies (71% of the world’s population in 2019) and strict restrictions on used electronics imports, only a small percentage of the produced e-waste in the world today is recycled in developed countries; the remaining is sent to developing countries across the globe. In Europe, despite formal e-waste collection, and a recycling rate estimated to be one of the world’s highest at 42.5%,⁴⁵ a large amount is disposed of within the European Union, or shipped for reuse and recycling to developing countries in Asia and Africa.⁴⁶ Similarly, in the US, less than 9.5% of e-waste is formally recycled,⁴⁷ while the rest is stored, landfilled or shipped to developing countries. Furthermore, there is a probability that part of the 20-25% of e-waste that is collected for formal recycling may also end up in developing countries through illegal exports.⁴⁸ For instance, in Germany, the volume of illegal exports in 2008 was estimated at 155,000t. These exports have been heavily criticised as environmental dumping, and are now subject to more detailed regulations on circumstances in which exports may take

⁴³ MoEFCC “E-waste Management Rules 2016,” Ministry of Environment, Forest and Climate Change, Notification dated 23 March, 2016, *Gazette of India*, Extraordinary Part II, Section 3, Sub-section (i), <http://greene.gov.in/wp-content/uploads/2018/01/EWM-Rules-2016-English-23.03.2016.pdf> (E-Waste Rules, 2022 p. 23). For a broader definition of recycling, see Catherine Alexander and Joshua Reno (eds), *Economies of Recycling: The Global Transformation of Materials, Values and Social Relations*, London, Zed Books, 2012.

⁴⁴ NASSCOM Strategic Review, “Priming for a no normal future. Technology sector in India”, 2023.

⁴⁵ Vanessa Forti et al., *op. cit.*

⁴⁶ Greenpeace, *Toxic tech: not in our backyard. Uncovering the hidden flows of e-waste*, Full report, 2008; Shakila Umair, Anna Björklund and Elisabeth Ekener Petersen, “Social impact assessment of informal recycling of electronic ICT waste in Pakistan using UNEP SETAC guidelines”, *Resources, Conservation and Recycling*, 95, 2015, pp. 46-57.

⁴⁷ Vanessa Forti et al., *op. cit.*, p. 74.

⁴⁸ Greenpeace, *op. cit.*

place.⁴⁹ That notwithstanding high levels of used electronic items are imported from Europe and North America for “recycling” in India. The existing rules in India allow the import of used EEE for reuse and “recycling”. Such products are often earmarked as donations for schools or charitable institutions that cannot afford new electronic equipment, but need to keep up with an increasingly technology-dependent world. This is considered by many as a way to circumvent the problem of “recycling”, by naming it as a product that can be reused or refurbished, whereas in reality the product would not function, and end up in the informal sector for disposal.

Additionally, the rapid expansion of the electronics industry in India contributed to the fast-growing domestic consumption of Information Technology (IT) and electronic products among the upper and middle classes. The government has enrolled more than 1.2 billion Indians in its biometric digital identity programme, Aadhaar, and brought more than 10 million businesses onto a common digital platform through a goods and services tax.⁵⁰ The public and private sectors are both propelling digital consumption growth. Indians had 1.2 billion mobile phone subscriptions in 2021 of which about 750 million were smartphone users.⁵¹ The Digital India campaign (2015), which would provide broadband internet to around 250,000 villages, as well as providing blanket mobile network services, has paved the way for the growth of the IT sector. The Indian market has predominantly seen consumption-driven growth. The rapid development in Information and Communications Technology (ICT) has contributed to the fast replacement of existing computers and mobile phones with new models. Simultaneously, the technological lifetime and time of use of such devices is decreasing.⁵² Mobile phones now have an average lifespan of less than two years in the industrialised world, and computers two to four years.⁵³

Consequently, the quantities of e-waste are increasing rapidly; and it is now one of the fastest-growing waste streams. The exponential increase in the quantum of electronic discards is driven by the rise in usage as well as the growing pace of upgrades. Consumers are discarding old PCs, mobiles, tablets, and other electronic devices much sooner than before. The growing digital market and with the flourishing use of mobile phones in rural areas too, it is argued that the digital market in the country will only expand in the years to come. The government would therefore want the industry to come up with technological solutions to deal with increasing e-waste. An e-waste recycler explained that in the future India could play an important role in the export of such technology to other countries. Attero, a prominent recycler, has set a leading example in this direction. It has been successful in developing indigenous technologies to process and recover different components of lithium ion batteries, and is now expanding the technology in facilities in Europe and in South-East Asia.

⁴⁹ Stefan Salhofer, “E-waste collection and treatment options: A comparison of approaches in Europe, China and Vietnam”, in Roman Maletz, Christina Dornack and Lou Ziyang (eds), *Source Separation and Recycling. Implementation and Benefits for a Circular Economy*, Springer, Cham, https://doi.org/10.1007/698_2017_36.

⁵⁰ McKinsey Global Institute, “Digital India: technology to transform a connected nation”, March 2019, www.mckinsey.com/capabilities/mckinsey-digital/our-insights/digital-india-technology-to-transform-a-connected-nation.

⁵¹ “India to have 1 billion smartphone users by 2026: Deloitte”, *The Hindu*, February 22, 2022, www.thehindu.com/business/india-to-have-1-billion-smartphone-users-by-2026-deloitte/article65075151.ece.

⁵² Shailesh Prabhu N. and Ritanjali Majhi, “Disposal of obsolete mobile phones: A review on replacement, disposal, methods, in-use lifespan, reuse and recycling”, *Waste Management and Research*, 41 (1), 2023, pp. 18-36.

⁵³ Shakila Umair *et al.*, *op. cit.*, p. 48.

To conclude this section, I would like to emphasise that the e-waste legislations in India borrow from the western concepts of e-waste and recycling, where recycling, heavily reliant on technological solutions, is both a way to address the environmental impact of polluting products and an economic opportunity. That notwithstanding, the Indian regulations try to distinguish themselves from the western technological models through a focus on developing indigenous technologies. This is all the more important as the bulk of e-waste dismantling takes place in the unorganised sector by astute businessmen popularly known as *kabadi*. As I will detail in the next section, formalising the e-waste management rules involved several levels and actors. These regulations are closely intertwined with urban politics, largely based on elite aspirations and visions of the city, in which the formal structures are privileged over the informal.

Framing E-Waste Regulations: Urban Transformations and Business Interests

In this section, I trace the genesis and evolution of E-Waste Rules in India. These technologically-driven ideas of “recycling” mentioned above are embedded in the larger urban politics of the city, backed by the aspirations of an aesthetic and economic elite and the actions of the judiciary. Next, I detail how the actual rules came into existence with a focus on the role of NGO Toxics Link, which was the first to spotlight the issue of e-waste, and the contribution of industrial actors in negotiating the contours of regulations. With the government ostensibly concerned about the environment, the responsibility for pollution has been displaced to those undertaking e-waste work in the informal sector.

• Elites and Courts: Aspirations of an Aesthetic and Clean City

In India, waste management legislations are intertwined with urban renewal measures like Smart Cities and Atal Mission for Rejuvenation and Urban Transformation (AMRUT), where middle- and upper-class citizens and courts constitute an active group in shaping policy discourses. Leela Fernandes shows that the elite desires are rooted in global consumer culture, and an exclusive restructuring of urban space.⁵⁴ Amita Baviskar links this form of exclusive urban reforms to ‘bourgeois environmentalism’, wherein affluent members of resident associations, and civic organisations vehemently defend urban public spaces from the alleged environmental degradation caused by the urban poor.⁵⁵ Vigilance over e-waste, too, stems from these broader concerns about Delhi’s global image, promoted as a clean, safe, and nuisance-free environment. The Swachh Bharat Abhiyaan (Clean India Mission) launched in 2014 by the central government, undertook similar measures.

⁵⁴ Leela Fernandes, “The politics of forgetting: Class politics, state power and the restructuring of urban space in India”, *Urban Studies*, 41 (12), 2004, pp. 2415-2430.

⁵⁵ Amita Baviskar, “The Politics of the City”, *Seminar*, 516, 2002, pp. 40-42.

Urban transformations with the aim to conform to international standards take the form of large infrastructure projects, the organisation of international events such as the Commonwealth Games, the construction of residential spaces of high standing aimed at elites, the privatization of land and urban production. Some scholarship describes this as the government-instituted neoliberal principles of entrepreneurial urbanism.⁵⁶ An example in Delhi would be the *Bhagidari* or “joint ownership” urban governance scheme. Introduced in 2000, *Bhagidari* had envisaged an aesthetic and functionally-upgraded Delhi.⁵⁷ The aesthetic transformations are largely effected through urban development measures that target any visible signs of poverty and underdevelopment. This includes cleansing congested slums, evicting street vendors, demolishing illegal constructions, and displacing scrap markets. An illustration of such policies is the forceful relocation of the Jama Masjid market scrap dealers to Mayapuri in the clearance drives during the period of national Emergency. In the early 1970s, the government shifted the automobile parts trade from Motia Khan, Paharganj, Turkman Gate, Anand Parbat, and Shahdara to Mayapuri Industrial Area. Currently, there are talks of moving the automobile scrap market farther outside the city. Another scrap market at Turkman Gate gradually developed after 1976, but has been the target of regular sealing drives in recent years.

Along with the elites, the courts have been active in refashioning the city, acting principally in its Public Interest Litigation (PIL) jurisdiction. For instance, through an examination of the language of PIL and judgements, Asher Ghertner demonstrates how laws recast slums as nuisance based on their so-called unsightliness.⁵⁸ Anuj Bhuwania, for his part, argues that the PILs gave judges a free hand in examining a specific case but applying the ruling to the entire city, thus micro-managing key aspects of city governance.⁵⁹ Since 1995, the Supreme Court has issued several orders to the Delhi government to close/relocate polluting industries in non-conforming/residential areas. In addition, the Supreme Court intervened in matters related to e-waste through its ruling that ensured a ban on the import of hazardous waste in 1997.⁶⁰ The ruling put pressure on the government, which had ratified the Basel Convention in June 1992 but refrained from adopting the 1995 Basel Ban Amendment, which prohibits the export of toxic waste from “developed” to “developing” countries.

In 2018, the Delhi government conducted crackdowns in several “recycling hubs” throughout the city with the aim of shutting down the vast majority of small workshops. As noted above, these were not the first attempts at displacing markets to the city’s peripheries. Anti-encroachment and sealing drives, which gained momentum from 2001,⁶¹ initially targeted

⁵⁶ David Harvey, “From managerialism to entrepreneurialism: The transformation in urban governance in late capitalism”, *Geografiska Annaler Series B. Human Geography*, 71 (1), 1989, pp. 3-17.

⁵⁷ Asher D. Ghertner, “Gentrifying the state, gentrifying participation. Elite governance programs in Delhi”, *International Journal of Urban and Regional Research*, 35 (3), 2011, pp. 504-532.

⁵⁸ *Ibid.*

⁵⁹ Anuj Bhuwania, “Public Interest Litigation as a slum demolition machine”, *Projections. The MIT Journal of Planning*, 12, 2016, pp. 67-98.

⁶⁰ Ravi Agarwal, Rakesh Ranjan and Papiya Sarkar, “Scrapping the hi-tech myth: Computer waste in India”, New Delhi, Toxics Link, 2003.

⁶¹ Sushmita Pati, *Properties of Rent: Community, Capital and Politics in Globalizing Delhi*, New Delhi, Cambridge University Press, 2022, pp. 86-89.

urban slum settlements, but, later, traders operating in the markets of Delhi also came under its radar, the first instance being in 2006-2007. Once again, the instructions came from the Supreme Court in response to a PIL filed by the Resident Welfare Associations (RWA). The RWAs' concern centred on civic problems, such as congestion, and strains on civic amenities caused by the presence of unauthorised commerce in their once-peaceful neighbourhoods. The Court subsequently ordered to close or to "seal" shops and businesses operating without permission in Delhi's residential areas. Such businesses were found to be operating in violation of the zoning laws that divided the city into separate residential, commercial, and industrial activities.⁶² The premises were originally purchased as residential units, but were used for commercial activities, making it an unauthorised use.

Apace with the Supreme Court, the National Green Tribunal (NGT) – established in 2010 – has also been active in handling environmental pollution matters. In 2014 and 2015, the NGT announced a ban on the use of petrol and diesel vehicles older than fifteen years and ten years respectively in Delhi-NCR.⁶³ In 2019, following pleas filed by residents of the area, the NGT ordered a shutdown of unauthorised PVC units in Narela,⁶⁴ and ordered the Delhi Pollution Control Committee (DPCC) to take action against plastic industries making shoe soles and other plastic goods, such as rexine, adhesives, and other highly inflammable items in the Narela and Bawana areas. Both tribunals constituted special task forces aimed at keeping the city clean, the Supreme Court appointing one to remove encroachments, and the NGT to curb pollution-causing activities.

Thus, middle classes and upper classes in conjunction with the government played an active role in shaping the urban space. Over the years their vision of the urban space has evolved from slum improvement and congestion-free traffic, to include environmental concerns. In the case of infrastructural transformations in solid waste management in Delhi, Demaria and Schindler⁶⁵ argue that pollution is used as a pretext to evict the urban poor. While this is true for e-waste too, as I show next, the regulatory changes were also about safeguarding the interest of a booming information technology sector and about providing them increased opportunities for future expansion.

• **Negotiations between Toxics Link, Industry Actors and State**

In matters of e-waste, the NGO Toxics Link has been at the forefront in following the trail of used electronic and electrical discards. A member of the transnational advocacy group Basel Action Network (BAN), Toxics Link has partnered with the Silicon Valley Toxics Coalition (SVTC), and the German Agency for International Cooperation (GIZ), engaging in cross-border efforts to raise international awareness on e-waste issues. The paucity of professional knowledge

⁶² Diya Mehra, "Protesting publics in Indian cities", *Economic and Political Weekly*, 47 (30), 2012, pp. 79-88.

⁶³ Ishani Saraf, "'We Too Have Blackened Our Hands': Work, Harm, and Legitimacy in a Delhi Scrap Market", *Anthropology of Work Review*, 41 (2), 2020, pp. 119-128.

⁶⁴ "NGT orders probe into illegal operation of PVC units in Narela", *Press Trust of India*, May 8, 2019.

⁶⁵ Federico Demaria and Seth Schindler, "Contesting urban metabolism: Struggles over waste-to-energy in Delhi, India", *Antipode*, 48 (2), 2016, pp. 293-331.

on the topic of e-waste and the need to form epistemic communities, combined with state lenience on the issue, propelled the organisation to embark on a fact-finding mission and come out with a report on e-waste. It conducted field visits and surveys of Delhi neighbourhoods where recycling and dismantling of electronic discards took place in order to raise awareness on the e-waste sector. This proactive involvement earned it an international reputation for expertise on environmentalism. Furthermore, its incorporation in transnational advocacy networks gave the NGO a political agency.⁶⁶

Reports and statistics published by Toxics Link, which were also covered by the media and read by civil society, drew attention to the increasing volumes of e-waste in the country as well as politicised the functioning of the informal recycling sector, raising important questions about the negative impacts on the environment and human health. The early debates largely associated the problems with the rising quantities of e-waste to transnational dumping, and increasing domestic consumptive economies. These findings were part of an ongoing process in bringing e-waste into political debates, albeit with a limited focus.

Although these actions forced the Ministry of Environment, Forests and Climate Change (MoEFCC), the nodal agency for environmental policies in India, to bring together multiple stakeholders to discuss possible measures to tackle e-waste, it did not bring about any substantial change in the matter. Between 2003-2007, 17 'multi-stakeholder' workshops on e-waste were organised wherein the MeitY, central and state pollution control boards, NGOs – including Toxics Link, scientific experts, representatives of the electronics industry, such as the Manufacturers' Association for Information Technology (MAIT) participated.⁶⁷ These were half-hearted efforts. Environment protection was enunciated under the 'National Environment Policy' implemented by the MoEFCC in 2006. The policy recognised the role of the informal sector in the "recycling" of e-waste and speaks about giving it legal recognition.⁶⁸ However, the government contented itself with these, refraining from making any rules on the management of e-waste as a separate category. E-waste came under a regulatory framework as "obsolete electronic gadgets" in the Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.

A radiation incident in the scrap market of Mayapuri Industrial Area in West Delhi led to a public outcry that also drew international attention to e-waste in the city.⁶⁹ The incident occurred on April 7, 2010 when a mass of scrap containing powerful radioactive materials, auctioned by the Chemistry department of Delhi University leaked in the scrapyard. The scrap workers, unaware of the radioactive material, cut open Cobalt 60 pencils to retrieve metal scrap. The leak caused one death, and severe injuries to six others. Though initial media reports denied the existence of radioactive emissions, downplaying the incident as a case of a mild chemical leak, the presence of Cobalt 60 and "acute radiation" was subsequently confirmed. The investigative agencies

⁶⁶ David Pellow, *Resisting Global Toxics: Transnational Movements for Environmental Justice*, Cambridge, MIT Press, 2007.

⁶⁷ Thomas Swerts, "The democratic deficit of transnational environmental activism: a case study of e-waste governance in India", *Global Networks*, 13 (4), 2013, pp. 498-516.

⁶⁸ Government of India, Ministry of Environment and Forests, "National Environment Policy", 2006, p. 39.

⁶⁹ Personal Communication, Shakeel, Scrap dealer, Shahdara, 2021.

consisting of a team of nuclear experts identified 11 sources of radiation in the vicinity. These findings triggered panic among the neighbourhood residents, and an agitation for increased State monitoring, and the implementation of strict rules concerning hazardous waste disposal.⁷⁰

In the same year, a final drafting committee with four national and international organisations was constituted, including Toxics Link and Greenpeace, MAIT and the GIZ to institute a set of recycling measures. The MoEFCC finally notified the E-Waste (Management and Handling) Rules in 2011. A preparatory period of one year between the notification, actual adoption, and implementation of the law was stipulated to raise awareness, and allow stakeholders time to set up proper e-waste management systems. In 2016, civil society activists filed a petition in the NGT, asking for an inquiry into the government's action in the 2010 radiation leak. This required making the legislative framework more stringent so as to be able to introduce specific rules governing the reuse and recycling of e-waste. The existing rules were subsequently amended as the E-waste (Management) Rules, 2016, mandating targeted responsibilities to the producers and the maintenance of a national registry.

As Thomas Swerts demonstrates, the actions of Toxics Link had a Toxics Link: “bounded political agency”.⁷¹ The initial negotiations were rather cosmetic efforts to address e-waste.⁷² At the negotiation table, the formalisation process got caught up in clashes of interest between the IT sector and civil society groups like Toxics Link. While Toxics Link pushed for a ban on illegal waste import and the implementation of the extended producer responsibility (EPR) framework based on the European Directive, the industrial sector was set on opportunities for value extraction. The government and the industry reached a consensus to leave e-waste recycling in the hands of the corporate sector.⁷³ As one of the scrap trade union leaders described:

“Rules are made, but by companies. Company mediators lobby with the government for policy making. The intellectuals and government officials only write policies, but the [actual] decision making is done by the companies... The company decides and the government [rubber] stamps the decision.”⁷⁴

Industry actors used their technical expertise to pressure the government into adopting “softer” laws for imports. A closer look at the policy furnishes revealing insights into the vagueness of rules that leave room for various interpretations. Refurbishers, too, were initially excluded from the rules as they had their own stakes and interests in the recycling sector.⁷⁵ For the industry sources, the real problem of e-waste lay not in its growing quantity or its import, but in how recycling was done. Unlike most other categories of waste, e-waste presents an opportunity to recover high-value and scarce materials. Most notably, it contains valuable metal fractions,

⁷⁰ Babu P. Remesh and C. P. Vinod, “Radiation incident in Mayapuri: Disquieting signals to labour”, *Economic and Political Weekly*, 45 (30), 2010, pp. 16-18.

⁷¹ Thomas Swerts, *op. cit.*, p. 499.

⁷² *Ibid.*

⁷³ *Ibid.*, pp. 505-506.

⁷⁴ Personal Communication with former Representative of the Informal Sector, November 2021.

⁷⁵ Stefan Laser, *op. cit.*

such as aluminium, copper, silver, tin and gold. These are used in printed circuit boards, sub-assemblies, and wiring. Imported waste could serve the local demand for low-cost raw materials in the country, especially for the Make in India and Digital India programmes implemented later on. Secondly, the industry also saw an employment creation opportunity in imports. The industry thus pushed for a comprehensive set of e-waste guidelines rather than rules. Guidelines provide only regulatory clarity, making it a moral responsibility of the producer and manufacturer to responsibly handle e-waste.

Over the years, real progress has been made in the categorisation of EEE objects established on the level of their toxicity. Some of the objects have been added in the Hazardous Waste rules. There are 21 categories of EEE identified in the E-Waste guidelines. The scope of products with toxic substances was widened with the inclusion of compact fluorescent lamps (CFL) and other mercury-containing lamps. On grounds of the above categorisation, various stakeholders – each with prescribed duties and regulations – were defined in the Rules: producers, refurbishers, collection centres, dismantlers and recyclers. Refurbishers and Producer Responsibility Organisations (PRO) were added as stakeholders with specific roles. Refurbishing is described as an activity undertaken to extend the life of a product over its originally intended life and for the same use as originally intended, through the processes of repair and assembly. Refurbished products can be resold in the consumer market. Under the new rules (2022), refurbishers are also required to get an authorisation from the SPCB on one-time basis (form 1 of the pollution control board). The authorised refurbishers are liable to submit a report every year of the items treated, and a list of e-waste generated through their activities (form 2), and ensure its transfer to a certified e-waste handler (form 3). Through the various forms, the CPCB aims to collect the necessary information on not only the refurbisher, but also the type of e-waste handled, its volume, and its treatment. On the contrary, disposal and treatment activities are understood as any operation that does not lead to “recycling”, recovery, or reuse, and includes physicochemical or biological treatment, incineration, and deposition in secured landfills. Such activities also require authorisations, preparation of yearly reports and certifications. Moreover, collection targets were introduced under EPR. These processes further artificially categorise e-waste networks into formal and informal sectors, while introducing new private actors in the formal chain.

For all stakeholders involved, the measures demonstrate a commitment to dealing with toxicity in the e-waste stream. Even Toxics Link, which argues for the inclusion of the informal sector in the e-waste value chain, in its 2019 report, built its entire legitimacy as a civil society organisation by highlighting the toxic effect of informal e-waste recycling on the environment, the land, and the people. In fact, the political cry pushing for an e-waste policy drew on some of their reports on toxicity. In response, the rules devised solutions to the problem of e-waste toxicity that would be based on technicity and be environment-oriented.

Increasing volumes of e-waste notwithstanding, it was the role of a burgeoning informal sector that collects, sorts, and dismantles e-waste in often appalling conditions, that appeared as a real problem for the majority of the stakeholders. Moreover, by highlighting the “unclean” “backyard” recycling processes through photographs and videos that often go viral, such

reports underscored toxicity as the most significant problem about e-waste.⁷⁶ They underscored that toxic substances contained in e-waste are either released in the process of informal dismantling, or that new toxins are produced when e-waste is disposed of by the unorganised sector. This compromises human health, the local environment, ecosystems, and water resources. Readers are also informed that the recovery of valuable materials is a costly process that, at best, can only recover a closed loop of 34% of the original material input. This is further compromised as the largest share of recovery work is undertaken in the informal sector. Reliable statistical data on e-waste workers is virtually non-existent. In 2019, a report⁷⁷ to assess the impact of e-waste rules published by Toxics Link mentions “5,000 informal e-waste processing units employing approximately 50,000 people continue to operate in violation of environmental norms in the capital” in “15 informal hotspots” in Northeast and East Delhi.

As I will discuss in the next section, this has had an impact on the work of *e-kabadis* who operate largely in the informal sector. The “recycling” business is organised through the construction of categories and processes with distinctions based on various actions that could be taken on e-waste, such as the activities of repair, refurbishing, dismantling, disposal, treatment, and “recycling”, which not only influences how informal waste work is done in the city but also has a negative impact on informal neighbourhoods.

FINDINGS FROM THE FIELD: SCRAPPING SECTOR, POLLUTION CONTROL AND BUSINESS AS USUAL

The resultant policy, its successive amendments, certification and licence schemes, introduced in the name of making the e-waste supply chain transparent and accountable, has not only created the categories of formal and informal, but also contributed to the widening of the formal-informal sector divide. New players in the sector see informal e-waste workers as obstacles to sustainable development, out of step with new e-waste management and urban development regimes. *E-kabadis*, however, contest recycling regime, casting doubts over its technicity and ability to control pollution.

⁷⁶ Julia Perczel, “Where is toxicity located? Side glances through fieldwork in a toxic place”, *Anthropology Today*, 32 (4), 2021, pp. 27-30.

⁷⁷ “Informal E-waste Recycling in Delhi: Unfolding impact of two years of e-waste (Management) Rules 2016”, New Delhi, Toxics Link, 2019.

Digital Platforms and EPR-PRO as New Players Dispute the Rights of the E-Scrap Sector

In addition to the stakeholders mentioned in the e-waste rules, the recycling regime also opened the market for new players such as PROs, digital collection platforms and NGOs. Belonging to the educated classes, these actors were better armed to duplicate the *kabad* model and adapt it to the Internet. I outline the consequences these and PROs have on the informal *e-kabadis* who have been in this business well before the rules were introduced.

• Digital Waste Collection Platforms & NGOs

Digital waste collection platforms are a recent business model for e-waste collection. This has been facilitated with the democratisation of the internet and the development of app-based technologies. These Internet-based collection entities founded in the past seven to ten years reflect the increased fusion of digital technology and traditional industries. They are modelled on the *kabadiwala* collection model to harness the household consumer market. Modern digital technologies, such as websites or mobile phone applications, are used to send waste equipment, especially mobile phones, laptops, take-back requests from households. However, there is a paucity of research on the use of these technologies in waste literature.⁷⁸ The underlying suggestion is that digital platforms can bring together multiple layers of logistics, administration, and approval processes that go into an efficient and effective e-waste management system. This can speed up the process of safe collection and disposal, and prevent environmental damage.

These enterprises fully utilise digital technology, with their platforms built on C2B (customer to business) models for the collection and hassle-free disposal of household electronic discards through intuitive three-step user-friendly processes. The first step would be for the seller to fill in details of the used EEE on the company's platform. This action would lead to the company suggesting a price estimated on the use and wear and tear of the product. If the seller is satisfied with the price, she accepts to sell the device. The company would then send an employee to the seller's doorstep to collect the item in return for cash. *KarmaRecycling* and *ExtraCarbon* are two examples of platforms that enable customers to sell their electronic gadgets like phones, tablets and laptops. The standard model provides two options for customer convenience: door-to-door collection, and outlets. Knowing that pricing and payment are key factors for customers, recommerce companies have launched a comprehensive analysis of product wear [and tear], and use market information to offer a reasonable price. They also provide customers various options to cash in on their used gadgets, such as paying customers via online wallets, online banking, and in cash. These businesses opened outlets in Delhi, Gurgaon, and other big cities to provide face-to-face communication, transactions, exchange, and re-sale services for consumers. Some of these platforms are great success stories. Many PROs also make use of digital platforms to take back material for the manufacturers.

⁷⁸ Aleksander Król, Piotr Nowakowski and Bogna Mrówczyńska, "How to improve WEEE management? Novel approach in mobile collection with application of artificial intelligence", *Waste Management*, 50, 2016, pp. 222-233.

Currently, due to lack of research on the topic, it is difficult to estimate their contribution to controlling environmental pollution. Instead, the platforms either hold the consumers' limited environmental awareness responsible for the failure of collection and take-back systems, because of which they are unwilling to drop off WEEE at their own expense at the collection centres, or blame it on the *e-kabadis* working in the informal sector. But there is more at stake than mere displacement of pollution. The industries acknowledge the value and economic benefits reaped through the exchange of discarded objects and materials on the national and the global scales. This can be assessed from the few interviews conducted with the consumers of the platforms in Delhi. It has to be noticed that the consumers of these platforms usually belong to the upper classes who are adept in the use of mobile technologies. Out of the ten persons interviewed 6 expressed satisfaction with the resale of their device, while the others were sceptical about selling used devices through the platform. Others found their pricing model not as lucrative as what the *kabadi* offered. Although the price is determined by the actual condition of the gadget based on the information filled in online by the customer, some interviews with consumers pointed out that the collection person sent by the platforms would find fault in the device, and try to reduce the price negotiated via the platform.

Lastly, the diverse digital business models and their positioning in the market highlight the gaps in e-waste regulations.⁷⁹ For instance, some digital platforms, like those associated with PROs, market themselves using environment and reduction of e-waste as the cause, while others have placed themselves in the refurbishing and second-hand markets that allow them to avoid any commitment to the environment. Additionally, they are able to bypass the bureaucratic systems, as second-hand businesses do not have to register at the pollution boards. This thus points out the loopholes in regulations that companies can play around with for financial benefits. These are only some reasons cited during interviews, but more focused research is required on digital waste platforms to fully comprehend their contribution to the e-waste economies as well as the environment.

Also, *E-kabadis* opined that NGOs and interest groups learnt from the *kabad* sector only to eliminate them, as many had started their own collection centres. They are formally organised groups outside of the government system. Yet, they seek to exert effects on policy and practice at different phases of the policymaking cycle. Moreover, many of these NGOs started out by involving e-scrap workers in their organisation only to replace them over time by newer entrants.

E-Kabadis are therefore wary of *padhey-likhey log* (educated people) wanting to gather knowledge about their business. Small-scale *kabadis* have to live with the uncertainties that accompany informal business. They have little social connection with institutions like the pollution control board and the municipal corporation. Moreover, due to low literacy, they tend to rely on agents or social networks to help them get documents, such as pollution certificates, collection and disposal certificates, etc. This has an added cost. When the e-waste rules began to be implemented, several *e-kabadis* were approached by activists and advocacy groups to help them get collection and/or recycling licences. Some were cheated by these educated and institutionally-connected people. A trade unionist approached a group of *kabadi* ostensibly to create a recycling company, but swindled them instead of procuring the promised

⁷⁹ At the platform end, logistics has been identified as a big challenge.

collection licence. He was compared to Prime Minister Modi, who had claimed he would bring back *kaala dhan* (black money) from overseas tax havens, but had gone back on his pledge. Similarly, the trade unionist had promised the *e-kabadis* a licence, but did not deliver.

“X talks in favour of labour etc., but he is a big ‘cheater’. You can say he is Modi. He is Modi! He puts up a facade of being concerned about labour issues to keep his union running. It’s all drama. He doesn’t do *kabad* work but he had an organisation. We had joined hands with him but we couldn’t reach a ‘settlement’. He fooled me. He fooled the others. I was the first one to meet him and I was the one who got the team of 15 members together for the licence. He swindled me of 2.5-3 lakh rupees. He also took 2 lakhs from another member, and 1.5 lakh from somebody else, and 1 lakh from yet another person...He took about 10-15 lakhs from all of us. He also got some money through the organisation that he had created. He took a place on rent. He kept taking money from me to install furniture etc. and then he did not give me the licence – he gave it to somebody else.”⁸⁰

The unionist also took 15 lakh⁸¹ rupees from the group members in the name of registering the company, and setting up the company office, buying furniture and office supplies, finding a warehouse and doing all the paperwork required. The unionist gave the licence to one of the fifteen members, creating a rift between them, and pocketed the funds he had collected under the garb of unionising waste *e-kabadis*. I was told that the funds were subsequently used to run for local elections. Alongside, his initiative also allowed him to raise funds from international agencies. Other scrap dealers spoke about how wastework allowed NGOs to get big awards, recognition, and to participate in international conferences, whereas those working on the ground were often forgotten.

• **EPR-PRO and Recyclers: Delayed Payments and Price Wars with the Informal Sector**

The EPR concept has its basis in the ‘management of the whole-life-cycle of products’ approach combined with the circular economy framework, and the polluter-pays principle. By shifting the burden of waste management upstream from the government to the producers, it makes the latter responsible for the reduction of the environmental impact of their products. Thereby, EPR encourages producers to conserve raw materials, reconsider product design, technology, production processes, and be responsible for environmentally safe post-purchase consumption, and disposal of their products.⁸² The producers can be made responsible in four distinct ways. Economic responsibility makes the producers pay a tax towards the costs of e-waste processing (e.g. collection, recycling, disposal). Physical responsibility involves mandating, for example, taking back the products after their useful life from the consumers. The product take-back requirements may also enforce collection rate targets. Information responsibility incorporates providing information on the attributes of the products (e.g. toxicity, recyclability), including such requirements as product labelling, and informing consumers how

⁸⁰ Personal Communication, Iftexhar Alam, Janta Market, November 2021.

⁸¹ 1 lakh is equal to 100,000 rupees (roughly equivalent to 1100 euros in October 2023).

⁸² Zinaida Fadeeva and Rene Van Berkel, “Unlocking circular economy for prevention of marine plastic pollution: an exploration of G20 policy and initiatives”, *Journal of Environmental Management*, 277, 2021, 111457.

to return used products. Lastly, financial liability for environmental damage and clean up. EPR regulations may include any one or a combination of these four types of producer responsibilities.⁸³

The Indian EPR framework is substantially different in approach compared to EPR approaches of advanced economies. It has primarily evolved not from international commitment but from the interest of internal stakeholders. It relies on physical responsibility (collection centres and take-back targets for producers) and information responsibility (how consumers can return the used electronic product). Producers are required to collect a certain percentage of their products sold in the previous financial year, which can rise from 10% to 70% with each passing year. Moreover, it is significantly non-directive in nature, and is said to be inclusive towards multiple stakeholders from both the organised and the unorganised sectors.

In India, e-waste management has emerged as a terrain where political as well as economic positions are constructed. Under EPR, the e-waste business is gradually being reconfigured. EPR has created a space from where formal arrangements to control e-waste flows are elaborated; but this is also where informal and illegal arrangements aimed at satisfying private interests – to wit, corruption – take place. This can be seen in competitions between the big sectoral players to conquer the national market share. The EPR system does not impose physical or financial liabilities; it is more of a set of pointers on the moral responsibility of producers and other key stakeholders.

It allows for multiple models to simultaneously co-develop and coexist, and significantly impacts producers and manufacturers across sectors and industries.⁸⁴ The e-waste EPR is usually implemented by a PRO composed of a group of electronics producers. The rules define a PRO as a professional organisation authorised or financed collectively or individually by producers, that can take responsibility for collecting and channelising e-waste generated from the 'end-of-life' of their products to ensure environmentally sound management of such e-waste. In India, the concept of PRO was introduced in two sectors, namely, plastic waste management, and e-waste management.⁸⁵ The E-Waste (Management) Rules, 2016, mandate the producer to carry out a phase-wise collection of between 30 to 70 percent of waste electronic products within a timeframe of seven years.

As a collective EPR system, the PRO has been created to achieve recycling cost efficiency.⁸⁶ For the PRO, the key objective is to close the loop by channelizing the maximum amount of electronic discards from the unorganised sector into the formal one for meeting the collection targets of its producers. Additionally, it ensures traceability of electronic items. A PRO could also help producers meet their EPR targets through various processing technologies. For instance, they issue data destruction certificates for the producers. Such PROs need to be registered with the Central Pollution Control Board (CPCB).

⁸³ Rama Mohana R. Turaga and Kalyan Bhaskar (eds), "E-waste management in India: Issues and strategies", *VIKALPA. The Journal for Decision Makers*, 44 (3), 2019, pp. 127-162.

⁸⁴ MoEFCC, Guideline Document Uniform Framework for Extended Producers Responsibility (Under PWM Rules, 2016), New Delhi, 2020.

⁸⁵ Guidelines for PRO dated May 23, 2018.

⁸⁶ Atalay Atasu and Ravi Subramanian, "Extended producer responsibility for e-waste: individual or collective producer responsibility?", *Production and Operations Management*, 21, 2012, pp. 1042-1059.

One of the biggest targets of *e-kabadi* complaints and disapproval is the same authorised PRO that the Indian government believes will rationalise and clean up the country's e-waste operations. Not surprisingly, as the informal *e-kabadis* absorb the majority of e-waste directly from their owners, extensive supply deficiency problems occur in developing the formal recycling sector. The PROs have no choice but to rely on the *e-kabadis'* acumen for sourcing and procurement.

They started out by contacting *e-kabadis* across the city, offering to integrate them in the formal collection system as aggregators. Aggregators have a storage space, and aggregate material from waste pickers, itinerant collectors, commercial sources, and residents. Two types of aggregators were integrated: those who did minimal or no processing of the material, and those who typically specialised in a single super category of material, and processed it to produce secondary raw materials as well. Furthermore, since PROs were interested in bigger volumes, they negotiated with the aggregators to buy discards based on weight (per kilo basis), instead of the prevalent piece-rate basis.

In the beginning, the *e-kabadis* were convinced by the model that the company was offering, as Ahsan Malik, an *e-kabadi*, recounted. After a quick calculation, he figured that the price difference between the haul sold by weight and that on piece rate was negligible. The PRO offer was therefore interesting as it helped him sell big hauls, and save time on dismantling discards. Moreover, he could utilise the time saved on disassembly and dismantling in finding new business clients, and hauls in the market. However, he gradually started noticing the flaws in the system. Then, a year later, the deal was called off. Payments were delayed, some *e-kabadis* having to wait for almost a year to get paid for the haul supplied to PROs. The *kabad* market works on short-term credits from buyers that can be stretched to a maximum duration of up to six months. Typically, the *e-kabadis* pick up a haul, sell it to a company, and pay for it within fifteen days to one month, once they have received money from the company. When the payback time exceeds this period, dealers risk their reputation in the market, which decreases their chances of acquiring scrap in the future. Moreover, the *e-kabadis* discovered that the PRO was taking advantage of their low level of education, not realising that they were astute businessmen who were well-informed about the market. The company would offer prices that were lower than the market rates. The PRO would frequently offer fixed rates, ignoring the fluctuations in precious metal prices. When *e-kabadis* voiced their concerns about this, the PRO came up with multiple excuses to justify lower rates. At the same time, there were other buyers in the market who were willing to offer better rates for the haul. The *e-kabadis* therefore turned to them for business. Ahsan Malik and his friends told me they would have to rethink their terms of engagement with the PRO in the future.

At the top of the e-waste stakeholder hierarchy are the "recyclers". These are registered companies with e-waste authorisation from the Central Pollution Control Board (CPCB) that operate at a big scale, with branches in major Indian cities. Big manufacturers like Samsung, Nokia, HP would directly contact such "recycling" companies capable of taking all their e-waste material from various locations across the country.⁸⁷ In 2022, there were 472 "recyclers" registered with the CPCB across India, of which only two "recycling" companies were registered in Delhi. But, the total "recycling" capacity of all recyclers included amounted to

⁸⁷ Personal Communication, Shakeel, Janta Market, September 2021.

1,426,685.22 metric tons per annum (MTA).⁸⁸ This is much smaller than the amount of e-waste produced, and is indicative of the fact that large portions of e-waste are treated in the informal sector – which the Indian government ignores to streamline.

- **Scrap work and Competition With Recyclers**

Environmental rules have made it difficult for scrap dealers to procure material. With the advent of authorisations and certifications, competition has increased for *e-kabadis*, making it difficult for them to acquire material from bulk consumers through public and private auctions. The rules make it mandatory for companies handling e-waste to register with the CPCB or the state pollution control boards. To register, interested companies have to first submit a plan with details of their activities to the pollution board for approval. These authorisations allow registered companies to have access to public and private auctions, giving them leverage over *e-kabadis* in terms of access to material and control over waste flows.

There are different grades of recyclers depending on their capacity to handle e-waste. Licences for e-waste vary from a collection to a recycler licence, based on the capacity of a company to deal with discard material.

“Recycling licences have categories based on weight. You can do *halka* (light) recycling in a small place of about 1000 [square] metres. There’s one lower than that, for which you would need 500 m² of space. If I have the capacity to handle a load of 30 tonnes in a month, then I will get the licence for 30 tonnes.”⁸⁹

The collection licence allows a company to collect, transport, and store discards, but does not allow it to process or dismantle e-waste. The e-waste rules ban public and private companies from selling their discards to non-licensed companies. They are also forbidden from participating in e-waste auctions.

Since the majority of *e-kabadis* do not have licences, they have to rely on recyclers for the procurement of hauls or source material through other channels. In many cases, the recycler would share its licence with the *e-kabadis* to collect material from public auctions. In exchange, the recycler would either take a commission, or a percentage of the estimated profit that the *e-kabadi* would make from selling the scrap. The *e-kabadis* felt exploited by recyclers when they acted as their front for the collection of discarded electronics during auctions. When selling to *e-kabadis*, recyclers also often attempted to dictate prices, squeezing in as much profit as possible from the sale. Furthermore, recyclers have decisional power on whom to sell to. For instance, recyclers know that Delhi is a hub of resourceful *e-kabadis*, therefore they refuse to sell to *Dilliwaley* (scrap dealers from Delhi), prioritising smaller dealers with less bargaining power who would settle for the prices quoted by the recycler.⁹⁰

⁸⁸ CPCB website List of E-waste Recyclers, 2022, https://cpcb.nic.in/uploads/Projects/E-Waste/List_of_E-waste_Recycler.pdf.

⁸⁹ Personal Communication, Iftekhar Khan, Janta Market, November 2021.

⁹⁰ Personal Communication, Shameem, Janta Market, October 2021.

By deciding whom to sell to and where, recyclers have become active players in redirecting waste streams and flows within the country. Moreover, it has triggered price wars between the recyclers and the *e-kabadis*. Although material from big recyclers eventually comes back to the scrap market, in many instances, precious items or material that could be resold and reused and would fetch higher value are already removed from the machines by the recyclers, leaving only low-value scrap for the *e-kabadis*. Since they buy material through the formal channels at considerable cost, the cost of scrap is recovered by selling it in the scrap market.

“There are certain things, things that are out of the box (*hat ke maal*) that the recyclers damage, and the rest is resold. If they start damaging everything, then what will be left? They buy at very expensive rates. But for us, what used to come in at 50 percent has become 1 percent.”⁹¹

As the commodities market is often very volatile, most recycling firms (and PROs) make actual profits not from recycling, but from undertaking and issuing data destruction certificates.⁹² Data destruction certificates ensure that all digital data is erased correctly and safely in order to keep a customer’s information private. Although big companies and government offices are particular about the secrecy of their data, many consumers give away their used phones and laptops without worrying about the data stored on these devices. In an informal discussion with the director of a successful recommerce business in cell phones, I learnt about the effort that his company has to make to clean the amount of data on a cell phone before putting it back on the market. For most big brands, the data destruction certificate personified the corporate image of companies that manage their waste responsibly. In most cases, to prevent this, the used material – like hard drives – are passed through shredding machines before being re-diverted to the informal sector for scrapping. For the informal sector, this affects the quality of materials recovered from such devices.

Faced with competition from licensed companies for procuring discards, *e-kabadis* were left with little choice: either toe the line, or find other ways of sourcing material. They opted for both. Nevertheless, there is a cost involved in acquiring authorisation from the pollution boards. First, *e-kabadis* have to pay a licence fee for registration, which varies from one state to another. Authorisations required paperwork, too, and often involve bribing officials at the pollution board. Additionally, the applicant would need to create and register a company beforehand, which is an added cost for most *e-kabadis*. The majority of the scrap dealers, though astute businessmen, are not equipped to deal with bureaucracy and paperwork due to low education levels. This, in turn, entails hiring a chartered accountant to deal with company matters. If an *e-kabadi* registered a company, and the deal with a PRO or authorised recycler was called off, they would promptly close it. Making a company was also not preferred to avoid paying Goods and Services Tax (GST).

To avoid such an eventuality, some transact only with other vendors in Delhi with whom it is possible to conduct business without billing, i.e., through “*kachcha*” (unregistered) bills. Alternatively, those who choose not to create their own recycling company either use the licences of registered companies acting as a front, or work with a licensed recycler to collect bigger hauls. Pairing up with a recycler allows them to deal in the *ek number* (legal) scrap

⁹¹ Personal Communication, Zain Malik, Shanti Market, September 2017.

⁹² Josh Lepawsky *et al.*, art. cited.

trading market. This also protected them from sanctions during sales tax raids while transporting material. These advantages notwithstanding, *e-kabadis* still prefer to operate independently, often travelling to far-off places to procure material.

Thus, we observe that the implementation of e-waste rules has done little to control environmental pollution and toxicity. It has, however, changed the *e-kabad* business through the introduction of formal actors like PROs, collection centres, and recyclers. Before the rules were implemented, the *e-kabadis* could directly collect, buy, and sell material from anywhere. Sourcing and collection have become difficult, with formal actors trying to capture e-waste and squeeze in profit margins.

Challenging “Recycling”: It’s all A Sham

Recycling regime, it was believed, would stop informal recycling practices, and ameliorate the land and the environment in turn. These initiatives, often perceived as being “well-meaning”, nevertheless attempt to displace scrapwork, and lead to “sanitising” lower-class neighbourhoods, which is achieved at the cost of working-class livelihoods.

- “Recycling” is *Dikhawa* (“It’s all a sham”)

The big recyclers acknowledged the expansive territorial networks of e-scrap dealers and their competitive edge. They nevertheless argued that these lucrative rates offered to the consumers came at the cost of the environment.

“*Kabadiwalas* give good money. They only operate in a small setup. They don’t have to think about the environment, spilling, etc. We are more conscious about it.”⁹³

To counter such accusations, *e-kabadis* questioned the effectiveness of the recycling units in terms of controlling pollution and being cleaner. They voiced doubts over what went on inside a recycling factory as rules were easily flouted despite the use of technology, and given the absence of transparency.

“Technology is changing but there are no rules and regulations in the factories. It is the mind that thinks that a factory setup is better, so the ‘load’ should be given to factories. It [the government] supposes that the recyclers will dismantle properly. This is their assumption, but the reality is the opposite of it. In fact, it’s the recycler who gives us material.”⁹⁴

The use and maintenance of machines used for recycling on an everyday basis increase business costs to such an extent that, usually, only large companies with a stable supply of materials can survive. As a result, such machines and standardisation processes work only

⁹³ Personal Communication, CEO Recycling Company, November 2021.

⁹⁴ Personal Communication with an *e-kabadi*, Shanti Market, September 2021.

for high-value metals rather than the flexible operations of dismantling, refurbishment, or product reuse.⁹⁵ Yet, investments in machines still continue for two purposes. First, they keep the recycling licences and contracts running. Second, the machines serve to escape inspection from authorities and Original Equipment Manufacturers (OEM). Licensed plants are subject to inspection by local environmental authorities like the State Pollution Control Boards: they organise quarterly and annual verifications of the sites to take stock of the quantities of e-waste handled. Moreover, companies such as Nokia, and Samsung, which are conscious of their brand image and name, desire to stand above the rest for their environmental stewardship, particularly when it comes to e-waste generated by its operations. Company executives often visit recycling units to ensure the proper disposal of their products, and to verify that the recyclers are not selling their material to other companies outside of the circuit.

However, in most cases, the majority of the e-waste hauls come back to the informal sector with recyclers selling them back to the e-scrap dealers. For a recycler, it is more profitable to redirect the discards to the informal sector for both technical and financial reasons. First, the quality of materials collected for recycling can vary, meaning that recycling plants cannot count on streamlined inputs of materials with a specific quality. Additionally, it saves labour costs and time. The factory space can be utilised for the churning and storage of new material, rather than be taken up for disassembly.

“Why would they open the items? They will have to hire labour or make their machines run. In both cases, it involves a financial cost. Instead, they can sell to us, and use the money and the space to get new material.”⁹⁶

In fact, it is more profitable to outsource disassembly to scrap workshops than engage in costly and time-consuming disassembly themselves. Multiple visits to big recyclers appear to corroborate this claim. The companies I visited always shied away from showing me the interior of their factories. I was either shown corporate videos, or photos of new machines standing in commercial shops and warehouses, waiting for customers to buy them. The only running equipment I have seen were the cardboard compactor machines at a waste paper dealer’s unit. As one of the *e-kabadis* informed me when I spoke to him about a video of a functioning recycling plant that a recycler had previously shown me:

“They do not use the machines. It is a sham. The video shown to you must have been for an inspection. They use the machines for a while, but in everyday practice they do not rely on them. During inspections, they show the machines etc. It is all a *dikhawa* (it’s all for show). We also buy from companies. When there is an inspection, they tell us we will not get any material off-loaded due to inspection (*koi maal nahi uthwaengey*).”⁹⁷

The company inspection dates are known in advance. On such days, recyclers temporarily stop selling to *e-kabadis*, making them wait until the inspection is over. In light of the above,

⁹⁵ Xin Tong, Jingyan Li, Dongyan Tao and Cai Yifan, “Re-making spaces of conversion: deconstructing discourses of e-waste recycling in China”, *Area*, 47 (1), 2015, pp. 31-39.

⁹⁶ Interview *e-kabadis*, October 2021.

⁹⁷ Personal Communication, Computer *e-kabadi*, October 2021.

e-kabadis expressed doubt over a formal recycling setup ever working. Corroborating the fact, *e-kabadis* gave examples of many recyclers that resell their haul to the scrap market. One of the names that came up was that of one of the country's biggest recyclers, Attero.⁹⁸ The *e-kabadis* therefore are far from being the only "recyclers" acting outside the regulatory framework.

Despite the proclaimed benefits, the "recycling" factory processes have not yet become widespread. The necessary new machinery and equipment is expensive, and reconfiguring and redesigning complementary processes demand time and skilled workers. The pay-off associated with digitising processes, for example, is proving to be too far off for most manufacturers, especially in an uncertain economic environment. But that increased automation will have a general impact on people and jobs is clear. Moreover, the complexities related to the use of recycling technologies and its limitations further complicates the actions undertaken to curb pollution.

- **Environmental Pollution, Sealing Drives and Corruption**

Environmental protection does, of course, need the government, but on the ground scepticism abounds over the government's efforts in curbing pollution, and removing local businesses.

Recyclers hire scrap labour on a daily wage basis, or on consignment basis to undertake *kholney ka kaam* (disassembly). More often than not, smaller hauls are transported to the labourers' homes for disassembly, whereas bigger hauls are often opened in the recycler's premises. By outsourcing material to e-scrap worker neighbourhoods, the recyclers also displace environmental pollution from the factory to the workers' neighbourhoods, which then get labelled as "toxic sinks" or "toxic havens". Yet, the authorised recycler rarely faced the consequences, whereas the *e-kabadi* had to constantly face sanctions and the closure of their workshops and businesses, following increased government monitoring. Since 2017, sealing drives, undertaken by the Municipal authorities and the Delhi police to close down premises where environment and land-use laws are not respected, have increased. The general perception is that its measures have essentially helped local bureaucrats and the police extort money from the unorganised sector – a common practice. In one of the markets, I was informed that each scrap dealer in the lane paid a monthly rent of Rs 1000 to the area police in order to maintain their business.

These discourses beg the question of whether the government and the industry is actually concerned about bringing pollution down. As Dona Kornberg demonstrates in the case of garbage management, most waste-to-energy plants have failed to work in the long term, and yet such technologies continue to receive widespread support from citizens and government officials.⁹⁹ One explanation lies in the fact that industries receive heavy subsidies on land, and tax rebates to set up their plants. A waste activist mentioned that many big companies are willing to suffer initial losses in order to maintain good working relations with the State. Moreover, they could later cash in on land acquired to set up recycling plants by converting it to real estate.

⁹⁸ See also, Julia Corwin, *op. cit.*, p. 26.

⁹⁹ Dona Kornberg, art. cited.

The “recycling” terminology also allows the DPCC officials to circumvent the sensitive topic of environment pollution, which is difficult to control. While I was contacting officials for interviews to understand the official narrative on e-waste recycling, they informed me that pollution was a vast subject encompassing a variety of sources of pollution or polluting activities. E-waste was only one part of the whole. And e-waste pollution was not their concern in the absence of registered recyclers with DPCC. Since the activity was not allowed under the Delhi Master Plan, and due to the scarcity of land in Delhi, manufacturers, producers, and recyclers were pushed to set up their businesses outside Delhi. There were mainly collection centres and refurbishers in Delhi. On cross-checking this information with a registered recycling company executive, I learnt that Delhi had recyclers, refurbishers, and dismantlers, but that the DPCC official was parroting the legal line out of caution.

While recyclers with large capital challenge the territorial rights of the informal sector,¹⁰⁰ sealing drives have displaced e-scrap industries, pushing them out of Delhi. As a consequence, informal e-scrap businesses in Delhi are changing, as e-waste units are being displaced to the outskirts of the city or in nearby states. The stricter enforcement of environmental laws has dislodged Delhi’s “negative environmental externalities” to neighbouring states. The dislocation of waste industries, along with their migrant and working-class populations, is a characteristic of Delhi, and is supported by its middle-class residents and activists.¹⁰¹ Consequently, multiple e-waste recycling nodal points have developed in “ordinary” cities around Delhi in the states of Uttar Pradesh, Haryana, and Rajasthan, from where trading with the capital takes place.¹⁰² Cities like Loni, Meerut, and Ghaziabad in UP are now transforming into nodal points for e-waste treatment.

Yet these have not necessarily controlled environmental pollution. Sealing drives are seen as facades with the aim of cleaning up the locality’s reputation rather than pollution itself.¹⁰³ The government, in the process, overlooks the structural reasons that encouraged the economic model of e-scrap dealers. Moreover, it does not take into consideration the impact of its own initiatives, like “Digital India” and “Make in India”, on consumption and obsolescence, for example, nor the impacts of bureaucratic corruption and communal riots on e-scrap workers’ livelihoods. Thus, only a small part of the recycling value chain came under the ambit of e-waste rules. “Recycling” technology is then nothing short of a performative act undertaken by companies to maintain contracts.

Ever since 2016, with more stringent e-waste management and handling rules, the used electronic goods market has undergone a significant shift. Increasingly, regulatory measures are directed particularly towards self-employed entrepreneurs and micro-businesses operating in the unorganised sector. They operate under harsher conditions, and conform to increasing government regulations – or face sealing drives and relocation. Informal businesses are neither

¹⁰⁰ Peter Kirby and Anna Lora-Wainwright, “Exporting harm, scavenging value: transnational circuits of e-waste between Japan, China and beyond”, *Area*, 47 (1), 2015, pp. 40-47.

¹⁰¹ Asher D. Ghertner, art. cited; Amita Baviskar and Raka Ray (eds), *Elite and Everyman: The Cultural Politics of the Indian Middle Class*, London, Routledge India, 2011.

¹⁰² Gayatri Jai Singh Rathore, “Circulating waste, circulating bodies? A critical review of e-waste trade”, *Geoforum*, 110, 2020, pp. 180-182.

¹⁰³ *Ibid.*, p. 45.

seen as a force in the value chain in general, nor in fighting pollution in particular. In cases when e-scrap dealers were considered for inclusion in the formal e-waste value chain, formalisation failed to safeguard the economic activity of the informal recyclers.¹⁰⁴ Simultaneously, the informal sector was projected as those contributing to environmental harm. Thus, India's recycling regime has framed the issue of used electronics from the perspective of the environment, focusing mainly on the pollution caused by small-scale unorganised "recycling". Together with policies to fight environmental pollution, these efforts promoted "corporate privatisation" at the cost of the informal sector.¹⁰⁵

Further deepening this dimension, I argue that Delhi's recycling regime in its current form is actually ineffective in safeguarding the environment in places like Delhi, as e-waste trickles back to the informal sector via the authorised actors. As Yvan Schulz argues about China, its recycling system would not function as it does, had there been no rural informal recycling sector.¹⁰⁶ Similarly, in India, even as the e-waste policies turn a blind eye to the e-scrap workers, it tacitly relies on them to tackle the increasing volume of e-waste in the country. As a matter of fact, flouting rules, authorised units redirect hauls of electronic discards back to the informal sector.

CONCLUDING REMARKS AND FUTURE ACTIONS

As this paper highlights, the recycling regime introduces intermediaries, modifies waste flows, sparks price wars between the authorised and the informal actors involved in waste work. This actually aims at preventing "leakages" to the informal sector. E-scrap dealers who held a collective monopoly on the trade and in waste's transformation into commodities are now facing competition from NGOs, advocacy groups, and big industrial groups that are backed by the government. In particular, the e-scrap sector is currently undergoing a period of transition. The ease of entry into this sector has been reduced by the introduction of a multiplicity of permits and licences required by various levels of government.

First, contrary to Europe, where the e-waste stream has a low recycling rate (mainly due to failure to separately collect this type of waste), India boasts a robust e-waste collection system in the form of itinerant and fixed *kabadiwalas*. No recycling regime can therefore be successful as long as the informal labour and economies are not fully integrated in these policies. There are promising inclusive recycling examples from the field of solid waste management, like the Pune-based cooperative SWaCH. To some extent, such models can also be created for e-waste management. For instance, a cooperative of e-scrap dealers could be formed in Delhi that

¹⁰⁴ Rajyashree N. Reddy, "Revitalising economies of disassembly: Informal recyclers, development experts and E-waste reforms in Bangalore", *Economic & Political Weekly*, 48 (13), 2013, pp. 62-70.

¹⁰⁵ *Ibid.*

¹⁰⁶ Yvan Schulz, "Scrapping 'irregulars': China's recycling policies, development ethos and peasants turned entrepreneurs", in Nicolas Schlitz and Stefan Laser (eds), *Journal Für Entwicklungspolitik*, 35 (2/3), 2019, p. 35.

would work closely with the PROs and recyclers at rates that are decided by the members of the cooperative. Such cooperatives could contribute to the resource reclamation supply chain.

While setting producer collection targets is a good initiative, the laws should make it mandatory for producers to invest in organisational skill sets for *e-kabadis*. There is also a need for the professionalisation of workers' skills and services through capacity building. This could be done by identifying some sites in the e-scrap neighbourhoods where regular training on the safe handling of e-waste is conducted. This would help the site transition to a sustainable recycling park with more regulated structures on a participatory basis.

Second, although *kabadiwalas* have been sidelined in the e-waste legislations, their economic activity is tacitly recognised by the PROs through their role as aggregators; and as part of the national tax regime. *Kabadiwalas* are subjected, under the category of waste trade and shipment, to the Goods and Services Tax (GST), at the rate of 5 per cent for both inward and outward movement. This places them in a peculiar in-between position, wedged between the formal and the informal outreach of the trade. On one hand, the tax regime creates a situation where collection and transportation of waste is authorised under state legislations. On the other hand, the illegality of transporting these goods is explicit in the e-waste rules.

Manual disassembly and segregation could be employed for high material recovery from discards with less harmful contents, while discards that are hazardous to health could be mechanically destroyed. The process of integrating e-scrap dealers requires governments and corporations to have an understanding of the complexities of scrap work, its links with other second-hand economies, and a willingness to think outside the box in order to see "recycling" in a holistic manner.

More labour-friendly and long-term initiatives are required, involving non-profits, or worker cooperatives. The work of advocacy groups needs close monitoring, too. NGOs and policy advocacy groups that had initially partnered with GIZ and the MoEFCC for research on the informal e-waste sector, later set up their own collection centres. These are often presented in UN and other donor agency reports as success models that have managed to establish a wide network of partners from the informal sector, based on trust through financial transactions. In practice, apart from having taken advantage of the informal sector and become their competitor, these agencies have not been able to sustain their initiatives in the long run. PROs involved with Delhi scrap workers could not sustain initiatives beyond two years, making many informal aggregators wait for their payments for up to 6 months and more. In the absence of sustained efforts, *e-kabadis* revert to informal working channels.

The producers, identified as the main stakeholders in the rules, often overlook the *kabadi* system in place and use its presence to hide their own failings. It is commonly found that producers are unable to meet their target. PROs are also found to be non-compliant. An inspection by the Delhi pollution control committee in 2019-2020 of 9 e-waste collection centres, associated with 56 producers, were all found to be non-compliant. CPCB reports show that most of the e-waste collection centres registered with different states, were either found to be inoperative, or, as in most of the cases, closed or not traceable at the locations given by producers in their EPR Plan.

The rules themselves need to be reworked and implemented taking into account the lessons from the ground. The current understanding of recycling is a narrow one, which does not

guarantee the extraction and disposal of all components in used EEEs as the separation of some metals is complicated, and for others even the use of scientific techniques in the disposal process could be dangerous. E-waste inventory is in its nascent stages in some states, and absent in many. The CPCB quantified e-waste for the first time in 2017-2018, and since then has published data for the three subsequent years, but the inventory is based on the sales of electronic products within the country, and does not take into account the imported EEE figures.

There are also inequalities within different states in India as some are externalising the environmental impact from their own use to other states nearby. CPCB reports found that setting up recycling facilities is not feasible in the case of some cities/states – as in Chandigarh because of the high cost of land, and Delhi too, in addition to already high pollution levels. However, there are provisions for collection in these states through various agencies, and the subsequent channelisation of that waste to their authorised dismantlers/ recyclers in other states.

There should be an effective monitoring of rules, with better coordination amongst the different institutions in charge of implementation and monitoring: the central and state pollution control boards, municipal authorities, and the MoEFCC.

Consumers should be made aware of current e-waste rules. Producers must provide information on the content of e-waste and its appropriate disposal to consumers through their websites or through product labelling and packaging. In addition, frequent awareness campaigns based on partnerships and collaboration among various stakeholders might improve the situation. Some PROs and recyclers run their own collection vans with slogans on recycling of e-waste; it has largely worked as a branding tool rather than a tool to create public awareness. Here again, the *kabadiwala*, with a wider network of household coverage, could be involved in an effective way to increase awareness about the disposal of e-waste.

The e-waste stream consists of a number of product categories, which have rather different properties and need to be treated separately. Specifically, PCBs, cooling and freezing machines (containing CFCs in the coolant circuits and the insulation) require a specific technology, and the same holds true for fluorescent lamps and screens or electrically-operated medical equipment. Most recyclers interviewed lacked such technologies, their equipment being limited to shredding machines. Under the Make in India initiative, producers must be mandated to find industrial design alternatives to minimise the use of toxic compounds in the making of the product so that e-scrap workers are less impacted by their toxicity. Producers and manufacturers need to rethink product design to make their products last longer, which would reduce the volume of the e-waste stream. Lastly, the rules should be given more teeth to bring in second-hand and resale economies, too, under their jurisdiction.

New forms of national regulations aimed at controlling toxic waste dumping, boosting material and energy recovery, and tracking the movement of discards, often have the unintended effect of rendering many flows of materials opaque or invisible.¹⁰⁷ It also sidelines those who have been pioneers when it comes to finding “value in waste”¹⁰⁸ and have been providing their

¹⁰⁷ Catherine Alexander and Joshua Reno (eds), *op. cit.*, p. 4.

¹⁰⁸ Vinay Gidwani and Julia Corwin, “Governance of Waste”, *Economic and Political Weekly*, 52 (31), 2017, pp. 44-54.

infrastructural labour through recycling, reusing, repairing, and servicing the city for a long time. Furthermore, “high-tech” formal processing is not a remedy, as findings indicate. Measures like those of e-waste rules and EPR regulations have introduced private actors and authorised intermediaries in the e-waste value chain, which have contributed to making the profit margins of the informal sector shrink. They focus exclusively on the pollution it generates, and ignore the structural reasons behind the creation and evolution of the e-scrap market. In doing so, first, they shift the blame for environmental pollution from the State to the e-waste workers. Second, the pollution discourse allows the State to push out small-scale industries from Delhi through sealing drives, which amounts to little more than shifting the environmental externalities from Delhi to nearby states, partially addressing the issue of environmental pollution. Land, which is already scarce in Delhi, is then recovered by the middle classes for gentrification.

Nevertheless, “recycling” and the e-waste trade looks fundamentally different from the perspective of scrap dealers, as this article demonstrates. The informal e-waste sector remains integral to the way the industry reuses and “recycles” electronic discards. Despite pressure from the government, and the deepening competition from authorised recyclers, informal workers are able to weather difficulties and changes in the regulatory climate and enforcement, thanks to their organisational modes and business models. Going forward, fostering collaborations between the informal and formal sectors, as a matter of fact, erasing the formal-informal binaries, is critical to closing the loopholes of e-waste management. For example, while safely dismantling some types of hazardous e-waste requires some level of professionalisation, the collection of this waste could be organised through informal waste collector cooperatives, which have the expertise to identify different components of waste and can work in areas with poor waste collection infrastructure.

However, this cannot be achieved in an environment of fear and violence created due to religious difference. The two neighbourhoods studied in Delhi are located on its outskirts, and operate at different levels to service the city as well as the global e-waste markets. However, these are also places targeted by communal politics, as witnessed in the 2020 riots in North-East Delhi. While global commodity prices and government regulations on e-waste and pollution affect scrap and recycling activities, these are equally disrupted when communal violence hits these neighbourhoods. Such events raise questions of safety and security, instil fear in the minds of the residents, stall everyday scrap work, and eat into the savings of the e-scrap dealers. The government must therefore not only ensure the livelihood of the informal scrap dealers, but also provide them a secure and safe environment in which recycling can be carried out. It is only then that we can think of a functional e-waste system in India.

Les Etudes du CERI

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