

MODERN WASTE

THE POLITICAL ECOLOGY OF E-SCRAP RECYCLING IN CHINA

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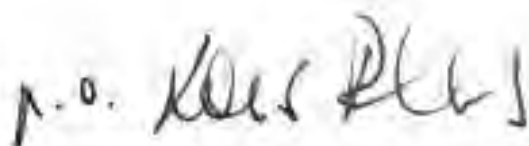
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IMPRIMATUR

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ABSTRACT (ENGLISH)

This PhD dissertation addresses changes that have taken place in recent years in the People's Republic of China regarding the image, fate and value of discarded electrical and electronic equipment (DEEE, also known as “e-waste”) and of the people who make a living by trading, transporting, and transforming this type of object. It originates in multi-sited ethnographic fieldwork conducted in Guangdong Province for a total of eighteen months (2014-2016), during which I paid particular attention to objects' materiality, recycling technologies, valuation practices, representations of waste/wastefulness, and state-society relations.

Drawing on scholarship from the sociology of public problems, China studies, political ecology, discard studies, environmental politics and the socio-anthropology of development, my research interrogates China's state program of “ecological modernization”. In particular, it analyzes the central government's project of “formalizing e-waste management and treatment” and its implementation on the ground, at the local level. Official discourse in China justifies formalization by the need for improved pollution control and resource efficiency. However, as my research reveals, this explains only a small part of the revolution in material and symbolic approaches to DEEE that unfolded in early twenty-first century China.

In particular, this does not account for the conspicuous absence of self-employed workers, family businesses and small and micro enterprises from China's new regulatory system and the industrial sub-sector this system gave birth to. These social actors and economic entities, often referred to collectively as the “informal sector”, dominated scrap recycling and object stewardship during the era of “reform and opening”. Some of them engaged in polluting practices, but others contributed in essential ways to object reuse, which is widely acknowledged as extending product lifespans, and thus reducing the overall environmental impact of EEE production and consumption. And yet, in China, the “informal sector” as a whole suffered from stigmatization, exclusion and dispossession.

Based on this observation, I conclude that, in order to understand China's official solution to the “e-waste problem”, one should understand it as a response to the need for displaying markers of modernity, environmentalism being but one of them. Technological progress,

material abundance and a position at the top of the international community, among others, also played a key role in shaping Chinese “e-waste” policies.

Keywords: e-waste, reuse and recycling, modernization, environmentalism, China

ABSTRACT (FRENCH)

Cette thèse de doctorat porte sur les changements qui se sont produits aux cours des dernières années en République populaire de Chine concernant l'image, le sort et la valeur des appareils et composants électriques usés et usagés (communément appelés « déchets d'équipements électriques et électroniques ») ainsi que des personnes qui gagnent leur vie en faisant le commerce de ces objets ou en les transformant ou encore en les transportant. Elle a pour origine une enquête ethnographique multi-située menée sur un total de dix-huit mois (2014-2016) dans la Province du Guangdong, durant laquelle je me suis intéressé avant tout à la matérialité des objets, aux techniques de transformation, aux pratiques d'évaluation, aux représentation des déchets ou du gaspillage et aux relations entre État et société.

Ma recherche interroge le projet étatique de « modernisation écologique » en prenant appui sur la littérature disponible dans les domaines de la sociologie des problèmes publics, de l'étude de la Chine contemporaine, de l'écologie politique scientifique, de l'étude des déchets en sciences sociales, de l'étude des politiques environnementales et de la socio-anthropologie du développement. Plus particulièrement, elle analyse le projet de « formalisation de la gestion et du traitement des déchets d'équipement électriques et électroniques » du gouvernement central ainsi que son application sur le terrain, au niveau local. Le discours officiel chinois justifie la formalisation par la nécessité d'améliorer le contrôle de la pollution et l'utilisation des ressources. Cependant, comme le démontre ma recherche, cette justification n'explique que de façon très incomplète la révolution des approches matérielles et symboliques des appareils électriques et électroniques usés et usagés qui s'est produite en Chine au début du vingt-et-unième siècle.

Notamment, elle ne rend pas compte de l'absence des travailleurs indépendants, des entreprises familiales et des petites et micro-entreprises du système réglementaire chinois ainsi que du sous-secteur industriel auquel celui-ci a donné naissance. Ces entités

économique et ces acteurs sociaux, souvent qualifiés d'« informels », ont dominé en matière de revalorisation des déchets, de réparation et remise en état des produits abimés ou de second-main et de remise en circulation de ces derniers à travers toute la période de « réforme et ouverture ». Certains d'entre eux se livraient à des pratiques polluantes, mais d'autres contribuaient de manière essentielle à la réutilisation des objets, laquelle est largement considérée comme une pratique « verte », qui prolonge les durées de vie des produits et réduit l'impact environnemental de leur production et de leur consommation. Et pourtant, en Chine, le « secteur informel » dans son ensemble était stigmatisé, exclu et dépossédé.

Sur la base de cette observation, je conclus dans cette thèse que la nature de la solution officielle chinoise au « problème des déchets d'équipements électriques et électroniques » s'explique par le besoin d'afficher plusieurs marqueurs de la modernité. L'environnementalisme en est un, mais il faut encore mentionner, entre autres, le progrès technique, l'abondance matérielle et une position au sommet de la communauté internationale.

Mots-clés : déchets d'équipements électriques et électroniques, réutilisation et recyclage, modernisation, environnementalisme, République Populaire de Chine

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1 INTRODUCTION

The modern world is an electrified world. Few objects have transformed lifestyles during the twentieth and twenty-first centuries to a greater extent than those that need electricity to function. The light bulb, invented in the late 1870s, made it possible for humans to disregard the day-night cycle, a fundamental aspect of life on earth. It led them to organize time in new, more autonomous ways, with far-reaching consequences (productivity increased but so did productivism, for instance). The incandescent filament also radically altered humans' relationship with their surroundings, especially in cities, where it facilitated the spread of street lighting, which eliminated darkness, a source of not only danger but also privacy. Thanks to the telegraph, and later the telephone, instant communication went from dream to reality. Distance became less of an obstacle, as it did not involve delay anymore. That enabled human action at a much broader scale, but also accelerated the pace of human life. Radio and television sets transported people to places they had never been before while at the same time gluing them to their couch. Refrigerators revolutionized eating habits. Air conditioners made otherwise inhospitable places perfectly adequate for the purpose of living and working. Other household appliances, in particular washing machines, made household chores easier and less time-consuming. Since the burden of washing, cleaning and cooking traditionally fell on women, household appliances also contributed, at least partially, to a reworking of gender roles. Finally, personal computers, whether desktop, laptop or handheld (smartphone), put the world at our fingertips — and prompted us to look at it through screens. Together, they constitute an unfathomable network, the Internet, on

which humanity becomes more reliant with every passing day. In sum, these objects are central to, and stand for, modern lifestyle.

It should not surprise, therefore, that producing them is big business. To many laypeople, this became particularly obvious in 2015, when Apple Inc., by then arguably the world's most famous electronics brand, recorded the biggest annual profit in corporate history, at USD 53.4 billion. Apple also qualified as the most valuable company in the world, with a market capitalization of USD 621.6 billion as of December 2015. That same year, according to some estimations¹, the global “electrical and electronics” industry (broadly defined) recorded EUR 4,008 billion in production sales. The sectors “house appliances” and “consumer electronics” (excluding communication technology), for instance, reached EUR 236.3 billion and 224.4 billion respectively. China topped the ranking in the categories “producing country” and “national market” with a share of 51 percent and 38 percent, respectively, thereby positioning itself far ahead of any other country (the USA came in second in both categories at 10 percent and 15 percent, respectively). Growth forecasts were also highest with regards to China, at 7%. The electrical and electronics industry has played a key role in the Chinese economy thus far (Pecht 2007) and will continue to do so. In the 1980s and 1990s, it grew mostly thanks to foreign direct investments, but massive domestic investments kicked in later on. Purely Chinese corporations rose to prominence in the late 2000s and early 2010s, thanks in part to support from Chinese state authorities, which sought to move the domestic economy away from export-led growth and saw in the sector an important driver of innovation. In recent years, Chinese brands have been growing quickly, both within China and, for many of them, on global markets. As a result, Chinese brands like Lenovo, Huawei and ZTE, which few people outside of China had ever heard of until recently, are now among

¹ “The Global Electrical & Electronic Industry – Facts & Figures”, *ZVEI - German Electrical and Electronic Manufacturers' Association*, July 2017. URL:

https://www.zvei.org/fileadmin/user_upload/Presse_und_Medien/Publikationen/2017/Juli/Die_globale_Elektronindustrie_Daten_Zahlen_Fakten/Fact-Sheet-International-2017.pdf (accessed January 26, 2018).

the top player worldwide². Figures on the size of the Chinese electrical and electronics industry are hard to come by, because the China Yearbook of Statistics does not contain a dedicated category and surveys by market analysts that promise a more detailed break-down must be paid for. The only publicly available numbers I could find are outdated and therefore of little use. However, there is ample evidence that the industry makes a considerable contribution to China's gross domestic product (GDP).

The industry producing electrical and electronic equipment (EEE) has become massive and has long reached a global scale. Like other industries, it relies on the exploitation of human labor and the plundering of natural resources, and therefore takes a heavy toll on people and the planet (Pellow & Park 2002, Dayaneni & Doucette 2005, Smith et al. 2006, Williams 2016). It requires large amounts of mineral resources, which need to be extracted from the ground, often at a high social and environmental cost. For instance, much coltan, a metal needed in the production of smartphones, is mined in the Democratic Republic of Congo, in a context that involves wide-ranging human rights violations³. Toxic tailings from rare earths mining in China, to take another example, have caused severe environmental degradation⁴. In terms of carbon footprint, a study commissioned by The Climate Group, a trade association, estimated that the electronics industry's greenhouse gas (GHG) emissions accounted for 2 percent of the total in 2007 and predicted that this figure would almost

² See "The Chinese Technology Companies Poised to Dominate the World", *The Guardian*, June 3, 2014. URL: <https://www.theguardian.com/world/2014/jun/03/chinese-technology-companies-huawei-dominate-world> (accessed January 26, 2018).

³ "Blood and Minerals: Who Profits from Conflict in DRC?", *Al Jazeera*, January 19, 2016. URL: <http://www.aljazeera.com/indepth/features/2016/01/blood-minerals-profits-conflict-drc-160118124123342.html> (accessed January 26, 2018).

⁴ "The Dystopian Lake Filled by the World's Tech Lust", *BBC*, April 2, 2015. URL: <http://www.bbc.com/future/story/20150402-the-worst-place-on-earth> (accessed January 26, 2018).

double by 2020⁵. Microchip manufacturing plants throughout the world leave a legacy of contaminated soils and groundwater (Little 2014). This first became apparent in electronics industry's birthplace, Silicon Valley, when local inhabitants started to experience miscarriages and birth defects in the 1980s. They also expose workers to toxic chemicals that can cause severe illnesses and death (White 2017). Further, the total amount of EEE currently in use consumes vast amounts of electricity, which at present is generated primarily through dirty and dangerous processes (fossil fuels burning, nuclear fission). Finally, the EEE industry produces hundreds of millions of products a year and sends them to the four corners of the earth but takes little responsibility for what happens afterwards — that is, unless it is forced to do so by laws and regulations. Many of these products are designed in such a way that they have short lifespans, contain toxic chemicals, or cannot be repaired easily. They therefore often become a burden for the communities and local governments that are left to deal with them.

Much EEE, in particular electronics, quickly becomes obsolete. The phenomenon has been widely criticized⁶ and is generally referred to as “planned obsolescence” (Slade 2006, see also Packard 1960) by critics who blame the industry for creating, facilitating or at least doing nothing to prevent it (Sterne 2007). It can be attributed to a number of factors⁷. First, rapid

5 “Smart 2020: Enabling the Low Carbon Economy in the Information Age”, *The Climate Group*, 2008. URL: <https://www.theclimategroup.org/sites/default/files/archive/files/Smart2020Report.pdf> (accessed January 26, 2017). For several years, however, the EEE industry has been trying to portray itself as a major contributor to total GHG emissions abatement, not intensification. See, e.g. “GeSI SMARTer2030”, *Global e-Sustainability Initiative*, [no date]. URL: <http://smarter2030.gesi.org/> (accessed January 26, 2018).

6 See, e.g., “The Story of Electronics”, *The Story of Stuff Project*, November 2011. URL: <https://storyofstuff.org/movies/story-of-electronics/> (accessed January 26, 2018); “We're All Losers to a Gadget Industry Built on Planned Obsolescence”, *The Guardian*, March 23, 2015. URL: <https://www.theguardian.com/sustainable-business/2015/mar/23/were-all-losers-to-gadget-industry-built-on-planned-obsolescence> (accessed January 26, 2018).

7 See “Obsolescence: Causes, Effects, Strategies”, *Eco@Work (Öko-Institut e.V.)*, June 2016. URL: <https://www.oeko.de/en/e-paper/obsolescence-causes-effects-strategies/> (accessed January 26, 2018).

technological advancement and innovation causes standards to evolve constantly. For instance, computer processing power has doubled every two years or so from the 1960s until recently⁸. On this front, at least, newer EEE is bound to outshine older EEE. Second, the evolution of standards often makes it difficult or even impossible to continue using old EEE. New plugs are introduced whose shapes do not match those of old sockets; new applications are created that do not run on old operating systems; new infrastructures are set up to deliver a form of information (e.g. digital) that old devices (e.g. analogic) cannot decipher; and so on. Third, many producers cut costs by using cheap, low-quality materials, parts or components instead of durable ones, which causes EEE to fail faster or become unusable. Fourth, all producers renew their models or versions regularly. They replace old ones with new ones, which feature different shapes, colors, functions and sounds. The latter are promoted through marketing campaigns that make the former look or feel passé and discourage users from holding on to them.

EEE obsolescence has major consequences. Not only does it create desire and need for newly manufactured EEE — which is the whole point, according to detractors of the industry — but it also eliminates desire and need for older EEE. As a result, the latter is generally stored away, given or donated, sold, thrown in the bin or dumped in the open. The phenomenon is usually referred to as “e-waste”. It has reached a considerable scale already but continues to grow. In 2013, an initiative led by the United Nations published a study⁹ that estimated the total amount of e-waste generated in the world at almost 48.9 million metric tons in 2012 and forecasted that it would reach 65,4 million tons by 2017. That, the study emphasizes, is the equivalent of 200 times the weight of the Empire State Building, or three-fourths of the length of the Equator lined up with 40-ton trucks. It also corresponds to a growth of 33

⁸ See “Moore’s Law”, *Encyclopedia Britannica*, November 29, 2017. URL:

<https://www.britannica.com/topic/Moores-law> (accessed January 26, 2018).

⁹ See “StEP Launches Interactive World E-Waste Map”, *United Nations University*, December 16, 2013. URL:

<https://unu.edu/media-relations/releases/step-launches-interactive-world-e-waste-map.html#info> (accessed January 26, 2018). Data based on Duan et al. 2013.

percent in five years, which explains why e-waste is often described as the “world’s fastest-growing waste stream”. Official take-back systems focusing exclusively on e-waste exist in many countries nowadays. However, it is estimated that they collect and treat only around 15 percent of the total amount (Baldé et al. 2015). The rest is basically unaccounted for.

In this thesis, I shall explore how the issue of e-waste played out in, and in connection with, the People’s Republic of China (hereinafter China), especially during the mid-2010s. China is a colossus in this regard: the country put the highest volume of EEE on the market, namely 11.1 million tons (followed by the USA at 10 million tons), and generated the second highest volume of e-waste, at 7.3 million tons (following the USA at 9.4 million tons) in 2012. China has also been receiving e-waste from abroad for many years — though it arguably receives less today than it did a few years ago. For this reason, the country has famously been described as the “largest e-waste dumping site in the world”. That label, given to China by a team of researchers led by the United Nations University (Wang et al. 2013), did not go unnoticed, neither abroad nor in China¹⁰.

A lot has already been written on e-waste, from authors with a great variety of backgrounds. Activists and journalists were instrumental in raising the issue and drawing public attention¹¹. They also played a key role in defining what e-waste was about as a social problem. Their reports, articles and books highlight two major causes for concern: the fast-paced growth in e-waste generated throughout the world and the transnational trade that allows for the externalization of environmental and social costs. E-waste is addressed in this literature as both an issue the world in general is faced with and a burden that falls

¹⁰ “China: The Electronic Wastebasket of the World”, *CNN*, May 31, 2013. URL: <http://edition.cnn.com/2013/05/30/world/asia/china-electronic-waste-e-waste/index.html> (accessed January 26, 2018); “Lianheguo: Dalu Quanguo Dianzi Lajichang” [联合国：大陆是全球电子垃圾场], *China Times* [中时电子报], June 3, 2013. URL: <http://www.chinatimes.com/cn/realtimenews/20130602002978-260412> (accessed January 26, 2018).

¹¹ See, e.g., Arensman 2000; Brigden 2005, 2008; Cobbing 2008; Grossman 2007; Puckett et al. 2002, 2005; Smith et al. 2006; Toxics Link 2003, 2004 and 2007.

disproportionately on certain disadvantaged communities. By denouncing its negative impact, the authors seek to prompt brand-owners, policy-makers and consumers to take action in order to redress some of the problems that arise due to mass consumerism and global inequality.

Researchers working in academia and in other organizations have also contributed a great number of studies, surveys and reviews on e-waste¹², especially in the fields of environmental science or engineering (waste management)¹³ and toxicology¹⁴. Those publications offer insights into: (1) legal, bureaucratic and incentive frameworks devised to address the issues of e-waste collection, import, processing and disposal; (2) current, and future flows of used EEE with respect to generation, trade and traffic; (3) methods currently used to collect, refurbish, disassemble, sort, recycle and dispose of e-waste; and (4) levels of pollutants found in soil, water, plants and human bodies, and their effects on the health and well-being of the affected individuals and communities.

In more recent years, the field has also been increasingly occupied by researchers trained in the social sciences and the humanities¹⁵ — including myself. A crucial difference between the publications of these scholars and those of the activists, journalists and researchers mentioned above is that they approach e-waste as not only a social and environmental problem to be managed, mitigated or solved (by inventing new technologies, devising new policies or adapting old ones, and revolutionizing producing and consuming practices), but also as a more general phenomenon that is deeply rooted in social relations, economic opportunities and cultural contexts. My thesis is marked by this holistic approach to e-waste

¹² See, e.g., Khetriwal et al. 2013, Lundgren 2012.

¹³ See, e.g., Hieronymi et al. 2012; Kuehr & Williams 2003; Schluep et al. 2009; Sinha-Khetriwal et al. 2006; Widmer et al. 2005.

¹⁴ See, e.g., Binion & Gutberlet 2012; Goodship & Stevels 2012; Hester & Harrison 2009; Tsydenova & Bengtsson 2011.

¹⁵ See, e.g., Burrell 2012; Gabrys 2011; Lepawsky & Billah 2011; Lora-Wainwright 2016, 2017.

and can be considered as a contribution to this growing body of scholarship in the social sciences and humanities — as well as to the more general discussion on e-waste, obviously. I am convinced that the tools of my trade, anthropology, are useful for engaging critically with what is being said and done about e-waste. Comparison, reflexivity and grounded observation allow anthropologists to produce alternative readings of reality. They put us in a position from which we can question taken-for-granted facts and ideas, identify unthought thoughts, test assumptions, and challenge conclusions and insights. This often leads to a deeper understanding of issues, sometimes even to surprising discoveries. I hope that my thesis will illustrate this.

1.1 Discard studies

To begin, let me give an overview of the broader academic field that informed my research, i.e. the social studies of waste. I gained many useful insights from it, and borrowed analytical tools from it as well. “Discard studies”¹⁶, as the field is sometimes referred to, have experienced a boom in recent years. Two decades ago an individual interested in exploring it might perhaps have found it easy to get acquainted with the totality of work published in English¹⁷. Nowadays, however, such a task seems almost impossible due to the profusion of publications that have come out in the meantime. These publications span disciplines as varied as area studies, urban studies, cultural studies, STS (science, technology and society), anthropology, sociology, geography, history, psychology, law, and economics. My review will therefore offer only a glimpse into the field.

¹⁶ See *Discard Studies: Social Studies of Waste, Pollution and Externalities*. URL: <https://discardstudies.com/> (accessed January 26, 2018).

¹⁷ Many publications on the topic can also be found in other languages, including my mother tongue, French (see, e.g., Anstett & Ortar 2015; Cirelli & Florin 2015; Ortar & Anstett 2017).

1.1.1 Key insights

Regardless of their background, scholars in the above disciplines share the assumption that “what people define as ‘waste’ varies with time, space, culture, and social group; in other words, [that] waste is socially constructed”. They all view waste as “a liminal or border concept, an object that can be valuable or valueless depending on various social and physical factors” (Gille 2012:833). Far from being just an epiphenomenon, waste plays a central role in the constitution, enactment and transformation of social relations (Gille 2007).

The discussion of waste and waste-related people, places and practices always boils down to an issue of value: the differential and fluctuating value of objects, of course, and, behind it, that of humans as well, and the environment they inhabit. The relation between waste and value is therefore at the heart of scholarship on waste in the social sciences and the humanities. In reflecting on this aspect, most authors refer to Mary Douglas’s seminal book, *Purity and Danger* (Douglas 2002[1966]), by now a mandatory point of passage. A fervent structuralist, Douglas famously defined “dirt” as “out of place” and a threat to order: “If we shun dirt”, she writes, “it is [because] dirt offends against order. Eliminating it is not a negative movement, but a positive effort to organize the environment” (p. 2). Interested above all in taxonomic systems, especially religious ones, Douglas concentrated her analysis on representations of dirtiness and cleanliness and paid little attention to practices of discarding objects or eliminating matter¹⁸. Nevertheless, she is considered by many as a precursor and her analytical framework, in which concepts such as purity and contamination, order and danger, and value and waste act as opposites, has had a strong influence on all those who followed.

As later authors have shown, the relation between waste and value is too complex to be grasped by a dichotomic approach such as that favored by Douglas. Michael Thompson

¹⁸ Many of those who quote Douglas’s equate her concept of “dirt” with rubbish or garbage, which is regrettable. Not only does it conflict with Douglas’s own use of these terms, but it also stands in the way of a richer and subtler analysis (Cooper 2010).

(2017 [1979]) argues for instance that “rubbish” represents only one stage in the processes of devaluation and revaluation that things constantly go through. It is only once things have reached that stage, Thompson advances, that they stand a chance of becoming priceless.

Both Douglas and Thompson played a key role in introducing the idea of waste as an epistemological, rather than ontological, category. In their work, waste is not an inherent quality of things but a way humans view things. As Douglas (2002[1966]) puts it: “There is no such thing as absolute dirt: it exists in the eye of the beholder” (p. 2). Following in their footsteps, many have explored the complex relation between waste and value (see, e.g. Hawkins and Muecke 2003). Perhaps most relevant to this thesis is Joshua Reno’s ethnographically grounded work (Reno 2009, 2016). Rubbish in landfills may give off bad odors, but, as Reno points out, those who know how to turn a profit from managing waste like its smell, which they associate with money. Reno’s work not only gives credence to the popular wisdom that one person’s trash may be somebody else’s treasure, but also adds a new dimension to this wisdom by linking it with broader issues, including: the impact of disposability and mass consumption on humans’ relationship with the material world; the alienation produced by contemporary forms of labor; and the stigma and discrimination that goes along with social stratification.

Waste is inherent to human life and to life more broadly. But its quantity and quality vary greatly in time and space. Therefore, a key question is: What differentiates the current era from previous ones? This has given rise to considerable debate. Some argue that waste is a defining feature of our time and wastefulness a built-in mechanism, rather than simply a side effect, of industrialized societies. With regard to capitalist societies, some note that economic growth (Gourlay 1992), the advent of mass production, mass consumption and disposability (Packard 1960, Slade 2006), and the weakening of traditional “object stewardship” (Strasser 2000) have led to an explosion in the amount of waste that is generated. Likewise, those who studied socialist societies and their transition to capitalism observe that this was accompanied by increased wastefulness (Gille 2007). A prevalent idea, among those authors, is that we have now reached a stage of crisis and lost control over our wastes. Others authors, by contrast, take a less dim view of the situation. They question the novelty of the so-called “waste crisis” (O’Brien 2007), arguing for instance that waste has always been problematic and that, while the challenges it poses have changed over time,

humans have also adapted their responses accordingly (Rathje & Murphy 2001). Discourses on waste, they stress, have a strong moral character, which tends to eclipse key material aspects, thereby producing vain debates and ineffective measures. In addition, the critique of consumerism fails to account for actual discarding practices, which are usually more diverse and complex than what the concept of a “throwaway society” suggests (Gregson et al. 2007; Evans 2012).

Whether or not contemporary waste should be considered a unique phenomenon, the responses it has elicited from humans in recent history are in many ways different from those of bygone ages. A major strand of research, to which historians have arguably contributed the most, addresses the emergence of waste as a nuisance and a public problem requiring state intervention. It traces the birth and advent of ideas and technologies devised to remedy or solve it, such as sewers (evacuate), incinerators (burn) and landfills (bury) (Blumberg & Gottlieb 1989; Gandy 1993; Melosi 1981). As these studies make clear, the definition of waste and the determination of its proper management are issues that bring social actors' competing interests and agendas to the fore. They are arenas for the expression of political struggles, in which citizens, public interest groups, private corporations and state authorities often oppose each other and strive to impose their views. Here again, the material and symbolic or metaphorical dimensions of waste must be considered together (Mazzolini & Foote 2012).

Samantha MacBride (2011) does this in the case of recycling, for instance. She asks why curbside collection programs in the US are celebrated as an environmentally friendly endeavor when, as she painstakingly demonstrates, they have little positive impact on overall resource utilization or pollution prevention. Her answer is that this can be attributed to corporations' collective scheme for protecting their own interest by diverting public attention away from some fundamental problems and effective solutions. Disposables, in particular, allow corporations to externalize part of their costs (see also Liboiron 2014), so corporations seek to avoid proposals aimed at eliminating disposables or making the industry pay for them. Waste management companies collaborate on that front. Foregrounding recycling allows them to obscure the fact that their main line of business is disposal, and by far (Asmatey 2013). In other words, it makes for good greenwashing. Geographer Josh Lepawsky (2012) observes a similar phenomenon with regard to e-waste.

North American legislation, he notes, is based on an approach to e-waste as a form of postconsumer waste. He makes the point that this end-of-pipe approach emphasizes the harmful impact of consumption and simultaneously obfuscates that of production. It places the burden of dealing with e-waste on government authorities and local communities, and shifts attention away from corporations. The prevalent focus on postconsumer waste, these authors stress, betrays a back-end approach that exonerates the sectors of manufacturing and mining, for instance.

Both the production and the management of waste are intricately linked to the issues of development, nation building and modernity (Scanlan & Clark 2013; Cooper 2010). In his work on Victorian England, environmental historian Tim Cooper shows for instance that waste featured prominently in debates regarding public health, economic thought, and the social question (Cooper 2009). He calls waste “a legitimating precondition of capitalist modernization” (Cooper 2011:21) in that the elimination of waste both required and spurred technologies that introduced a new type of relationship between humans and their environment. From the first industrial revolution onwards, the concept of waste carried a complex set of ethical meanings about the proper use of resources or the right relationship between society and nature.

Jesse Goldstein (2013) demonstrates for instance that the enclosure movement in eighteenth-century Great-Britain promoted an understanding of common lands as “lands being wasted for want of use”. A dialectic of waste and potential, she argues, is what enabled the transformation of nature into a universal means of production. The concept of waste also brought particular subjects into being and gave or denied them legitimacy and, in so doing, contributed in fundamental ways to the project of modernity (Scanlan 2005).

Though waste and modernity are linked, the nature of their relationship changed with time. Based on an analysis of key texts on waste published in the English-speaking world, Alberto Duman (2013) observes that the category of waste evolved from “a problem to be solved” in the nineteenth century, when being modern involved having the ability to tame or eliminate waste, to “a necessity to be promoted as socially constructive and economically necessary” in the twentieth, when modernity became associated with the generation of vast quantities of waste. In the nineteenth century, sanitary utopias in Europe emphasized the problematic nature of filth and the necessity to rid bodies, dwellings and cities of it, whereas in the

twentieth century consumerist dystopias in North America denounced the constitution of a society that celebrates excess and disposability. Both dimensions remain with us and can still be observed in the way waste is approached today, in and beyond the Western world. For instance, Switzerland, my country of origin, ranks as one of the most economically developed countries in the world and is regarded by many as a beacon of modernity. It not only possesses the technology necessary to deal with waste efficiently but also produces massive amounts of waste. This is obvious if we look at e-waste: Switzerland has pioneered the study of this “waste flow” and the development of dedicated recycling techniques. The Swiss collection and recycling system serves as a model worldwide (Streicher-Porte 2006)¹⁹ and Swiss environmental scientists and engineers have served as advisers, in particular to developing countries (Widmer et al. 2008). At the same time, Swiss consumers are among those who generate the largest amount of e-waste in the world, namely an annual 26.3 kg per capita (Baldé et al. 2015:67). The transition described by Duman (from modernity as the capacity to control waste to modernity as the capacity to generate waste) also took place in China, albeit in different configurations to those found in the United States or Western Europe. In major Chinese cities, for instance, the sanitary ideal emerged as soon as the late 1900s, in connection with colonization (Rogaski 2004), but mass production, consumption and elimination only took hold of the country towards the end of the twentieth century (Goldstein forthcoming), that is, much later than in Western countries or even Japan.

A major concern among scholars interested in waste-related phenomena is the impact of pollution, especially industrial pollution, on affected individuals, groups and communities. Much of this work is informed by an environmental justice perspective and shows that pollution is unequally distributed, with poor countries bearing a bigger burden than rich ones and underprivileged people everywhere being more exposed to harmful substances, foul air, undrinkable water and the ensuing health problems than privileged ones. Some

¹⁹ Actually, it is estimated that only 60 percent of e-waste is collected and recycled in Switzerland, but that counts as a high figure (Baldé et al. 2015:44).

authors denounce the export of hazardous waste from "developed" to "less developed" countries (Clapp 2001, Pellow 2007, Moore 2011). Others point out that contaminants affect disadvantaged people more than others, because waste is usually expelled from centers towards peripheries, which is where most disadvantaged people live (Brown & Mikkelsen 1990, Pellow 2004). In many cases, they note, the dumping of waste or the siting of waste facilities leads to struggles between communities, governments and corporations. Others yet look at how communities affected by pollution deal with it, in other words how they: learn to live with contamination and the associated stigma; work towards internal and external mobilization; and seek justice and reparation (Little 2014, Kirby 2011).

Another key topic in discard studies, and one that is related to the previous one, is the circulation of waste on a global scale. With the advent of a global waste trade in recent decades, many authors have concerned themselves with studying how discarded objects flow, especially from "developed" to "emerging" or "developing" countries (Alexander & Reno 2012; Gregson & Crang 2015; Minter 2013). They highlight that global markets for recyclable waste, or scrap, cannot be understood only from the angle of environmental dumping, as they are much more complex and diverse. Certain social actors manage to extract economic benefit from discarded objects by subjecting them to a series of displacements. Three of these are central: trade (from one individual or group to another), transport (from one place to another) and transformation (from one state to another). In other words, waste can become a valuable commodity again through changes in ownership, spatial position and material properties. Discarded objects take on new meanings and moral connotations as they are exchanged, displaced and reshaped, and the same goes for the humans that come into contact with them. Re-commodification is an ambivalent process that entails both opportunities and risks. Issues such as renewed goods' origins, authenticity or quality, for instance, regularly become cause for concern and bones of contention. Similarly, trust and reputation are always at stake in dealings on the scrap market.

The revalorization of waste through its circulation is a reality, but it is also an ideal or a project. Waste management experts throughout the world recommend making material flows more "circular" so as to solve many of the problems faced by contemporary societies, from growing resource needs to pollution. Many governments, including the Chinese government, have already adopted policies and regulations that promote a more "circular"

economy. Concepts borrowed from the field of industrial ecology, such as “closed loop” and “zero waste”, have become global buzzwords that signal ambitious attempts at increasing resource efficiency and thereby both protect the environment and boost the economy. Yet, in practice, the circular economy suffers serious limitations. Scholars who have critically interrogated the project in the European context (Gregson et al. 2015, Kama 2015) note, for instance, that it promotes the circulation of resources within national or regional boundaries and restricts outbound flows. It thus forecloses the use of global recycling networks for recovering waste as resources, even though those networks are already achieving circular economies of their own (Gregson et al. 2012). The circular economy should therefore be examined from not only a strategic and an economic point of view but also a moral and a political one.

A final dimension explored at length in the literature and relevant for this thesis is that of waste as livelihood. Studies of the individuals and communities that support themselves through collecting, picking, transporting, sorting and processing rubbish abound (see, e.g., Medina 2007; Sicular 1992; Zimring 2009). They focus on the social stigma attached to waste work, the marginalization of the people who perform this type of work, and the associated poor conditions these people generally work and live in (on China, e.g., see Yang Lichao 2016; Wang Jiuliang 2016). This body of scholarship is informed by, and contributes to, a broader and deeply anchored tradition in the social sciences that concerns itself with the study of social exclusion, poverty and oppression. In connection with the Global South, it reveals, for instance, that so-called “informal” actors dominate waste collection, sorting and processing, and yet are excluded from official programs and policies for urban planning and economic development (Cavé 2014; Furniss 2010; Gidwani 2015; Scheinberg 2012), and often replaced with corporations (Furniss 2012). At the same time, waste workers should not be seen as incapable of getting a grip on the situations they are in. They also make decisions for themselves and devise strategies to cope with their fate. In his account of a sanitary landfill in the United States, Reno (2016) shows for instance how workers defy their company’s rules and their superiors’ orders by stealthily salvaging objects from a fungible mass of rubbish and conferring on them new roles and significance. Through this “individuation” of objects, as Reno calls it, workers: give meaning to their daily activity, claim control over their bodies and surroundings, and transcend their condition as low-skilled, low-wage and low-status individuals. In short, they regain some degree of power over their lives.

1.1.2 Analytical tools

In terms of theory and methodology, the community of researchers involved in discard studies has a great debt towards sociologist and social theorist Zsuzsa Gille (2007), who is among the few to have attempted to provide a blueprint for the study of waste. Crucially, "materials are not 'born' to be waste", Gille tells us, "they are transformed into waste by identifiable material and social processes. Therefore, the focus must shift from waste as a certain kind of material to the activities from which waste emerges" (p. 18). According to Gille, waste has three dimensions, a spatial, a temporal and a material one, and all three need to be taken into consideration and explored (p. 19). Spatially, what characterizes waste is that it is not found in the same places and categories as other objects. The spatial segregation of waste is indicative of how it is valorized. Temporally, waste should be looked at as a process, something that unfolds or changes with time. In capitalist societies, Gille writes, "the chief waste circulation pattern [...] is [...] the metamorphosis of waste as unutilized excess into waste as pollution" (p. 32). Last but not least, materially, waste has particular characteristics, which produce effects on the world. In that sense, waste has agency. In its contemporary forms, Gille stresses, waste is much harder to treat than in previous eras. It requires more complex technologies and modes of organization, including on a global scale. Gille insists that the material and social realms are always entangled in waste, which, in her words, makes waste a "hybrid" entity. Finally, she proposes a single, encompassing concept for the systematic study of waste in historical or geographical context:

"What appears to be unique in different time periods and different societies are the types of waste produced [...]; the key sources of waste production [...] and the dominant mode of waste circulation and metamorphosis; the socially and culturally determined ways of misperceiving waste's materiality; the ways in which, as a result, waste tends to 'bite back'; the cultural, political and moral inclinations to resolve waste's liminality [...]; and, finally key struggles around waste [...]. To systematically study these patterns, I propose the term 'waste regime.'" (Gille 2007:34)

Parts of Gille's conceptual framework have been applied fruitfully to the study of e-waste. Mary Lawhon and Djahane Salehabadi (2013), for instance, refer to Gille's work explicitly and borrow her concept of hybridity — though they prefer to speak of "sociomateriality". These authors observe that e-waste's material characteristics are a key factor underpinning exports from rich to poor regions of the world:

“What challenges us in the case of e-waste emerges from the need to consider these components together, and the consequent need for the separation and management of the different components. This material complexity results in a situation in which efficient separation is critical to obtaining maximum value. Efficient separation has generally been found to be best obtained by dismantling and separating the waste manually [...] the sociomateriality [of e-waste] has consequences not just for whether goods can be made into new goods, but for who may profit from doing so. [...] labour-intensive manual dismantling is preferable for some parts of the e-waste recycling process. This [...] has led to extensive recycling in the global South.” (Lawhon & Salehabadi 2013:20)

Lawhon & Salehabadi analyze the regulations that have been put in place in Germany and South Africa to deal with e-waste and note that:

“there is a similarity in the politico-economic implications of any regulatory change. These similarities are based on the material properties of e-waste, which have arisen out of particular social processes of design and production. In Germany, there is a movement toward a division of labour in which higher value processes occur in the formal sector in the global North. In South Africa there is a similar movement of high value processes out of the hands of the small informal sector and into established industries, particularly those with already significant market shares.” (ibid.:29)

Those who seek to govern e-waste through regulation grapple with its complex sociomateriality and the fact that it is fundamentally a dynamic category. In some context, e-waste is toxic, in others it is not (see also Wynne 1987). Under certain conditions, e-waste can be reused, under others it cannot. Regulations, as relatively rigid policy instruments, struggle to take this into account. They therefore tend to reduce e-waste to something specific, well-delineated, immutable and immobile. By doing so, they also restrict access to e-waste to a certain category of actors (referred to as “formal” in the above excerpt) and prevent other (“informal”) actors from engaging with it, at least in regular and lawful ways. Furthermore, Lawhon & Salehabadi contend, regulations’ incapacity to deal with e-waste’s complex sociomateriality causes them to lack effectiveness — or, as they write: “regulations consider the category of e-waste as fixed (stable/held) and therefore fail to fix (repair/order) the problem they are intended to resolve” (Lawhon & Salehabadi 2013:21).

1.2 Why “formalize”?

In this thesis, my aim is to give an account of how e-waste presented itself as a social problem in China during the mid-2010s and identify and analyze some of the solutions that

have been put forward to solve it. My main focus is on state action, which I shall approach through both policy analysis and ethnographic fieldwork, thereby combining a top-down with a bottom-up perspective. As the anthropology of policy has shown (Shore & Wright 1997), policies generally appear as neutral tools that merely promote effectiveness and efficiency, when they are in fact fundamentally political ones. Policies categorize, give a status, classify, shape and order people, things and places. But only few people are aware of the processes at work, and fewer yet have control over them. Policies raise issues that lie at the heart of anthropology: norms and institutions; ideology and consciousness; knowledge and power; rhetoric and discourse; meaning and interpretation. My main aim, here, is therefore “to expose the political effects of allegedly neutral statements about reality” (Wedel et al. 2005:37) by analyzing the origins, content, instruments, target populations, implications, effectiveness, and reception of China's e-waste policies.

My decision to orient my research in this direction was partly influenced by timing. From the early 2000s to the early 2010s, China went through a long phase of policy experimentation and development with regards to e-waste. When I embarked on fieldwork in the mid-2010s, that phase had come to an end. The Chinese central government had adopted and implemented several key regulations, and local government had been enforcing them for some time. It was therefore possible to see in which direction the country was heading and with what effects.

One aspect stood out clearly: the Chinese government's e-waste policies were intended and expected to bring about profound changes. In late twentieth and early twenty-first century China, the bulk of e-waste was handled by self-employed individuals, family businesses and micro and small enterprises governed, if at all, by local governments at a low administrative level (village, township). These individuals, enterprises and state authorities were closely associated with the “e-waste problem”, accused of greediness and corruption, and made responsible for environmental degradation and rulelessness. In the 2000s, the central government intervened and embarked on a program to transform China's e-waste recycling sector, which basically involved setting up a regulatory and bureaucratic system, and progressively replacing existing protagonists with new, larger ones, on which state control could be exercised more easily. The process of “formalization” (*zhengguihua* 正规化), as it is often referred to, extended well into the 2010s. It is widely alleged and believed, by not only

Chinese (see, e.g., Tong & Wang 2012:114) but also non-Chinese experts (see, e.g., Baldé et al. 2015:42), to play a key role in reducing the environmental impact of e-waste. Indeed, the necessity to protect the environment is the major justification for this policy move.

Assuming this to be true, one would expect the measures taken as part of this program to be of a certain nature and to do certain things. First, one would expect them to be based on a thorough assessment of material flows: which devices, components or materials go where, in what quantities, how are they dealt with and by whom? Second, one would expect them to take into account basic and widely accepted ecological principles, such as the 3Rs principle²⁰, which states that waste must be managed first through reduction (avoid creating objects likely to turn into waste), reuse (put objects through various cycles of use) and only then recycling (recover materials from waste). Finally, one would expect these measures to lead to an unambiguous reduction of e-waste's overall ecological footprint. My empirical observations, however, reveal a different picture. As we shall see, the Chinese government's approach is largely borrowed from abroad and few of the measures it took are informed by empirical studies of the situation on the ground in China. This approach ignores, does nothing to promote, or even obstructs practices widely acknowledged as environmentally desirable, first among which is product reuse. Finally, whereas some official measures (e.g. more stringent pollution control requirements) are clear steps forward, others (e.g. the imperative to recycle e-waste through destructive processes) go in the opposite direction.

If formalization is first and foremost about “environmental protection” (*huanjing baohu* 环境保护 or *huanbao* 环保), then how do we account for the above contradictions? Could it be that there are other rationales as well behind this project? If so, what are they? Which other factors are likely to contribute to driving the transformation of e-waste recycling in China? What is expected from this transformation besides cleaner streams and fields, less odorous air, and fewer contaminated bodies? And if something else is expected, then how to account

²⁰ See, e.g., “The ‘Reduce, Reuse, Recycle’ Waste Hierarchy”, *Conserve Energy Future*, [no date]. URL: <https://www.conserve-energy-future.com/reduce-reuse-recycle.php> (accessed January 26, 2018).

for this prevalent focus on the environment and its quality? Why does it make sense for most people to approach China's e-waste revolution, so to say, from this angle? Those are the research questions that guided me throughout this PhD research.

Luckily, I did not have to start from scratch. In several emerging countries, the same kind of phenomenon as formalization was at play and scholars before me had already scrutinized it. Mary Lawhon (2012a, 2012b), for instance, carried out extensive research on what she calls the South African "e-waste transition". In her work, Lawhon stresses that transition theory and practice adopt an apolitical take on socio-technical transitions. But those processes, she argues, based on insights from political ecology, necessarily involve a "contestation over power" and therefore "winners and losers". In particular, Lawhon demonstrates that actors belonging to the so-called "informal" sector were left out of discussions conducted, and instruments created, to bring about the e-waste transition in South Africa. Other researchers come to much the same conclusion with regards to India (Laha 2014; Laser 2016; Reddy 2015) and China (Lora-Wainwright 2016). Together, these authors point to mechanisms of exclusion or even dispossession in what is generally considered to be an entirely harmless and beneficial sector upgrade. They also make another argument, which is that the specificities of each country or area are often disregarded by policy-makers and their advisors, who tend instead to borrow models from abroad, regardless of whether those models fit the local, regional and national context or not. With regard to South Africa, Lawhon (2013) observes that environmental justice and ecological modernization discourses were imported into the discussion on e-waste and the e-waste transition. She argues that both discourses "are underpinned by (often implicit) assumptions regarding technology, the state, and the global economy which [...] do not apply" to South Africa. According to her, these discourses have a "limited utility when translated out of their original contexts to South Africa and other similarly dynamic middle-income countries" (p. 700-1).

The two aspects (exclusion of informal actors and policy transplants) are rather nicely brought together by Rajyashree Reddy (2015), who studied the *Indo-German-Swiss E-Waste Initiative* (IGS), a program aimed at improving e-waste recycling in Bangalore, from 2006 to 2008. Reddy deplores the fact that the foreign experts who participated in this program showed little interest in working from the ground up by collaborating with the existing

(informal) actors and instead sought to replace them with a large (formal) company that had only recently become involved in e-waste recycling. He makes two arguments:

“First, I argue that the well-intentioned improvement scheme devised by IGS experts to make Bangalore’s e-waste disposal practices sustainable and safe, by failing to adopt a plural understanding of environmental justice and by giving a large e-waste company preferential access to e-waste generated in Bangalore’s premier IT enclaves, reproduces the injurious, anti-poor effects of ‘bourgeois environmentalism’ [...]. Second, I argue that as the direct consequence of this the survival of recyclers who pioneered e-waste recycling in Bangalore was undermined, leading to their expulsion from the city’s most lucrative circuits of e-waste. Dispossessed of their sources of e-waste, these recyclers were constituted as abject residents of the city.” (Reddy 2015:166)

The insights presented here raise an additional set of questions. Why are imported concepts, theories and policy models shaping the e-waste transition in emerging countries? What makes them attractive? And why does the reality on the ground tend to be neglected by policy-makers and those who advise or try to influence them? How come regulations are put in place in emerging countries that ignore preexisting actors or even aim at doing away with them? What are the rationales behind this? What prevents experts from engaging with them and entrusting them with at least some of the many tasks involved in e-waste recycling? Finally, and most importantly, did the same phenomenon take place in China too?

Research by Lawhon, Reddy and others suggests that negotiating an e-waste transition in South Africa or India requires more than tackling recycling as a technical problem and finding appropriate solutions — though it does require that as well. Similarly, there seems to be more at stake in the drive to “formalize” e-waste recycling in China. Those endeavors are both more ambitious and of greater significance. They call for profound changes and a broad improvement: new models are being sought, old ways of doing are being reviewed, some social actors are being replaced with others, all this with the idea that what lies ahead or can be found elsewhere is preferable to what is already available here and now. Those aspects of the e-waste transition strongly evoke the notion of modernization. Thus, it seems justified to approach the phenomenon from that angle.

What it means to be modern is a concept that has changed over time. But it has always involved admiration for powerful people or nations. During the twentieth and twenty-first centuries, industrialized nations, especially those forming what is commonly referred to as “the West”, served as the main model.

“The Western experience of industrialization was the model for world industrialization. To become modern was to become something like Western industrial society. Non-Western societies were not always given much choice in the matter. As formal colonies or informal clients of Western powers, they often found themselves being ‘developed’ in a Western direction before they were permitted to take political control of their own destinies. Once on the way, there was no turning back. But, even where an element of choice existed, it remained the consensus that the only viable form of society in the modern world was industrial society. Only industrial societies could be active agents in the world system. All others must remain clients or dependents” (Kumar 2016)

Modernization is a worldwide process, though one that has different outcomes in every nation or community, depending on the details of the local environment (Poggie & Lynch 1974). The concept of modernization itself, through its wide acceptance, has become the screen through which many of the concerns of the Global South (or its predecessor, the Third World) have been viewed and acted upon. This is why countries like South Africa and India may display similar features to those of China, as they do for instance if we look at e-waste transitions. However, one can only generalize about modernization in emerging countries up to a point. A lot of what I shall describe in this thesis is proper to China and cannot be observed elsewhere, or only in very different and barely recognizable forms. I now turn to a review of the forms and meanings that modernization has taken in China over the course of the last hundred years or so. That should allow the reader to get a sense of the particularities of the Chinese case.

1.3 The modernization of China

Here, I propose to explore the modernization of China from various angles: (1) history and political economy, (2) social stratification, (3) environmentalism. China’s evolving political economy and political ecology in the twentieth and twenty-first century bears numerous examples of moments when the notion of modernization became central and was invoked to provoke far-reaching transformations.

1.3.1 History and political economy

Historically speaking, the roots of China’s modernization can be traced back to the nineteenth century (Hsü 2000). They are strongly linked to the occupation of major Chinese ports and cities by colonial powers (Japan, Germany, Russia, France and the United

Kingdom). A traditional view among China scholars is that the Western ideal of modernity was very much resisted in China during the nineteenth century (e.g. through the Boxer Rebellion) and that, as a result, China did not modernize, or only to a very limited extent (e.g. with regard to its military) (Rozman 1981). However, key modern ideas found their way into the country during that time, in particular those of progress and hygiene (see, e.g., Rogaski 2004), which soon developed an enormous influence. The late imperial era is also key in that it profoundly altered the Chinese's self-image as members of a great, if not the greatest civilization on earth. China's subjection to colonial powers imposed an unflattering picture of the country that the Chinese people have struggled with for at least a century (Wang Zheng 2014). China may currently be on its way out of this long and difficult soul-searching (Jacques 2012), but until recently its relationship to beacons of modernity was characterized by a constant oscillation between a superiority and an inferiority complex.

It is not necessary, for the purpose of this thesis, to recount every step in China's modernization process. In particular, we can skip the Republican era and look directly at what happened after the Communist Revolution of 1949. The modernization of China ranked high on the list of priorities set by Mao Zedong and his clique. When it became the legitimate ruler of China, the Chinese Communist Party (CCP) launched a series of campaigns to transform the country, including the infamous Great Leap Forward (1958-1962), an economic program designed to surpass the achievements of Western industrialization in an accelerated timeframe. The Great Leap Forward had catastrophic consequences: it caused a nationwide famine, which lasted until well after the campaign ended and took the lives of millions of Chinese (Dikötter 2010). Mao's attempt at propelling China to the status of fully industrialized country also proved particularly wasteful (Goldstein 2006 and forthcoming). The campaign mobilized people throughout China for the economic development of the country and framed the scavenging of large quantities of scrap iron and steel as a patriotic duty for every citizen. As a result, all kinds of objects, many of them still usable and useful (e.g. frying pans or farming tools), ended up in small furnaces that struggled to attain high temperatures and therefore produced mostly useless metal mush. This wastefulness stands in stark contrast to the thriftiness that the Communists promoted among, and expected from, the Chinese population. It reveals, through an arguably extreme example, some of the fundamental inefficiencies that went

along with a rigid, oversized bureaucracy and a planned economy, two main features of the Communist regime.

Twenty years later, a new push for modernization seized China. Following Mao's death and the overthrow of the Gang of Four, the Chinese leadership embarked on a new path by adopting a series of economic and political reforms. Early on, it set four main goals, known as the Four Modernizations, namely to strengthen the fields of agriculture, industry, national defense, and science and technology (Hsü 2000). Though they had been devised by Zhou Enlai in 1963 and enacted by Hua Guofeng in 1977, the Four Modernizations quickly came to be seen as the brainchild of Deng Xiaoping, who served as head of the Communist party from the late 1970s to the late 1980s (and continued to play a central role thereafter). They were designed to make China a great economic power by the turn of the century. Once again, the rationale was very much that China needed to catch up with industrialized countries. However, unlike the Great Leap Forward, which rested on a Stalinist industrial development approach, the Four Modernizations aimed at fostering balanced growth and consumerism. Deng laid great emphasis on education and many Chinese students were sent abroad in the late 1970s and early 1980s to receive Western training (Englesberg 1995) and later come back with key skills and knowledge.

Starting in the late 1970s, Deng adopted a series of policies that radically transformed the Chinese economy. His program, known as "Reform and Opening" (*gaige kaifang* 改革开放), involved introducing market principles in China and integrating the country into the global economy. During that period China experienced what Barry Naughton (2007) calls a "dual transition": (1) from a predominantly agricultural and rural society to an industrialized and urbanized one; and (2) from "bureaucratic socialism" to market economy. It is often remarked that China's development during the reform era is quite unlike that of other countries that transitioned from socialism to capitalism during the last decades of the twentieth century. The difference with the Soviet Union, in particular, is striking: Mikhail Gorbachev's *perestroika* and Deng Xiaoping's Reform and Opening had similar origins but very different effects on their respective countries' economies. Both efforts occurred in large communist countries attempting to modernize their economies, but while China's GDP has grown consistently since the late 1980s (albeit from a very low level), national GDP in the Soviet Union and in many of its successor states fell precipitously throughout the 1990s.

Naughton attributes the uniqueness of China's recent development to a confluence of three factors: structural, transitional and traditional. Structural influences are China's socialist past which has provided advantages such as controlled population growth and a broad base of health, education and skills; transitional factors include the gradualist approach to reform which has protected China from recession and prevented recourse to Naughton calls "market fundamentalism" (the rapid installation of sophisticated market institutions unsuited to local conditions); and traditional factors refer to the revival of Chinese economic relationships, which have emerged from the reform process and put the population back in touch with its heritage of commercialism and entrepreneurialism.

Deng's reforms had far-reaching consequences for the Chinese economy (Lieberthal 2004). They unleashed the entrepreneurial spirit among the Chinese population and spurred the growth of a dynamic private sector, which, as the public sector simultaneously shed jobs, soon became the main generator of new employment. They laid the ground for a consumer revolution that has created a new middle class and made major Chinese cities resemble London, Tokyo or New York. And they increased foreign direct investment, thereby turning China into the manufacturing center of the world.

These were all significant transformations in China's economy. Many predicted that they would trigger similar transformations in the country's political system and regime. But that did not happen, or only to a very limited extent. China's current political system remains authoritarian and hierarchical, as it was almost forty years ago. The CCP has managed to hold on to power and even to design and steer economic reforms in ways that serve its interests (Naughton 2008). Deng's realization that the CCP's survival depended on its capacity to trigger economic growth, and his emphasis on growth as the fundamental principle behind China's new political economy — Deng famously declared that "development is the only iron law" (*fazhan cai shi ying daoli* 发展才是硬道理) — were decisive. None of his successors has deviated from this course. The days of double-digit growth figures are gone, however, and Chinese leaders acknowledge that a deceleration is taking place today — be it only through the euphemistic vocabulary of a "new normal" (*xin changtai* 新常态). However, the CCP's legitimacy and the Chinese people's approval of its policies still rely heavily on growth. This is obvious, for instance, in the fact that estimates of China's annual GDP growth rate are a politically sensitive topic.

Since the middle of the twentieth century, China's economy was largely a dual economy in that it was characterized by a profound rural-urban divide (Naughton 2007). In a sense, China's rural-urban divide had existed for centuries, but it was made worse by Mao and his policies. The household registration system (*hukou* 户口), in particular, which divided people into two categories (rural and urban) and tied them to their place of residence, created two very different economies. In the urban economy, on the one hand, one could find permanent employment, government supplied housing, pensions, and education, all of which benefited from considerable state investment. In the rural economy, on the other hand, state investment was scarce, and the population had to rely on its own resources. Very different conditions prevailed in the two ends of this dual economy. In particular, the rural population was much poorer than its urban counterpart. After Mao, the Chinese government relaxed the rules and controls on intranational movements of people. Rural dwellers started to leave the countryside en masse to look for paid work in cities. But the system remained rigid and complex, so, in the last twenty to thirty years, millions of "migrant workers" (*nongmingong* 农民工) have been living outside of the areas where they are officially registered, with far-reaching implications for their legal rights, access to public services, and living conditions.

1.3.2 Social stratification

This brings us to the question of how modernization played out in Chinese society. If we focus on the reform era, the answer is: through the notion and phenomenon of a middle-class in China. According to sociologist Jean-Louis Rocca (2017), social stratification changed dramatically in the wake of the reforms of the 1990s and a new category of people, the "middle incomers" emerged in urban areas: "They were wage earners, urban, skilled, playing a crucial role in the functioning of the new economic sectors. They were running the economy without being in a dominant position" (p. 5). For Rocca, the middle-class is closely associated with the project of modernization in China:

"From the outset, members of the middle class have been defined in a certain way, as adopting new moral values and new standards of behavior. They are supposed to **facilitate the modernization process in all aspects of social life**. They are perfect consumers and perfect citizens, open, well-educated and honest people, ready to defend their rights, but at the same time they are moderate protesters. In essence, they **constitute an ideal class**." (Rocca 2017:6, my emphasis)

In present-day China, Rocca tells us, modernization is portrayed as relying on the middle-class, requiring its development, and spreading its influence throughout society: “Only the middle class, or more precisely the growth of the middle class, can civilize China. The middle class is associated with culture (*wenhua*), civilization (*wenming*), ‘quality’ (*suzhi*)” (p. 6). It both incarnates and serves the Chinese Party-State’s project to “civilize” all social behaviors and forms the “core of the ‘civilizing process’”, Rocca contends (*ibid.*).

Representations of migrant workers, and people with rural origins more broadly, offer the reverse image: they are considered as “lacking culture” (*mei wenhua* 没文化), being “uncivilized” (*bu wenming* 不文明) and “of low quality” (*suzhi di* 素质低)²¹. In other words, they are portrayed as obstacles rather than assets to modernization. In China, local origins — not race, religion, or nationality — define ethnic identities among the overwhelmingly Han population. The origins of the discrimination and stigmatization of individuals and groups from the Chinese countryside go back a long way (see, e.g., Honig 1992 on the Subei people in Shanghai). To this day, these people are routinely looked down on and treated with disdain. In her study of a village in Henan Province, anthropologist Lili Lai (2016) observes that the Chinese countryside is seen as antithetical to modernity and argues this has far-reaching consequences for its inhabitants. The villagers she studied, for instance, still lacked a functioning sewage and waste management system in the 2010s, even though they had nothing to envy their urban compatriots in other areas, including car ownership. Lai speaks of a process of “uncanny modernization”, by which “rural areas have kept pace with the cities in the process of national modernization, but only on ‘the other side’ of recognized progress: the rural is that which has been contained and concealed within China’s much-vaunted large-scale urbanization” (p. 17). At the same time, however, Lai stresses that villagers resist their reduction to the status of non-moderns. For her, “the stigma of peasant-

²¹ Recently a new, equally disparaging expression has been used to refer to these people, namely “low-end population” (*diduan renkou* 低端人口).

hood is not so much victimizing as it is productive: it generates unique forms of life and structures of feeling for both villagers and urbanites” (p. 18).

In present-day China, social distinction is often expressed through the language of “quality” (*suzhi*). A person’s perceived “quality” depends on her position within social, geographic and economic orders, and a whole range of factors serve as criteria for assessment, including: education, experience, outlooks, appearance and morality (Kipnis 2006, Jacka 2009). People of rural origins in China generally have lower levels of formal education and are less wealthy than their urban counterparts, so they are also more likely to be considered as being of “low quality”. *Suzhi* discourse is an integral part of the modernization process. In public education, for instance, it is put to work in ways that help state institutions implement policies such as accelerating demographic transition, restructuring the education system, professionalizing labor markets, promoting agricultural skills training, instituting economic liberalism and carrying out patriotic education (Murphy 2004), and it reduces the costs of policy enforcement for the state. In other words, *suzhi* discourse is also a mode of governance that the state uses to discipline its subjects.

1.3.3 Environmentalism

From an environmental perspective, the roots of China’s modernization can be traced back to the Maoist era, which established a new type of relationship between humans and their natural surroundings. In her book *Mao’s War Against Nature*, Judith Shapiro (2001) investigates the environmental costs, both intended and unintended, of various political campaigns that characterized the early history of the Communist regime. The Anti-Rightist Campaign (1957), Shapiro notes, silenced original thinkers who had warned of the dangers of rapid population growth. The Great Leap Forward (1958-1962), as we have seen above, mobilized people in a utopian frenzy to catch up with the developed West and plunged the country into the worst famine in human history. The Cultural Revolution (1966-1976) celebrated villages like Dahai, where the post-famine search for grain self-sufficiency had led to hills being turned into grain fields, which ultimately triggered much land reclamation from lakes, wetlands, and forests throughout the country. Finally, the Third Front Movement (from 1964 onwards), an initiative motivated by national defense considerations, relocated a large part of China’s industry to the interior, that is, to places that had not been affected by pollution until then. Through her analysis of those four campaigns, Shapiro

argues that political violence raged side by side with violence against nature. Mao Zedong was instrumental to the environmental modernization of China, because he sought to abrogate the traditional Chinese ideal of “Harmony Between Heaven and Humans” (*tian ren heyi* 天人合一) and replace it with the injunction that “Humans Must Conquer Nature” (*ren ding shengtian* 人定胜天). Mao and his following waged a “war” to bend the physical world to human will and that, as Shapiro demonstrates, had disastrous consequences both for human beings and the natural environment.

The scale of the environmental degradation that ensued from China embracing Mao’s revolutionary ideals is stunning. In his appraisal of environmental change from the Communist Revolution of 1949 to the early 1980s, Vaclav Smil (1984) leaves little room for hope. He brushes a picture of sweeping damage caused by thirty-plus years of massive population growth, irrational agricultural policies and misguided industrialization, all of which problems that, he stresses, were compounded by bureaucratic blunders and indifference to ecological consequences, opportunism, corruption, and waste at all levels. Smil painstakingly demonstrates that the advent of Communism in China opened Pandora’s box as far as the environment is concerned.

Indeed, the destruction of nature in China became even worse during the reform era, when China experienced an unprecedented economic boom. Fast-paced growth and ubiquitous development took a serious toll on the environment, aggravating most of the problems the country was already facing and creating new ones (Economy 2010). At first, China’s increased economic activity focused on exports and was driven by foreign direct investments. That led to the country assuming a considerable part of global manufacturing activities and, by implication, a disproportionate environmental burden (Shapiro 2012, Minter 2013)²². Later, the problem was compounded by domestic factors, including a boom in real estate development, a revolution in transportation, and the advent of mass

22 Of course, this new, globalized distribution of labor impacted not only on the Chinese natural environment but also on society (see, e.g., Pun 2005 and 2016, Harney 2008).

consumption. Starting in the 1990s, the situation became a source of concern in connection with not only China but the entire planet and its inhabitants (Watts 2010, Shapiro 2012). In her book *The River Runs Black*, Elizabeth Economy (2010) argues that “China's leaders were well aware that they were trading environmental health for economic growth” (p. 18). They did so because they hoped economic growth would strengthen the CCP's legitimacy. At the same time, they may not have foreseen that environmental issues would become one of the main areas of political contention in China.

With the rapid worsening of environmental degradation, concern over environmental issues progressively built up throughout Chinese society. In a growing number of cases, popular discontent expressed itself through protests.

“Perhaps most threatening to the Chinese leaders, protests over polluted waters, damaged crops, air pollution, and forced resettlement contribute to the increasingly pervasive social unrest already confronting them. Top leaders have commented on the danger that environmental protest poses to the authority of the Communist Party and the stability of the state.” (Economy 2010:19)²³

Western observers started studying mounting grassroots environmental activism in China in the 2000s. They observed that Chinese state authorities tolerated popular discontent to a much greater degree when it was expressed in connection with environmental degradation than with other issues. That gave many of them hope that social movements might act as a driver of environmental improvement in China, much as they had in Western countries (Yang 2005, Mol 2006, Zhang and Barr 2013, Hilton 2013). Some even announced the “rise of a green public sphere” (Yang & Calhoun 2007). A decade later, however, the picture seems

²³ Contemporary forms of environmental protest take on an even greater political significance if we read them through the lens of China's long-term history. According to a belief known as “The Mandate of Heaven” (*tianming* 天命), Chinese Emperors had the task of ensuring order in both the human and the natural worlds. Disruptive events, such as floods or famines — Northern China's recent bouts of heavy smog would certainly qualify as well — were often interpreted as expressions of Heaven's displeasure with a given Emperor and signs that his authority could or should be challenged.

rather different. While some scholars celebrate what they see as “a new repertoire of contention” in environmental protests (Steinhardt & Wu 2015), others stress that the largest part of the Chinese population does not engage in environmental activism (Lora-Wainwright 2013) and that many of those who do are not really in a position to exert pressure on companies or state authorities (Lora-Wainwright 2017). New mechanisms for public participation in enforcement of environmental regulations have been put in place, but at the same time, studies show that citizens’ influence on decision-making processes remains limited (see, e.g., Johnson 2013a) and they still stand little chances of winning environmental cases in courts (Stern 2013). As for environmental NGOs, political scientist Wu Fengshi (2009) summarizes the situation as follows: “Though there is consensus that the scope of the environmental NGO community is growing fast in China, scholars disagree on the political interpretation of them as a whole in terms of both their autonomy from state penetration and the nature of their interaction with the state” (p. 391). In any case, it seems that the rise of a green public sphere in China has been slower and less prevalent than expected, and severely restricted and controlled since Xi Jinping took office²⁴. Nowadays, the Chinese population can only engage freely in environmental activism as long as it does not question political authority.

Growing concern about environmental degradation during the reform era, accompanied by mounting environmental activism, led to the adoption of policies aimed at preventing or slowing down the collapse of the country’s natural fundament. Pollution became hard to ignore, deny or downplay. The Chinese Party-State therefore moved aggressively to establish formal institutions, draft laws, and undertake large-scale programs in the name of environmental protection (Economy 2010, Shapiro 2012). Recent milestones in this evolution include: the upgrade of the central government agency in charge of environmental

24 “As It Looks to Go Green, China Keeps a Tight Lid on Dissent”, *Yale Environment* 360, November 2, 2017. URL: <http://e360.yale.edu/features/as-it-looks-to-go-green-china-keeps-a-tight-lid-on-dissent> (accessed January 26, 2018).

protection to full ministry status in 2008²⁵; Premier Li Keqiang's speech in front of the National People's Congress, China's national legislature, in which he "resolutely declare[d] war on pollution" in 2014; and, that same year, the recast of the country's national Environmental Protection Law, which now has more teeth and is therefore more likely to act as a deterrent for polluters. There is a consensus among China scholars that, in recent years, the country has equipped itself with good environmental laws and that the main challenge now lies with implementing those laws (see, e.g. Shapiro 2012:66-67).

Towards the end of the reform era, the Chinese Party-State started making increasing use of environmental concepts and theories that had originally been coined abroad. In particular, it adopted many of those that rest on the idea that the protection of the environment is compatible with the promotion of the economy, or that both are even mutually beneficial. This process started in the late 1990s with the adoption of "sustainable development" (*kechixu fazhan* 可持续发展) (Sustainable Development Strategy Study Group 2007) and continued in the late 2000s with the addition of "ecological modernization" (*shengtai xiandaihua* 生态现代化) (China Centre for Modernisation Research 2007), "circular economy" (*xunhuan jingji* 循环经济)²⁶, "clean production" (*qingjie shengchan* 清洁生产)²⁷ and "green growth" (*luse fazhan* 绿色发展). All of these concepts and theories made their way into official plans, policies and propaganda (Si 2012). The Chinese Party-state clearly joined the international community in embracing and advocating the notion that "the greening of economies is not generally a drag on growth but rather a new engine of growth"

25 Formerly called the State Environment Protection Agency (国家环境保护总局), it is now known as the Ministry of Environmental Protection (环境保护部).

26 "Circular Economy Promotion Law of the People's Republic of China" [中华人民共和国循环经济促进法], August 29, 2008. URL: <http://www.lawinfochina.com/display.aspx?id=7025&lib=law> (accessed January 26, 2018).

27 "Cleaner Production Promotion Law of the People's Republic of China (2012 Amendment)" [中华人民共和国清洁生产促进法(2012 修正)], June 29, 2002 [amended February 29, 2012]. URL: <http://www.lawinfochina.com/Display.aspx?lib=law&Cgid=168382> (accessed January 26, 2018).

(UNEP 2011:abstract). In doing so, it also redefined what it means to be on the path towards a “green economy” (Weng et al. 2015). In other words, it both drew inspiration from environmentalism as it had developed abroad and contributed to changing its contours and meanings (see Hathaway 2013).

This is particularly obvious if we look at ecological modernization. The Chinese version of the concept takes no account of the innovative take on environmental governance that can be found in much ecological modernization literature (see, e.g., Jänicke 2009[1993], Hajer 1997). In this body of scholarship, authors link this concept to the environmentalization of not only state institutions, but also, and more generally, social, political and economic ones. They call for the increased involvement of non-state actors such as non-governmental organizations (NGO), civil society and private economic and market organizations in the promotion of environmental interests and ideas. By contrast, Chinese-style ecological modernization sticks to a state-centered approach in which interventionism and technological progress play the main role, and market mechanisms or citizen participation are not nearly as important (Zhang et al. 2007, Yeh 2008, Chen 2009, Kostka & Mol 2013, Hubbert 2015). For that reason, some analysts speak of the development of “authoritarian environmentalism” in China (Beeson 2010, 2016). In sum, far from making room for “negotiated forms of state intervention” (Jänicke 2009[1993]:38), ecological modernization with Chinese characteristics, so to say, eschews the issue of political transformation and remains true to China’s “very powerful tradition of state sovereignty” (Jacques 2012:263).

In recent years, the language in which Chinese leaders formulate their intention of achieving both a stronger economy and a cleaner environment crystalized around the term of “ecological civilization” (*shengtai wenming* 生态文明) (Pan 2015)²⁸. According to non-Chinese observers (Oswald 2014, Geall 2015), the call for an ecological civilization is not

²⁸ See, e.g., “Communiqué of the Third Plenary Session of the 18th Central Committee of the CPC” [中国共产党十八届三中全会公报（全文）], *China.org.cn*, January 16, 2014. URL: http://www.china.org.cn/chinese/2014-01/16/content_31213800.htm (accessed January 26, 2017).

mere rhetoric. It has been accompanied by a series of concrete measures, including environmental education programs for party cadres, amendments to China's Environmental Protection Law and greater powers to environmental authorities (for a comprehensive list, see UNEP 2016). It is difficult to assess whether these measures, or the ecological civilization program more broadly, have brought any improvement to the quality of the environment in China. In any case, they formulate a program of increasing state power and control in the language of environmentalism.

More interesting perhaps is the fact that the aims pursued by the Chinese Party-state through the promotion of ecological civilization go beyond environmental protection. The last incarnation of a civilizing discourse that dates back to the end of the nineteenth century, ecological civilization serves to produce obedient Chinese citizens on a national level and to gain recognition for China from other powers on an international level. As Geremie Barmé and Jeremy Goldkorn point out:

“The Chinese Communist Party uses the expression ‘civilisation’ (*wenming* 文明) within China to **improve civic standards, promote patriotism, evoke pliable cultural and political traditions and limit dissent**. As China becomes wealthier and more confident on the global stage, it also expects to **be respected and accommodated as a major global force** — and a formidable civilisation.” (Barmé & Goldkorn 2013:abstract, my emphasis)

This is even clearer if we look at President Xi Jinping's signature slogan: “Building a Beautiful China”. Declared one of the Chinese central government's strategic goals during the 18th Party Congress in November 2012, the slogan gained much traction recently, when the president reaffirmed it and gave it a prominent position in his report to the 19th Party Congress in October 2017²⁹. Basically, Building a Beautiful China is synonymous with greening the economy, making development more sustainable, or ecologizing civilization,

29 See “Xi Jinping Delivers Report to CPC Congress, *Xinhua*, October 18, 2017. URL:

http://www.chinadaily.com.cn/china/19thcpcnationalcongress/2017-10/18/content_33398037_5.htm (accessed January 26, 2018).

but it carries an obvious patriotic connotation — one that “Save the Planet”, to take a relevant but very different example, lacks completely.

The Party-State’s propaganda vocabulary betrays the fact that environmentalism in China, like elsewhere, goes far beyond the idea that the environment and the humans who depend on it deserve protection. This a point Jennifer Hubbert (2015) makes quite convincingly in her study of the 2010 Shanghai Expo, which she calls a “green” mega-event. Hubbert analyzes “myths of sustainability in contemporary China” and concludes that environmentalism has become a “master narrative” and a “contemporary form of governance”.

“Expo practices and exhibitions offered an environmentalist message that defined ecological modernization as a function of **technological innovation** and **green consumption**. They posed **members of China’s urban, educated cohort** as the domestic citizenry capable of understanding the problem of the environment and therefore capable of working toward its amelioration. These narratives **depoliticized the terrain of environmental degradation**, decoupling environmental benefits from ecologically harmful current development models, relocating it within politically neutral spaces of technological development and population quality. These narratives also marked **China as a modern and globally significant nation** because of its environmental perspective in ways that **enhanced state and corporate power**.”
(Hubbert 2015:48-49, my emphasis)

By defining “proper green subject” (see Agrawal 2005), environmentalism “links citizens to state and global practices and norms and constructs hierarchies of value and belonging” (Hubbert 2015:31). As Hubbert experiences while visiting the Expo, environmentalism is often associated with *suzhi* discourse in China, in which case people of rural origin or with a low a low level of formal education are described as morally incapable of caring for the environment and made responsible for pollution (p. 42, see also Lai 2016). Environmentalism also acts as a marker of “modern belonging” that positions individuals and nations in a global arena. Here, the logic is fundamentally reputational: being green and high-tech amounts to being modern. The Shanghai Expo gave Chinese leaders the opportunity to display those markers and to position China as a country on a par with global powers — the title of Hubbert’s article, *We’re Not That Kind of Developing Country*, makes that aspect particularly clear. Finally, Hubbert argues that the focus on technology and (individual) morality as solutions to environmental degradation in official discourse in China obscures the fact that this problem results first and foremost from a growth-based

mode of development. By embracing environmentalism, she claims, the Chinese Party-state seeks to sweeten the pill of growth at all costs.

1.4 Political ecology

By now, it should be clear that China's e-waste transition did not take place in a void, or independently from other developments. Rather, it unfolded as one strand of change among others within a broader process that, following emic practice, I have decided to refer to as modernization. As we have seen, this process is fundamentally political, so it must also be approached as such. What tools do we have at our disposal for doing so? What can we draw on? The body of research known as "political ecology" seems to be an obvious starting point.

Paul Robbins (2004) defines political ecology as "an explicit alternative to 'apolitical' ecology" as represented by such approaches as ecoscarcity and ecological modernization, which "tend to dominate in global conversations surrounding the environment" (p. 14). According to Robbins, "politics is inevitably ecological and [...] ecology is inherently political" (p. 3), so environmental changes and issues can only be fully grasped by taking into account both of these dimensions. Political ecology boils down to the study of the political economy of environmental change and is based on the idea that "the secret to understanding environmental problems, struggles, crises, and opportunities lies with being able to read and write the contradictions, the ironies, the winners and losers, and the simultaneously real and represented nature of the world" (p. 252). Political ecology informs much scholarly work on environmental issues in social science (see, e.g., Biersack & Greenberg 2006, Peet et al. 2011), including in geography, anthropology and sociology (see, e.g., Peluso 1992, Escobar 1999, Dürr & Jaffe 2010, Haller 2012). Many of the authors writing on topics or in fields of direct relevance to my research invoke political ecology explicitly (e.g. Tilt 2007, 2010 on pollution in rural China; Little 2014 on EEE-related pollution; Moore 2011, Cavé 2015, Demaria & Schindler 2016 on waste and recycling; and Lawhon 2012 & 2013, Pickren 2014 on e-waste). Though there is no unified definition of political ecology, a consensus has formed around several key elements: cross-disciplinarity; the analysis of environmental and developmental discourses; a focus on power relations and inequality; the identification of links between dynamics and structures at the global and local scales; and political engagement on the part of researchers, who usually express empathy for marginalized populations (Blaikie & Brookfield 1987; Robbins 2004). Political ecology's

strength lies in providing critiques and alternatives in the interplay of the environment and political, economic and social factors. The discipline, Robbins (2004) contends, also starts from a “normative understanding that there are very likely better, less coercive, less exploitative, and more sustainable ways of doing things” (p. 12).

Using political ecology as a theoretical framework pushes one to acknowledge that changes in the environment do not affect society in a homogenous way, and that political, social, and economic differences lead to the uneven distribution of costs and benefits (Bryant & Bailey 1997). It requires paying particular attention to inequalities. A good example of how environmental change can affect some sectors of the population more than others is Emily Yeh’s (2009) study of “ecological construction” programs conducted in the in the 2000s with the aim to protect grasslands and forest in western China. Yeh notes that these programs played a key role in the national project of ecological modernization and the conceptualization of China’s transformation into an environmental state. Having studied their implementation, however, she casts doubt over their environmental benefits and insists that they caused increased social inequality:

“in China’s west, the environmental protection programs that have been celebrated by both Western observers and Chinese proponents of ecological modernization have in many cases had the effect of **further marginalizing already politically and economically marginalized citizens**, while also **producing only questionable environmental benefits**. [...] Though China’s ecological construction projects do reflect an integration of certain environmental logics and rationales into state governance, the environmental rationales are in some cases **not backed by scientific evidence**, and the results often **disproportionately take away access to resources of some groups over others**.” (Yeh 2009:892, my emphasis)

Yeh is staunchly critical toward the Chinese project of ecological modernization. Her analysis of the articulation of this process shows that it does not deliver on the theory’s promise of making economic growth and ecological protection compatible, and that it eliminates reflections around the changing nature of politics and the relationship between state and civil society (p. 892). Her conclusion is that the “greening” of China cannot be grasped using the tools of ecological modernization theory but must instead be approached from the angle of critical political ecology (see Forsyth 2003):

“It is important to understand what forms of knowledge and representation allow ‘the environment’ to come into being as an object of regulation and intervention, and what the implications of these authorized interventions are, not only for ecological outcomes and the

livelihoods of specific groups of affected people, but also for the relationship between the state and different groups of citizens and for the production of new interests and subjectivities. It becomes clear that ecological construction projects in western China constitute a form of reterritorialization, categorizing different kinds of citizens as having different degrees of worth, with some considered to be aligned with the interests of the state at large, and others, seen as marginal to the broader Chinese public, who become the targets of intervention of ecological construction projects. Thus, **new environmental logics in China**, in which there is an incitement to identify as 'green,' **affect both concrete environmental conditions and also enhances profits, productivity and power for some regions and citizens over others.**" (Yeh 2009:893, my emphasis)

Yeh's take on environmental change in China and, through her analysis, the approach of political ecology more broadly, have greatly influenced my thinking. They have brought me to formulate such questions as: Who are the winners and losers in the formalization of e-waste recycling in China? How is the world represented through that discourse, to what effect and with what implications? Which untold political story unfolded behind the apparently straightforward, unambiguous and benign process of formalization? As I will demonstrate in this thesis, China's e-waste transition produced two types of exclusions: first, that of protagonists deemed "informal"; second, that of practices based on reuse. And the two points are very much linked to one another.

1.5 The selectiveness of progress

While formalization benefited certain individuals and organizations, it clearly turned others into outcasts. As a constituent of China's broader modernization program, it turned its back on the very actors that had flourished during the reform era and driven China's economic growth. Self-employed workers, family businesses and small enterprises were excluded from the government's plans for the future, prevented from pursuing their activities, and criticized as being inefficient, wasteful, dirty, immoral and dangerous (Schulz 2015, 2016 & 2017, Lora-Wainwright 2016, Lai 2016). In their stead, formalization welcomed larger entities, capable of interacting with the higher levels of the state apparatus and embodying a brand of environmentalism centered on technological progress and moral correctness (see also see also Furniss 2010 & 2012, Benson et al. 2014, Laser 2016). Formalization aimed at bringing China's recycling sector, which had developed autonomously for thirty years thanks largely to small-scale capitalism and spontaneous entrepreneurship, back under state control and to

make it more bureaucratic. It gave priority to compliance over efficiency: participants were encouraged to follow the rules, but not required to be particularly dynamic, inventive or industrious. That represented a considerable change and posed a serious challenge for the bulk of actors already involved in recycling in China.

Seen from the Chinese state's perspective, the discourse of formalization was about replacing informal entities or practices with formal ones. It reduced the world to two categories and portrayed one as desirable, the other as despicable. Interestingly, Chinese state authorities' attempt to do away with informality in the field of waste and recycling conflicted with recommendations found in the scientific literature, where the so-called "informal sector" is widely acknowledged as making a key contribution to recycling and researchers insist that it should be included into regulatory systems (on municipal solid waste, see Medina 1997, Nas & Jaffe 2004, Wilson et al. 2006, Velis et al. 2012, Scheinberg 2012, Ezeah et al. 2013, Raghupaty & Chaturvedi 2013; on e-waste, more particularly, see Schluep et al. 2009, Chi et al. 2011, Wang et al. 2012, Williams et al. 2013, Reddy 2015). Yet, by and large, the informal sector enjoyed no official recognition and benefited from no integration efforts in China³⁰.

How are we to explain this discrepancy between the recommendations issued by the — largely non-Chinese — scientific experts mentioned above and the measures taken by Chinese officials? More generally speaking, in waste management and urbanism, formalization is largely synonymous with progress. Most specialists in these fields assume that this process can have a globally positive outcome. They expect that it will make waste collection and recycling not only economically more productive and environmentally less destructive, but also socially more just. There is ample evidence, however, that the formal

³⁰ The situation seems to be quite different in other areas of the world, in particular in Latin America, where state authorities in various countries accept to collaborate with scavengers, even to endorse them (Medina 2000, Gutberlet 2008).

economy, just like the informal one, can either increase or reduce injustice and inequality, depending on the context (Fontaine & Weber 2011).

It is rather ironic that formalization should be associated with progress or modernization, for the concept of informality initially emerged as a response to the inadequacy of modernist thinking. It was first put forward by economists and economic anthropologists conducting empirical research on economic development in what was then called the “Third World”, more particularly in Sub-Saharan Africa (ILO 1972, Hart 1973). These researchers realized that what they observed on the ground in countries like Kenya or Ghana did not fit with what modernizationist models and theories³¹ predicted would happen there. The developing world of the 1960s and 1970s experienced urbanization at a rate far exceeding that of growth in employment in modern industry, so the majority of rural migrants who arrived in cities did not join the so-called “capitalist” sector of the economy (controlled by capitalists who use reproducible capital and employ the services of labor). Instead, they landed in some unique, in-between socio-economic space. The inexorable movement from the subsistence sector into the capitalist one, from the countryside into the cities, and from the poorer classes into the middle classes that modernization theory had announced simply did not take place. Anthropologist Keith Hart (1973), who conducted fieldwork in Accra (Ghana) in the early 1970s, famously asked: “Does the ‘reserve army of urban unemployed and underemployed’ really constitute a passive, exploited majority in cities like Accra, or do their informal economic activities possess some autonomous capacity for generating growth in the incomes of the urban (and rural) poor?” (p. 113). His interrogation was genuine, not rhetorical, for he had observed that the urban informal economy in Ghana provided, on the one hand, a certain access to paid labor, which was welcome given the high levels of poverty and, on the other, very low wages, which did little to solve the problem of poverty. Based on his experience in Ghana, Hart called for “a historical, cross-cultural comparison of urban

³¹ See, e.g., Arthur Lewis’s model of economic dualism and Jean Fourastié’s three-sector theory. See also Talcott Parsons’s modernization theory.

economies in the development process” that would “grant a place to the analysis of informal as well as formal structures. It is time”, he argued, “that the language and approach of development economics took this into account” (p. 89).

In many ways, Hart’s call has been heeded. Over the years, the concept of informality has become part and parcel of the official language in which international organizations address economic development in so-called developing and emerging countries. The formal versus informal dichotomy suffuses reflections on the topic (Lautier 2004, Guha-Khasnobis et al. 2006). In the literature on waste in the Global South, for instance, an established practice consists in describing the recycling sector as being divided into a formal and an informal (sub)sector. Most authors use those terms (on e-waste, see, e.g., Chi 2012, Lundgren 2012, ILO 2013 & 2014, Wang et al. 2013; on municipal solid waste, see, e.g. Wilson et al. 2006, Medina 2007, Cavé 2014).

In my view, the dichotomy is of little use as an analytical tool, for it creates more problems than it resolves. First, the definition of what constitutes formal and informal actors and activities is anything but clear. Various criteria have been used to differentiate the former from the latter, including scale or size (large versus small), nature of labor relationships (impersonal versus personal), and degree of subjection to state regulation (strong versus weak). But each criterion is problematic in and of itself, and introduces subcategorizations that does not necessarily overlap. Second, the opposition between formal and informal suggests a clear-cut separation between actors and radical differences in their activities. But empirical studies show that, in many cases, actors interact with each other regardless of the labels ascribed to them (Scheinberg et al. 2010:195, Laha 2014:318) and that the activities of the ones can resemble those of the others. Third, because it covers everything that does not qualify as formal, the category “informal” lumps together actors and activities that, in some cases, have little in common. It therefore lacks coherence. Fourth, the dichotomy is infused with morals: informality (or formality) is always either a good or a bad thing, but never neutral. This is obvious in the way meanings shift: depending on the adopted stance, activities and actors that are simply not monitored, not regulated or not governed by recognized standards are qualified as “clandestine”, “illegal” or “disorganized”, or, to the contrary, “independent”, “free” or “flexible” (Lautier 2004, Guha-Khasnobis et al. 2006, WIEGO 2015). For all these reasons, some social scientists argue that it would be preferable

to abandon the formal versus informal dichotomy altogether (Guha-Khasnobis et al. 2006). I sympathize with this argument, so I shall only use the terms formal and informal in this thesis as emic (not etic) concepts.

In China, researchers and policy-makers are reluctant to acknowledge the existence and size of the informal economy. Very little research has been conducted on the topic and few policies take it into account. This is surprising, notably because China has a very considerable proportion of informal employment, like other so-called developing and emerging countries (Harriss-White 2014). Using official statistics and a series of arithmetic operations — for Chinese statistics say close to nothing about informality directly — Philip C. Huang (2009) managed to calculate that the informal economy accounted for the second largest share of total employment in China in 2006, after farming:

“The informal economy [...] includes mainly the 200 million *nongmingong* plus 50 million informally employed urban residents, or a total of 250 million. While still a somewhat smaller number than the 300 million-odd engaged mainly in farming, it is 2.2 times larger than the number employed in the formal urban economy. [...] in China, as in other developing countries, the informal economy has come to exceed by far the scale of the formal in terms of numbers employed.” (p. 412)

Clearly, the informal economy in China has reached a massive scale (see also Freeman 2015) and there is evidence that it might still be growing (Liang et al. 2016). Its contribution to the Chinese economy in general is crucial and there are good reasons to believe that growth rates in China would not have been as high without it. Yet, the informal economy has been largely ignored and downplayed in China thus far. Huang attributes this to the fact that economic thinking in this country is still largely influenced by classical modernization theory, which leaves little room for the acknowledgement of informality. But the explanation needs to be pushed further. As my case study on e-waste recycling makes clear, the discourse of formalization not only ignored but also denigrated and attacked informal actors and informal activities. It did so, in particular, by constructing them as illicit, immoral and illegitimate. It often kicked in after a period of relative tolerance and was then accompanied by a series of concrete measures that targeted informal actors and activities directly and aimed at eradicating them. This is more than willful ignorance.

1.6 A rhetoric of risks and riches

A second, closely related point I make in this thesis is that formalization in China was informed by a definite and limited vision of e-waste's materiality and the type of sociotechnical interventions this materiality calls for. It promoted that vision and simultaneously obstructed concurrent ones. The fundamental model behind formalization was industrial ecology, whose main tenet is that materials should flow in cycles, i.e. be constantly recovered and remade. Tellingly, proponents of formalization used all the keywords proper to that discipline, including “circular economy” (*xunhuan jingji* 循环经济), “closed loop” (*bishi huanlu* 闭环 or *bihuan* 闭环) and “urban mines” (*chengshi kuangshan* 城市矿山). Industrial ecology's influence came through the predominant global framing of e-waste, which it informs as well (see, e.g., Widmer et al. 2005, Schluep et al. 2009, Hieronymi et al. 2012). According to Chinese formalization discourse, e-waste is simultaneously a form of waste likely to cause severe environmental harm and a source of riches potentially yielding valuable raw materials. It matters because of its content: substances of various types, some of which are thought to remain beneficial to humans, whereas others are deemed to become detrimental. In line with this representation, the only appropriate material intervention consists in neutralizing and recovering the chemical elements and compounds e-waste is made of. Recycling (*huishou liyong* 回收利用) comes to mean “pollution control” (*wuran kongzhi* 污染控制) and “resource renewal” (*zaisheng ziyuan* 再生资源), and nothing else.

I call this a definite and limited vision because recycling can, and often does, have a broader meaning. Other framings of e-waste's materiality can be encountered, and other forms of material engagement observed on the ground as well. Repair, refurbishing, repurposing, reuse, resale, for instance, are anything but marginal practices. They abound in many places, especially in Asia and Africa (Eugster & Fu 2004, Yang et al. 2008, Kahhat & Williams 2009, Burrell 2012:160-182, Minter 2013:107-114, Jackson et al. 2014). As we shall see later, this holds true in China as well. Those practices convey a radically different image of the nature, significance and value of e-waste (see Liboiron 2016). They are part and parcel of the issue, which they define as well, just like the notions of waste and materials recovery, so attention must be paid to them too (Parks 2007). EEE, when discarded, does not automatically turn into waste (Sterne 2007:25). Like other consumer durables (Hansen 2000, Reno 2009, Brooks

2012), it often enjoys a grace period and a second chance to prove its usefulness. Recycling, in this case, is about preserving functions, not salvaging materials. But it is recycling nevertheless. Repair and maintenance play a crucial role in sustaining the world we live in (Graham and Thrift 2007, Jackson 2014). Technical artefacts and systems are constantly at risk of failure or breakdown and therefore require regular care to function properly (Denis & Pontille 2011). This is particularly true of the fragile and complex objects that we group together in the category of information and communication technology (ICT) (see, e.g., Jackson et al. 2011). And yet, repair and maintenance practices were systematically ignored or impeded by the proponents of formalization in China. Formalization left no room for concurrent takes on the materiality of e-waste, in particular ones that prioritize function instead of composition.

1.7 The scrapping state

How are we to account for the dual exclusion produced by formalization in China? My take is that it is part and parcel of the country's modernization project, which I have described above, especially in connection with environmentalism. On the surface of things, the main problem formalization tackled was pollution caused by e-waste. But on a deeper level, I would argue, it aimed at solving China's backwardness, real or perceived. This is what China's project of ecological modernization points to and I believe it must be taken seriously — though not at face value. It portrayed the heroes of China's recent history, self-made entrepreneurs, as has-beens, and recommended that they be sidelined. It treated the technological marvels of yesterday, previous generation EEE, as bygones, and prescribed their systematic destruction. It claimed that the past had to make way for the future. And it presented China as catching up with its models, overtaking them, or beating them at their own game, so to say. Taking into account this representational logic is key to understanding the factors driving formalization.

Formalization allowed China to display the markers of modernity, even to (re)define them. In that sense, it served its purpose. But what if we evaluate this project on its own terms? Can it be considered successful? Did formalization reach its alleged objectives? Did it keep its promises? In particular, did it reduce the environmental footprint of (D)EEE? My short answer is no. For formalization tended to create waste where there was none and to abolish circular flows where there were some. It promoted excess and made efficiency irrelevant. It

restricted the circulation of goods and the involvement of people, and reduced the opportunities for recycling. In sum, it made e-waste more problematic, not less. In that sense, formalization should be considered a failure. It is only by glossing over a long list of shortcomings and carefully avoiding taking a comprehensive view that one can argue the opposite.

Why did formalization fail? Work by anthropologist James C. Scott helps us answer this question. In *Seeing Like a State*, Scott (1998) explores “great utopian social engineering schemes of the twentieth century” (p. 4) that states devised to “improve the human condition” and that failed. Scott provides an explanation for these schemes’ failure:

“The most tragic episodes of state-initiated social engineering originate in a pernicious combination of four elements. All four are necessary for a full-fledged disaster. The first element is the **administrative ordering of nature and society** [...] The second element is what I call a **high modernist ideology**. It is best conceived as a strong, one might even say muscle-bound, version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and, above all, the rational design of social order commensurate with the scientific understanding of natural laws. [...] Only when these first two elements are combined to a third does the combination become potentially lethal. The third element is **an authoritarian state** that is willing and able to use the full weight of its coercive power to bring these high-modernist designs into being. [...] A fourth element is closely linked to the third: **a prostrate civil society** that lacks the capacity to resist these plans.” (Scott 1998:4-5, my emphasis)

Scott’s description of the “potentially lethal” combination likely to lead to “the most tragic episodes of state-initiated social engineering” reads almost like a description of present-day China, which — besides being unsettling — suggests that my analysis may not be too far off the mark. Scott attributes the failure of high modernist state schemes to the fact that “designed or planned social order is necessarily schematic” and that “it always ignores essential features of any real, functioning social order” (p. 5). The recipe for avoiding failure, according to Scott, is to make “practical knowledge, informal processes, and improvisation in the face of unpredictability” an integral part of the scheme (ibid.). The Chinese central government’s scheme to formalize e-waste recycling, however, did exactly the opposite. It disregarded practical knowledge, devalored informal processes, and denied unpredictability. Its failure, therefore, should not surprise.

But what does the failure of formalization tell us? As anthropologist James Ferguson (1990) famously argued, based on a study of development aid in Lesotho, projects regularly fail to achieve their objectives. But even when they fail, they still produce a host of effects, which are generally unacknowledged. Ferguson recommends that anthropologists and other researchers pay particular attention to those effects and make them explicit. I should therefore ask: What are the unacknowledged effects produced by formalization? If it failed to improve e-waste recycling, then what did it do? I would argue that formalization had the following two main effects. First, it fostered EEE renewal by removing from the market millions of useless, used up and also simply used devices and components. That created demand for newly manufactured EEE and therefore contributed to a rise in consumption and production rates, which, in turn, supported the growth of the EEE manufacturing industry and made all sorts of upgrades possible. In the 2010s, rates of first-time purchases were declining in China, so it was becoming necessary to convince people to let go of their EEE in order to maintain high sales numbers.

Second, formalization facilitated the involvement of the central government in local affairs. The bureaucratic character of the regulatory system set in place to deal with e-waste in China implied that Beijing could acquire knowledge of, monitor and even shape recycling operations throughout the country (e.g. by steering material and financial flows or selecting participants). That made it possible for officials in Beijing to better understand local political economies, supervise local governments' activities, subject local officials to scrutiny, and put an end to the great autonomy that recycling companies had enjoyed during the reform era, which allowed them, among other things, to evade taxes. Those two effects of formalization are aligned with the goals of both the Chinese manufacturing and recycling industry and of the Chinese central government, which goes a long way towards explaining the broad support that the project enjoyed in those circles.

1.8 Thesis outline

By now my arguments should be clear and I can turn to supporting them. This will be done in the remaining six chapters of this thesis as well as in the conclusion. In the second chapter, I explore the social construction of e-waste as a public (or social) problem in China at the domestic level but in connection with global influences. Using the relevant literature, I identify claims and the social actors who made them, and follow the process by which

these claims have been chosen, instrumentalized, politicized and, interestingly enough, rarely contested publicly. In particular, I focus on the successive typifications of e-waste as a problem having to do mainly with: environmental pollution, global injustice, moral decline and technological backwardness. I note that a dominant framing has formed around the issue in China and illustrate the effects it can have in a particular situation, i.e. one in which a social movement invoked e-waste to mobilize people for its cause.

The third chapter addresses the issue of transnational movements of e-waste. This is a topic of great significance, since, as I have noted above, China has been described as the “largest e-waste dumping site in the world”. In this chapter, I trace the origins and identify the key drivers of scrap imports to China. I recount the emergence of a dedicated recycling sector along the coast and stress the crucial role Hong Kong played as a transshipment hub. Then, I analyze state policies on the import of recyclable waste, including e-waste, and note a clear trend towards more restrictions, higher requirements and tougher enforcement. The Chinese government justified this by emphasizing the dirty and dangerous character of “foreign rubbish” and the necessity to protect China’s environment from pollution — and often used e-waste as an example of a particularly harmful type of waste. I advance the argument, however, that other factors may have weighed in more heavily in the decision to adopt a strong ban on scrap imports from abroad. In particular, such a ban made it possible to: leverage foreign countries’ reliance on China as a waste buyer in order to procure high quality raw materials for the Chinese industry; and prop up domestic scrap prices in order to put wind in the sails of domestic waste collection and recycling.

From there, I move to an investigation of the places most commonly associated with e-waste. I call them rural recycling hubs, because they are areas of the Chinese countryside where the population is heavily engaged in specialized dismantling and processing activities. In this fourth chapter, I begin by providing a comprehensive description of rural recycling hubs, focusing on local living and working conditions. For many years, business thrived in these places and state authorities did not intervene. E-waste recycling provided employment for tens if not hundreds of thousands of people, but simultaneously contaminated bodies and caused serious illnesses. I then go on to recount the decline of two rural recycling hubs located in Guangdong Province. According to my analysis, this was due to a combination of factors: state authorities’ failed attempts at reforming, upgrading and upscaling this sector;

the sudden enforcement of restrictions on scrap imports; material prices that fell to ever-lower levels; and increasing competition for labor between the various parts of China. Crackdown operations conducted by state authorities in the mid-2010s struck at a time when recycling workshops had become particularly vulnerable, so they basically wiped these workshops out. This represented a massive blow, from which workshops might never recover.

A fifth chapter is dedicated to the policies and regulations set up by the Chinese central government to deal with domestically generated e-waste. It gives an account of how they came into being and evolved, and emphasizes the importance of foreign models. It also discusses the main features of this “formal e-waste recycling system”, in particular the fact that it welcomed exclusively large, capital-intensive operations specialized in materials recovery and de facto excluded all other protagonists and practices. Proponents of China’s formal system routinely portrayed it as an improvement, in particular from the perspective of environmental protection. Here again, I propose an alternative reading by bringing the formal system’s fundamentally wasteful and inefficient nature back into the picture.

The sixth chapter focuses on collection and is largely based on an ethnographic study of DEEE collectors in downtown Guangzhou. It details the strategies deployed by various entities to access e-waste. Independent rubbish collectors, for instance, positioned themselves close to the source geographically and socially by sitting next to large apartment blocks in popular neighborhoods and seeking interaction with residents. They also ensured that their business remained profitable by cutting costs to the bone. Because they offered free, convenient and effective services, self-employed collectors represented an obvious choice for urbanites looking to get rid of e-waste. Some companies sought to outcompete them, notably by setting up online collection platforms, but they were rarely successful. As a rule, the only protagonists that made it in the collection business in China were those that capitalized on reuse. A key observation I make in this chapter is that owners of EEE had to be taught to discard aging devices and appliances, not to expect money in return, and to only use the services of licensed companies, because all this actually went against their interests. On this basis, I conclude that, if we look at it through the lens of e-waste policy, the promotion of environmental awareness among the public in China served above all to reorient material flows towards the newly created “formal sector”.

In the seventh chapter, I explore the worlds of repair and refurbishing, especially in connection with electronics. I identify the various actors who made a living by extending e-waste's lifespan, describe their methods, and map their networks. In the mid-2010s, thousands of specialized businesses throughout the Pearl River Delta contributed to resurrecting devices and components. The sector was huge and prevented millions of objects from going to waste. Yet, state authorities did not valorize it at all. Not only did protagonists involved in repair and refurbishing benefit from no state support whatsoever, they also faced repression as soon as they started to pose a threat to large Chinese brands and the domestic manufacturing and retail industry.

Finally, in the conclusion, I come back to the concept of “waste regime” as defined by Gille (2007) and apply it to the issue of DEEE recycling in China. This allows me to identify some of the strengths and shortcomings of this concept and to offer a critique of Gille's work.

1.9 Terminology

Before we go any further, it is necessary to dedicate a few lines to the question of which words to use and why. In particular, we need to look at those that describe objects. The terms “e-waste” (*dianzi laji* 电子垃圾) and WEEE (Waste Electrical and Electronic Equipment or *dianzi dianqi feiqiwu* 电子电器废弃物) have come to dominate discussions of what happens to old, outmoded, dysfunctional, damaged, cast-off or simply unwanted EEE. The vast majority of researchers, journalists, activists, government officials, corporate representatives and private citizens who produced accounts of the fate of goods grouped together in the category of EEE in the last two decades have used one or the other term. Evidence of the popularity of the word e-waste, which was first coined around the turn of the century, can be found in its inclusion in recent editions of reference dictionaries³², for

³² See “E-waste”, *Oxford Dictionary of English*, [no date]. URL: <https://en.oxforddictionaries.com/definition/e-waste> (accessed January 26, 2018). The Oxford English Dictionary defines “e-waste” as: “discarded electronic appliances such as mobile phones, computers, and televisions”.

instance. As for WEEE, the expression features prominently in the specialized laws and regulation that have been adopted throughout the world since the early 2000s.

We have seen above that the language of “waste” and approaches focused on the back end predominate in discussion on the issue of EEE’s obsolescence. Experts in waste management have been entrusted with this issue and they refer to EEE as having reached its “end of life” as soon as it is discarded, regardless of its age, condition, reparability or desirability. This perspective and this terminology are simplistic, even if not always wrong. A wide range of practices can be observed after EEE fails and/or a human being loses interest in it. They include, but are not limited to, dumping products or extracting materials from them. For instance, discarded EEE is often stored, given, resold, repaired, refurbished, reused or repurposed. The latter group of practices, unlike the former, tend to be ignored and their importance downplayed or not fully grasped. Using the word “waste” to refer to obsolete EEE therefore amounts to prejudging the nature, status and fate of these objects, as well as the types of engagements, physical or otherwise, that they call for or make necessary. Discard studies teach us that objects’ status as waste is never absolute or definite and that waste has a liminal character (Gille 2012). I have therefore decided to depart from the established vocabulary of e-waste, WEEE and end-of-life electronics, and to adopt instead a more encompassing and open one. From now on I shall use e-waste as an emic concept only and replace it as an etic concept with “discarded EEE” (DEEE). By DEEE, I mean: EEE that someone, somewhere, has parted with or gotten rid of, for whatever reason and in whatever way, e.g. by handing it in, selling it, giving it away, tossing it in a bin or abandoning it to the elements.

This terminology has the advantage of defining the objects I studied according to a decisive event or moment in their long and eventful life, and not to a predetermined status. It allows me to cover more ground and be attentive to more discourses and practices than if I unreflectively used e-waste or WEEE. Besides, an expression similar to DEEE exist in

Chinese (*feiqi dianqi dianzi chanpin* 废弃电器电子产品), which indicates that my choice is relevant in the Chinese context too.

Every research project has limits and requires making certain decisions. One of these decisions, in my case, was to ignore stockpiling and storage³³ of obsolete EEE, even though I know that they represent important aspects or practices. In other words, in this thesis, I only look at what happens to obsolete EEE after it departs houses, offices and businesses, and not while it remains in them.

1.10 Methodology

This thesis is the result of a research project that has lasted five years. I conducted ethnographic fieldwork in China for a total of 18 months spread over a period of three years (from 2013 to 2016). I spent most of this time in the Pearl River Delta, regularly visited eastern Guangdong Province and occasionally went to Beijing or Shanghai for short research trips. I also attended a few conferences and visited a few recycling plants outside of China, in particular in Europe and Southeast Asia. My fieldwork put me in contact with a great number and variety of people, including: rubbish collectors, scrap dealers, scrapyard workers, staff and management at recycling plants and manufacturing plants, repairmen, journalists, environmental activists, engineers, researchers, shop clerks, and state officials at various administrative levels. I tried to meet these people in their everyday working or living environments, at least to encounter them there. I asked them questions — and they asked me questions in return. In many cases, we exchanged not only words and ideas, but also money, goods, contacts, data or dinner invitations. I tried to spend time with them and to get a sense of what they thought about DEEE, did with DEEE, and felt because of DEEE.

My initial interest for the topic of this research was sparked by the scandal around pollution caused by DEEE dismantling and processing operations in Guiyu, an infamous town located

³³ In many cases, throughout the world, owners of EEE store it and postpone getting rid of it (see, e.g., Kennedy & Wilken 2016).

in Guangdong Province (see chap. 2 and 4). Like most people, I was shocked by the images of that place I saw in the media. I found it disturbing to think that some of my own DEEE may have ended up there. Soon after my arrival in China in spring 2013, it became clear to me that conducting research in Guiyu would pose a series of practical challenges. I also quickly realized that if I wanted to address the phenomenon of EEE's afterlife in a holistic way, I should not restrict the scope of my research to a single town, however important this town may be. I therefore started following every track likely to lead to DEEE and selected field sites in an eclectic fashion. Later, I realized that I had spontaneously embarked on what anthropologists have been referring to since the early 1990s as "multi-sited ethnography" (Marcus 1995).

In a seminal article, George Marcus (1995) observes that, towards the end of the twentieth century, many anthropologists were adapting the discipline's preferred and distinctive method, ethnography, to the imperatives of research in an increasingly globalized world. He argues that a paradigmatic change has taken place that involves abandoning the old model of studying intensively one population in one place and adopting a new one based on the mobility of humans, objects, ideas and narratives (see also Hannerz 2003). Describing this new model, he writes:

"Strategies of quite literally following connections, associations and putative relationships are [...] at the very heart of designing multi-site ethnographic research" (Marcus 1995:97).

"Multi-sited research is designed around chains, paths, threads, conjunctions, or juxtapositions of locations in which the ethnographer establishes some form of literal, physical presence, with an explicit, posited logic of association or connection among sites that in fact defines the argument of the ethnography." (Marcus 1995:105)

Marcus identifies several ideal-typical forms of multi-sited ethnography and calls them: "follow the people"; "follow the thing"; "follow the metaphor"; "follow the plot, story or allegory"; "follow the life or biography"; and "follow the conflict". Any concrete research project is a mixture of several of those forms. Mine involved following the thing (DEEE), the metaphor (waste) and arguably also the plot, story or allegory (formalization), but not so much the people, the life or biography, or the conflict. Following the things seemed an obvious choice, because things moved and changed hand. They were the link between people and between places. Following people, on the other hand, proved difficult, as many of them were wary of my presence (more on this below).

Marcus's article had a considerable influence on social scientists using ethnography, in particular anthropologists. However, there is a substantial precedent for late twentieth century anthropologists' drive to approach social reality from the angle of material objects, namely the collective work entitled *The Social Life of Things: Commodities in Cultural Perspective*. In the introduction, editor Arjun Appadurai (1986) puts forward that the best method to understand the complex ways in which humans value things is to follow things themselves through time and space, and to study their "trajectories", "careers" or "biographies". Appadurai calls this thing-centered approach "methodological fetishism" and argues that:

"Even if our own approach to things is conditioned necessarily by the view that things have no meanings apart from those that human transactions, attributions, and motivations endow them with [...] we have to follow the things themselves, for their meanings are inscribed in their forms, their uses, their trajectories. It is only through the analysis of these trajectories that we can interpret the human transactions and calculations that enliven things. Thus, even though from a theoretical point of view human actors encode things with significance, from a methodological point of view it is the things-in-motion that illuminate their human and social context. (Appadurai 1986:5)

Appadurai's book focuses on the notion of commodity and shows how it is "not one kind of thing rather than another, but one phase in the life of some things" (p. 17). In the first chapter, Igor Kopytoff (1986) describes commoditization as "a process of becoming rather than as an all-or-none state of being" (p. 73) and the production of commodities as a not only material but also cultural process (p. 64). The same can be said about waste, a category that material objects are likely to enter or exit as they progress from one moment to the next, move from one place to another, and are exchanged among humans.

Valuable as it may be as a heuristic advice and a tool for empirical research, the image of a researcher tailing material objects also has limits. First of all, no one really follows things in practice. Researchers catch a glimpse of them here and there. They run into them in different places, at different times. But they are never hot on their heels. Ian Cook, a British

geographer who promoted the “follow the thing” approach³⁴ for years and applied it in the early 2000s to the study of the global production network for papayas (Cook 2004) once told me that he had “never taken the plane next to a box of papayas”. Were researchers to attempt to follow things literally by sticking to their trails, they would face insurmountable challenges and fieldwork would become either impossible or meaningless. So they piece together trajectories using the little they know and the lot they assume, and must resign themselves to having blank spots on their maps.

Second, there isn't a thing that can be followed consistently. Material objects always mutate and morph into other material objects. They are never exactly the same in two different places or at two different moments. Indeed, some of the transformations they undergo make them all but unrecognizable. This is particularly obvious when one looks at refuse and its valorization. Several human geographers interested in global recycling networks have invoked this to complement, challenge or criticize dominant “follow the thing” research on the global circulation of goods and value in their discipline, i.e. approaches grouped under the labels “global commodity chain” (GCC), “global value chain” (GVC) and “global production network” (GPN) (Gregson et al. 2010, Lepawsky & Mather 2011, Crang et al. 2013, but see also Pickren 2015). In particular, they have taken issue with the assumptions, inherent in those approaches, that things are stable and follow linear trajectories, and that value accrues continuously along those trajectories. Insights from the study of global recycling networks, they argue, reveal a more complex picture, in which things are constantly in the process of becoming something else and ultimately find their way back into production processes. Value can be created as well by moving them across conceptual or categorical boundaries as by moving them across (physical) borders.

In my view, the two limitations described above do not invalidate the “follow the thing” method, but call for using it in flexible ways. I personally, and pragmatically, dealt with them by construing “follow” as “try to encounter and track for a while” and “the thing” as “a

³⁴ See *Follow the Thing*, [no date]. URL: www.followthething.com (accessed January 26, 2018).

material assemblage of elements that hold, held or will hold together”. In practice, I rarely tried to link more than three sites together or paid attention to more than three stages of material transmutations (e.g. from manufactured products to parts and components and from there to constituent materials). Admittedly, there is some arbitrariness in this way of proceeding, particularly in the choice of consumer goods as a point of departure. But I believe it has served my needs and purposes fairly well.

Overall, I had the impression that my fieldwork was highly fragmented. While part of this impression was inherent in the method I used, part of it certainly also had to do with my object of study. From the outset, people warned me that I was addressing a “sensitive” topic. More often than not, access to the field proved problematic, as people felt threatened by my presence and curiosity. Some of them wished to protect what they saw as proprietary information. But most of them simply sought to avoid publicity and the risk of being exposed as having possibly not entirely legal activities. In a traditional, single-sited approach, I would have worked hard to build trust with a limited number of informants or research collaborators. But a multi-sited approach called for a different solution to the problem. Following Mark-Anthony Falzon (2009), who contends that not only time but also space produces depth of analysis, I broadened the spatial scope of my research when the practicalities of fieldwork narrowed its temporal scope. The less time I was allowed or able to spend on a certain type of site, the more sites of that type I tried to visit. The fewer the people willing to talk with me, the more people I tried to meet and engage with.

I also tackled this problem by developing and using several identities. In some cases, I became a simple resident wanting to acquire or discard EEE, in others a professional merchant looking to buy or sell such devices. Both of those identities were real, if a little contrived. I did live in China, own EEE and occasionally need to have it repaired, exchanged or taken away. I did also have the green light from an Italian DEEE recycling company to canvass southern China for business opportunities, and would have conducted transactions if it had been advantageous to that company — it turned out it was not. In that sense, I do not feel like I acted dishonestly by presenting myself as something else than a researcher. I never turned into a full-blown undercover anthropologist, but only occasionally switched to another role, which could just as well have been my primary role and which my

interlocutors therefore found credible. This allowed me to avoid jeopardizing my relationship with certain potential informants.

Some fellow researchers may nevertheless find this way of doing ethically objectionable. Several of my colleagues suggested that it violated our discipline's deontological rules and emphasized that, unlike me, they systematically presented themselves as researchers while doing fieldwork. Yet, I still feel justified in assuming multiple identities. For one thing, I realized that it was not an uncommon practice among colleagues with whom I shared common research interests (i.e. the global trade in goods subject to import and export restrictions, unregulated activities in the informal sector, potentially hazardous substances, risky activities and polluting operations, and so on). Unsurprisingly, those who condemned my choices, on the other hand, tended to engage mostly with people who have little to hide or even are eager to talk about themselves, their lives and their occupation. Furthermore, switching between identities allowed me to engage in activities that really deserve to be called participant observation. It is one thing to collect information on prices for DEEE but quite another to try to buy or sell DEEE at those prices, for instance. If one studies trade, then one must trade — at least a little or attempt to do so — in order to understand the famous "native's point of view". A special emphasis on participation is what gives anthropology its added-value compared to other disciplines. Through participating in social interactions, and not just observing them at a distance, anthropologists gain a deeper understanding of them, based on both, perception and affect. Some might argue that I could have worn two hats at the same time, e.g. that of researcher and merchant. I did try but found that it confuses people more than anything and does little to prevent ethical dilemma from emerging or to solve them. Finally, each identity or position produces its own patches of light and shade, which, when combined, form a more vivid picture and allow one to develop a more thorough understanding. Finally, the necessity to negotiate various identities is a built-in characteristic of multi-sited ethnography, so to say. Marcus writes that:

"the qualification or effacement of the traditional privileged self-identification as ethnographer that seems inevitable in multi-sited research in favor of a constantly mobile, recalibrating practice of positioning in terms of the ethnographer's shifting affinities for, affiliations with, as well as alienations from, those with whom he or she interacts at different sites constitutes a distinctly different sense of "doing research"." (Marcus 1995:112-113)

Multi-sited ethnography forces the researcher to regularly negotiate his identity. This process is always multilateral, and no one involved has full control over it. We should therefore be realistic about the researcher's capacity to influence the way people perceive him and the labels they attribute him. In my case, for instance, I tried to stick to the three identities mentioned above, but was regularly assigned a fourth one, much against my will, namely that of foreign "journalist" (*jizhe* 记者). That too had ethical implications, which it would also be interesting to reflect on. Had I the right to go and interact with people who viewed me as a potential risk — or, in some cases, opportunity — despite my attempts to convince them that they had mistaken me? What would be an ethical way of dealing with such a situation, where simply being upfront clearly does not suffice?

2 A FRAMING TO BE RECKONED WITH

By the time I began fieldwork, “e-waste” (*dianzi laji* 电子垃圾)³⁵ had long reached the status of public problem in China³⁶. Most people I talked to had heard the term, could associate it with concrete phenomena, and found those phenomena worthy of concern. What they knew about e-waste, the way they talked about it and the types of ideas and values they expressed in connection with it were remarkably consistent. One element, in particular, kept on surfacing, namely “pollution” (*wuran* 污染) caused by recycling activities in Guiyu (贵屿), a town located in eastern Guangdong Province. More generally, e-waste appeared as a problem linked above all to environmental degradation. This framing of the problem clearly dominated and people took for granted that it explained what e-waste was all about.

Dominant frames appear as natural or logical: they give the impression that there is only one way, or at least only one correct way, to think about a problem. But this is deceiving. As we know from the literature on public (or social) problems, especially from developments in American sociology in the 1970s and 1980s, dominant frames are in fact the result of an

³⁵ From now on, quotation marks on the word “e-waste” will be omitted, for the sake of readability.

³⁶ In a way, this reassured me about the necessity and value of my research. At the same time, it both facilitated and complicated my work on the ground, as I shall make clear later.

important work of social construction carried out in the public arena (see, e.g., Gusfield 1996). They emerge through a process in which a variety of actors each try their hand at shaping the problem in question in a certain way. If, at the end of this process, they appear as coherent and ordered, it is mainly because they are staged as such, which obscures the uncertainties of their coming into being.

In this chapter, my aim is to deconstruct the dominant framing of e-waste in China, or in other words, to reveal its social construction. I recount the history of how e-waste became a public problem and trace the origins of the discourses and representations I encountered while doing fieldwork. In doing so, I borrow a series of key analytical tools from the literature. The first one is the idea that public problems are socially constructed through “claims” made by “claims-makers” in a process referred to as “claims-making” (Spector & Kitsuse 1977). Claims can be defined as either “a morally legitimated demand that a right be recognized, implemented or created, or a condition be altered or eliminated” or “an attempt to persuasively define a situation in a particular way and to have that definition become widely accepted as a basis for action — an attempt to construct and impose a meaning”. Claims-makers are “those who assert that a social problem exists and needs solving by persons in authority”. And claims-making refers to “how problems get identified, defined, and used to create social reactions” (Best 2016).

A series of questions must be asked for each of those key elements in the social construction of public problems (Best 2009[1989]:250): (1) with regard to claims: “What is being said about the problem? How is the problem being typified? What is the rhetoric of claims-making? How are claims presented so as to persuade their audiences? (2) With regard claims-makers: “Are claims-makers affiliated to specific organizations, social movements, professions or interest groups? Do they represent their own interests or those of third parties? Are they experienced or novices?” (3) Finally, with regard to claims-making: “Whom did the claims-makers address? Were other claims-makers presenting rival claims? What concerns and interests did the claims-makers’ audience bring to the issue? and how did these come to shape the audience’s responses to the claims?”.

The second key idea I borrow from the literature on public problems is the notion of typification (Best 2009[1989]). It refers to the way a problem is configured. Typification happens when claims-makers characterize a problem's nature, which is most commonly

done by suggesting that a problem is best understood from a particular perspective (e.g. from the perspective of pollution in the case of e-waste). Often, this requires including or emphasizing certain aspects of the problem while ignoring or downplaying others. By typifying a problem, claims-makers can shape policymaking and public response to the problem.

A third idea informs my analysis, namely that the general claims-making process can be divided into various subprocesses, which need to take place in order for an issue to originate, develop and grow powerful. Writing specifically about environmental issues, John Hannigan (2014[1995]:55) identifies three of those subprocesses: assembling, presenting and contesting claims. These subprocesses can take place in a sequence, but more often overlap. Another way to think about them is as tests that an environmental issue must pass in order to make it into the policy-making agenda, or tasks that claims-makers must perform to promote this issue to the status of public problem (Cefaï & Terzi 2012).

Finally, I follow the idea that a fundamental characteristic of the way social movements³⁷ operate is by creating frames and trying to align them with other frames in order to achieve frame resonance. In sociology, a frame is said to “resonate” when it appeals to targeted audiences (Snow & Benford 1988:198), in other words when it “it rouse[s] the interests of bystander publics, elected officials, institutional authorities, or potential social movement recruits” (McCammon 2013). “The source of frame resonance lies in a *conjunction* of the content of framing and ideational elements in the wider cultural milieu. Frames resonate because a segment of individuals find them convincing” (ibid.).

This chapter is made up of two sections, each of them based on a case study featuring an area located in Guangdong Province that has been involved in the dismantling, sorting and

³⁷ Following Diani (1992), I define social movements as: “networks of informal interactions between a plurality of individuals, groups and/or organizations, engaged in political or cultural conflicts, on the basis of shared collective identities”.

processing of DEEE and related objects or materials for decades³⁸. The first section is about Guiyu, a town famous — or rather infamous — throughout China and the world. It discusses the social construction of the e-waste problem, identifies key claims and claims-makers, and calls attention to the links between them, in order to shed light on the claims-making process. In particular, we learn about: environmental activists' and experts' formulations of initial or primary claims on the issue of e-waste in China; Chinese media's transformation of those primary claims into secondary claims that have a different moral dimension; certain recyclers' use of these secondary claims to legitimize their own action and pursue their own interests; and the broader public's reception of these claims. My aim, here, is to provide a background that can help us understand how e-waste emerged as public problem in China in the early 2000s and how this problem consolidated or crystallized thereafter. It is not to offer a minute, exhaustive or definitive analysis of the problem's social construction.

The second section in this chapter features the municipality of Qingyuan (清远市), more precisely the district of Qingcheng (清城区). As far as e-waste is concerned, Qingcheng (or Qingyuan) is arguably less well-known than Guiyu, even though it received a fair amount of attention within China in the mid-2010s. This section provides an illustration of a social movement focusing on environmental degradation that sought to attain frame resonance through aligning its frames with preexisting ones. In this case, a group of homeowners objected to the pollution caused by dismantling and processing workshops located close to their properties and invoked e-waste in order to attract the media's attention and, ultimately, push state officials to take action. We shall see that their strategy was by and large successful, but also had limits.

³⁸ Given that both places could easily be identified by anyone familiar with the topic, it makes little sense to refer to them using pseudonyms. To pretend that they are located elsewhere in the country might solve the matter but would create another problem, for their location is one of their key characteristics.

Understanding the social construction of public problems is crucial because it affects not only how these problems are perceived and how people relate to them but also how they are dealt with, i.e. what types of actions or measures are put forward as solutions.

2.1 The epitome of an “e-waste tragedy”³⁹

Guiyu, perhaps more than any other place on earth, epitomizes e-waste’s negative impact. The town features prominently in a great number of documentaries, TV and radio programs, reports, news items, academic publications and artistic photography series produced in both the English- and the Chinese-speaking worlds. It is generally portrayed as a dirty, chaotic place where once beloved gadgets, now in shambles, encroach on local inhabitants’ living and working spaces, and contaminate their bodies, thereby causing cancer and other severe illnesses. Guiyu is an important reason why China has been dubbed “the world’s largest e-waste dumpsite”⁴⁰. The town is considered by many as one of the most polluted places on earth⁴¹.

2.1.1 A defining moment: *Exporting Harm*

Guiyu’s fame dates back to the early 2000s. Adam Minter, an American journalist who has reported extensively about the world of recycling in and beyond China, writes that:

³⁹ I borrowed this expression from a documentary entitled “The E-Waste Tragedy” (Dannoritzer 2014).

⁴⁰ See “Finding Solutions to China’s E-waste Problem”, *United Nations University*, April 22, 2013.

URL: <https://unu.edu/publications/articles/assessing-and-improving-chinas-e-waste-problem.html> (accessed January 26, 2018).

⁴¹ Interestingly, the same superlative titles have been awarded to another, much smaller place involved in e-waste recycling, namely Agbogbloshie, an area located at the fringes of Ghana’s capital, Accra. However, several experts found out during a recent study tour that Agbogbloshie’s size and involvement in this line of business have been grossly overstated. See “Anatomy of a Myth: The World’s Biggest E-Waste Dump Isn’t”, *Shanghai Scrap*, June 16, 2015. URL: <http://shanghaiscrap.com/2015/06/anatomy-of-a-myth-the-worlds-biggest-e-waste-dump-isnt/> (accessed January 26, 2018).

“Guiyu has never been a secret, either in China or abroad. Hong Kong media covered its horrors in the early 2000s, and Communist Party-controlled Chinese media has devoted considerable coverage to it since at least the mid-2000s. Outside of China, Guiyu entered the popular consciousness in 2002, after Jim Puckett [...] published [...] *Exporting Harm: The High-Tech Trashing of Asia*.” (p. 189) “Puckett’s account was an instant media sensation that raised the previously unknown problems associated with the disposal of old electronics into a top environmental priority (in the United States and Europe, at least).” (Minter 2013:190)

Minter refers here to a report published in 2002 by a group of nongovernmental organizations (NGOs) led by the US-based Basel Action Network (BAN) and Silicon Valley Toxics Coalition (SVTC)⁴² (Puckett et al. 2002). A documentary with the same title (*Exporting Harm: The High-Tech Trashing of Asia*) accompanied the report. Minter is right to stress the crucial role *Exporting Harm* played in bringing the issue of e-waste to the fore. My understanding, however, is that this report and its accompanying film have had a strong impact not only abroad, but in China as well.

Together, these two sources provide ample visual evidence of the type of activities that were taking place in Guiyu in the early 2000s as well as of local inhabitants’ living conditions (see also chap. 4 in this thesis). One sees, for instance, workers unloading landline telephones manually from a three wheel tractor and piling them up on the floor, in the open; plastic parts going up in flames and releasing dark fumes; workers dismantling devices on the streets “using hammers and chisels and their bare hands” in order to “separate the waste into aluminum, steel, copper, plastic and circuit boards”; people trucking drinking water into Guiyu, which became necessary “due to severe groundwater pollution” in the area; a worker “without respiratory protection brushing carbon black toner from printer cartridge into bucket”; a child eating an apple “in a landscape of ash and toxic residues”; people sorting and burning electrical wire; a female dismantler cracking a cathode-ray tube (CRT)

⁴² Toxics Link India, the Society for Conservation and Protection of the Environment (Pakistan) and Greenpeace China are mentioned as contributors.

television monitor with a hammer to remove the copper yoke — after which, the reader is told, “the rest of the CRT is dumped”.

The report and the accompanying film not only document and denounce the pollution caused by e-waste in Guiyu, they also: describe DEEE recycling in New Delhi and in Karachi; explain why companies that collect DEEE in the USA have an interest in exporting this stuff to Asia; provide information on regulations, policies, and technologies of recycling; and include “recommendations for action” at both the organizational and individual levels. At the time of release, public awareness about the environmental problem that “end-of-life” EEE can pose was much lower than today, and specialized legal instruments designed to deal with it were still lacking in most parts of the world, including the USA. The first Europe-wide regulation, for instance, was adopted only in 2002, the same year *Exporting Harm* came out. BAN, SVTC and their Asian partners sought to remediate this and to “open peoples’ eyes to the true horror of the high-tech revolution”. In order to do so, they targeted an audience composed chiefly of American policy-makers, recyclers and consumers, and stressed the responsibility borne by these people for the fate of populations living in low-tech recycling hubs in the Global South.

A perspective centered on environmental dumping (see Clapp 2001) informs the report and documentary. The authors acknowledge several of the factors that account for the transboundary movements of scrap material, but lay emphasis on the loopholes that make it possible for a country like the USA to externalize part of the costs linked to DEEE recycling by sending this “waste” abroad, thereby shifting the burden to poor and remote populations. The report stresses for instance that: “Rich industrialized countries have made use of a convenient, and until now, hidden escape valve – the export of the E-waste crisis to the developing countries of Asia” (Puckett et al. 2002:11).

In subsequent years, the environmental dumping perspective indelibly marked public discourse on e-waste both within and outside of China. It became a crucial aspect of what one could describe as a standardized narrative on the topic (see also Lawhon 2013). In his analysis of the “political ecological imaginaries of e-waste” behind American certification standards (including BAN’s own “e-Stewards” label), Graham Pickren (2014) argues, with regard to BAN, that:

“because they believe that all nonworking electronics should be managed as hazardous wastes rather than as resources, they tend to conflate the entire category of used EEE export with waste disposal, seeing recycling as a Trojan horse for dumping. [...] In marketing the e-Steward standard, BAN hopes to raise awareness of the problem and its solution [...] Despite the anecdotal nature of [BAN’s] claim [that 50-80% of American is not recycled domestically but exported], it has been widely cited, arguably making this environmental injustice framing the hegemonic representation of the ‘e-waste’ issue.” (Pickren 2014:35, my emphasis)

I experienced this “hegemonic representation” first-hand when I participated in a seminar on e-waste organized by Solving the E-waste Problem (StEP), an initiative led by the United Nations University, for young scholars and scientists. The previous year, participants had started designing a game as an outcome of the seminar and our group was asked to complete it. Like our predecessors, we had been listening to a great variety of talks and thinking about a great variety of issues for more than a week, but, tellingly, the game was to be about “transboundary shipments of waste” from rich to poor countries, and nothing else.

Since DEEE contains toxic substances, it falls under the scope of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (thereafter Basel Convention), a treaty that was adopted by the international community in 1989 “in response to a public outcry following the discovery, in the 1980s, in Africa and other parts of the developing world of deposits of toxic wastes imported from abroad”⁴³. This leads to the routine assumption that DEEE’s fate resembles that of other hazardous wastes: for instance, the delivery of a few containers of used computers and television sets to Accra seems to share the same push and pull factors as the dumping of hydrogen sulfide-containing liquid in the suburbs of Abidjan, which took place in 2006⁴⁴ and launched the

⁴³ “Overview”, *Basel Convention*, [no date]. URL:

<http://www.basel.int/theconvention/overview/tabid/1271/default.aspx> (accessed January 26, 2018).

⁴⁴ The incident, which involved the multinational commodity trading company Trafigura, was named after the ship that transported the hazardous waste to Africa. See Amnesty International, *Trafigura: A Toxic Journey*. URL: <https://www.amnesty.org/en/latest/news/2016/04/trafigura-a-toxic-journey/> (accessed January 26, 2018).

infamous Probo Koala affair. The environmental dumping perspective is often taken for granted in discussions of e-waste. In some cases, e-waste even comes to epitomize environmental dumping, as in a recent report by the United Nations Environment Programme (UNEP) on the illegal global waste trade (Rucevska et al. 2015).

Exporting Harm addresses e-waste largely as a moral predicament and tells the story of a global injustice that needs to be redressed. The report establishes a direct connection between (from the imagined reader's perspective), here, mass consumption cum ignorance or indifference regarding the repercussions thereof and, over there, environmental destruction cum human suffering. The underlying rationale is that people living in the Global South should not have to foot the bill for the affluent lifestyles of those living in the Global North and that, accordingly, the latter have a duty to make sure this does not happen.

In their pursuit of justice, the authors of *Exporting Harm* do not hesitate to perturb or shock readers. The report's cover page, for instance, shows a little boy sitting alone on a pile of mixed waste (fig. 2.1). He is wearing clothes, but no shoes, and his feet are smeared with black dirt. The boy stares right into the camera, thereby making the reader a witness of his ordeal. This picture, which was reproduced in a number of press reports, clearly aims to foster an emotional response, even a feeling of compassion or guilt. Since then, children have figured prominently in the social construction of e-waste. For instance, many of the pictures taken by photographer Andrew McConnell in Ghana's "e-waste dump", Agbogbloshie⁴⁵, feature children burning cables, though researchers have generally reported that the majority of copper salvagers in Agbogbloshie are young adults (see, e.g., Caravanos et al. 2011). Likewise, and more crucially, a panel composed of toxicologists from all around the world brought together by the World Health Organization to work on e-waste chose to focus on the issue of children. This is significant, for children — referred to in the panel's

⁴⁵ See <http://andrewmcconnell.photoshelter.com/gallery/Rubbish-Dump-2-o/GoooooLuiBLHismM/> (accessed January 26, 2018).

final report (Heacock et al. 2016) as “vulnerable populations” — are the innocent victims par excellence. Focusing on them feeds a discourse that victimizes the people located on the receiving end of DEEE flows.



Figure 2.1: The cover image of BAN’s report on Guiyu. Photo credit: Basel Action Network.

Initially, BAN’s report and documentary may have been intended for a North-American or, more broadly, Western audience — which they can be said to have reached successfully — but that does not mean they went unnoticed in China, quite to the contrary (Tong et al. 2015:33). First, they were not lost to Chinese environmentalists. One of them, whom I shall call Wang Aidong⁴⁶, told me in an interview in 2014 that he remembered having watched the

⁴⁶ Individuals that participated in my research and organizations that I studied directly (i.e. not only through publicly available information) are referred to in this thesis using pseudonyms, in order to protect their anonymity.

documentary “sometime around 2002” and heard soon thereafter that remediating Guiyu’s e-waste plight had become “one of Guangdong Province’s ten priorities in the field of environmental protection”. Mr. Wang had lost track of the issue but was not surprised when I reported that the provincial government had not taken any significant action in the decade that followed (i.e. until the mid-2010s). What Mr. Wang remembered vividly from the documentary is the statement by a worker in Guiyu who said that the effects of DEEE dismantling and processing on his health did not really matter to him as long as he could earn enough money to provide for his children. Mr. Wang said he had been shocked by this statement.

Second, state agencies at various levels and in various spheres of activity also took notice of *Export Harm* as well as of the spate of news reports that ensued in China. They reacted promptly, though in some cases somewhat superficially. The authorities in Guangdong province, for instance, who, as mentioned by Mr. Wang, claimed in the early 2000s to have included Guiyu in their list of priorities, did little more in the subsequent decade than pay regular visits to the township — all of them organized by the local government and highly theatricalized, so as to make the town look clean and well-ordered, several of my informants told me. Similarly, the Ministry of Information Industry (MII)’s “determination” to turn Guiyu into a national “demonstration base” (*shifan jidi* 示范基地) for WEEE recycling and to invest a staggering RMB 2 billion (about USD 241 million at the time)⁴⁷ did not really materialize until late 2015 (more on this below). The release of the BAN report played a key role in the story of how Zhang Yong, a university professor who has gained recognition as one of China’s leading experts on DEEE recycling, came to found and fund a research institute focusing exclusively on this area of research⁴⁸:

⁴⁷ “Recycling Base Seeks Sustainable Development”, *Xinhua News Agency*, May 3, 2005. URL: <http://www.china.org.cn/english/environment/129705.htm> (accessed January 26, 2018).

⁴⁸ Today, the institute receives a budget of 10 million RMB (approx. 1.5 million USD) from the municipal government of a large Chinese city, in addition to funding from other sources. It employs fifty specialists,

“We started in 2003. One day, I received a phone call from someone at the Ministry of Environmental Protection [then called the State Environmental Protection Agency (SEPA)]. Many reports on Guiyu had come out in the media, for instance in the [here, Prof. Zhang goes through a long list of Chinese media outlets]. These reports all addressed the situation in Guiyu, that is the people’s living and working conditions, and the pollution caused by their activities. The MEP called me to understand what that was all about. They didn’t know much about the issue of WEEE, but the person in charge said they were determined to do something about it. We talked for about forty minutes and I told him/her everything I knew. At the end, (s)he said: ‘Prof. Zhang, you seem to have a particularly deep understanding of this issue.’ I replied that I had had the chance to meet [name of a European scholar], one of the world’s first expert of this question, in 1998, back when I was doing my post-doctoral research in [name of a European country]. He and I shared the same office and we became friends. He often told me about his research [...] That’s how [my team and I] started getting money from the government to do research specifically on WEEE.”

Prof. Zhang went to Guiyu four times, including once in 2003 when he was mandated by the Ministry of Commerce (MOFCOM) to “study the local government as well as dismantling workshops”. Other teams of scientists received funding as well, around the same time, and initiated China’s first research programs on e-waste

The story of Prof. Zhang and his colleagues shows that Guiyu’s rise in infamy, which began before the release of *Exporting Harm* but certainly accelerated thereafter due to increased media exposure, persuaded large Chinese state agencies to take action. If we are to believe Baidu Baike’s article on Guiyu⁴⁹, the Chinese central government launched pilot projects (the aforementioned “national demonstration bases”) for the recycling of DEEE in four provinces in order to “rethink the Guiyu model” (*guiyu moshi de fansi* “贵屿模式” 的反思). Thus, it can be said that this report cum documentary played a key role in bringing the issue

about thirty of whom have a doctorate. Its main mission consists in linking up recycling companies with academic researchers.

⁴⁹ “The Guiyu Model” [贵屿模式], *Baidu Baike* [百度百科], [no date]. URL: <http://baike.baidu.com/item/贵屿模式> (accessed January 26, 2018).

of e-waste to the fore, not only in Europe and North America but also in China. One prominent Chinese researcher who was already interested in the social and environmental impact of the electronic industry in China in the late 1990s and early 2000s confirmed this to me by saying, after the publication of *Exporting Harm*, Chinese accounts of e-waste almost systematically mentioned Guiyu.

2.1.2 A determining legacy: Greenpeace China's awareness campaign

In the years following the release of *Exporting Harm*, Greenpeace China managed to sustain the attention that was being paid to Guiyu. The regional branch benefitted from the fact that Greenpeace International had embarked on a special awareness-raising campaign on e-waste, which lasted from 2002 to 2006. Greenpeace China conducted further investigations, including one that highlighted “Hong Kong’s role as a key entry point to China for hazardous electronic wastes from developed countries”; organized a number of public events, including an international workshop on e-waste disassembly in Beijing in 2013, in which several national and local government agencies took part (Zhang 2009:984); and provided the media with documentation of Guiyu produced by mandated, professional photographers. The NGO used powerful symbols to shape public perception of, and attitudes towards, DEEE. For instance, it created a display made of used personal computer equipment that had the shape of a giant wave on the verge of collapse (fig. 2.2).



Figure 2.2: A picture used in a campaign by Greenpeace China. Photo credit: Greenpeace.

The “tsunami” metaphor proved to be a potent symbol. Later, it resurfaced in numerous press reports in English, as well as in a declaration by Achim Steiner, then executive director of the United Nations Environment Programme (UNEP)⁵⁰. In China, it found its way in, among others, a cartoon published by a newspaper (fig. 2.3) and the title of an academic publication (Ni & Zeng 2009).

⁵⁰ “UN Environment Chief Warns of ‘Tsunami’ of E-waste at Conference on Chemical Treaties”, *UN News Center*, May 5, 2015. URL: <http://www.un.org/sustainabledevelopment/blog/2015/05/un-environment-chief-warns-of-tsunami-of-e-waste-at-conference-on-chemical-treaties/> (accessed January 26, 2018).



Figure 2.3: A drawing published in a Chinese newspaper. The inscription reads “e-waste dismantling industry”. Source: Economic Information Daily [经济参考].

In parallel, Greenpeace China commissioned several scientific studies. In an interview, Li Jie, the person in charge of the NGO’s e-waste program at the time, explained that he approached the Department of Anthropology at Sun Yat-sen University in 2003 and asked them to conduct ethnographic fieldwork in Guiyu with a view to highlight migrant workers’ living and working conditions. This led to the publication of a joint report in Chinese (Sun Yat-sen University & Greenpeace China 2003)⁵¹ that was the first — and long remained the only — detailed source of information on the town’s social organization. Lie Jie also contacted the Institute of Medicine at Shantou University and offered them funding to

⁵¹ In a publication in English that summarizes the findings of this report, Zhou (2010:28) credits Oxfam (Hong Kong) for supporting the Sun Yat-sen researchers, which seems to be a mistake.

conduct toxicology studies in Guiyu. A professor and her students started collecting and analyzing blood samples in order to assess the nature, extent and impact of heavy metals contamination in the recycling town. One of the studies found “significantly higher” blood lead levels in children living in Guiyu compared to those of children living in the neighboring town of Chendian (Huo et al. 2007). Another one revealed “significantly higher rates of adverse birth outcomes” as well as a “much higher median level of cord blood lead” among neonates in Guiyu than in a control group living in the city of Xiamen (Fujian Province) (Xu et al. 2008). These findings were mentioned in numerous accounts of e-waste in China, where they served as proofs of this “waste stream”’s detrimental effect on human health.

Greenpeace greatly influenced the framing of e-waste as a public problem. Its focus on labor exploitation, bodily contamination and the overwhelming threat that ever-growing quantities of e-waste represent for humanity has determined the way people throughout the world think about e-waste. The NGO’s campaign was successful in large part because it broke new ground and managed to find relays within the academic and media community. Thanks to various translations, the elements of the discourse propagated by the NGO spread from the mid-2000s onwards and enjoyed increasing currency. Toxicology, for instance, soon became a standard angle from which to approach the e-waste problem and studies in this field quickly multiplied in China (Schulz 2016) and elsewhere⁵².

As the only professional Chinese environmentalist specialized on e-waste — at least up until recently — and a dedicated raiser of public awareness, Li Jie was instrumental in elevating e-waste to the status of public problem in China. Despite Greenpeace International’s decision

⁵² By contrast, the “Sun Yat-sen anthropology report”, as it became known, remained the sole instance of a truly empirical social scientific investigation for more than ten years, which testifies to the dominant understanding of DEEE as an object of study proper to the hard and applied sciences.

to discontinue its program in 2006⁵³, he chose to remain involved in the issue. In 2008, for instance, he founded a small volunteer-based NGO dedicated to making information about e-waste available to a wider audience, and steered it until approximately 2013, when the NGO became dormant due to a lack of human resources. From the early 2000s onwards, he was also interviewed by a great number of foreign and Chinese journalists interested in e-waste and he accompanied quite a few of them on a visit to scrapyards located in Guiyu or in Hong Kong's New Territories. His views on the issue have therefore received considerable echo. The main measures he advocated in that time, and talked about during our interviews, include: (1) stop the influx of e-waste into China by increasing controls and crackdowns on exports and imports; (2) force small dismantling and processing workshops out of business; (3) replace them with large plants using state-of-the-art industrial technology; (4) establish a regulatory system governed by the "polluter pays" principle; and (5) encourage owners of used or defunct EEE to sell or give it away exclusively to licensed companies.

2.1.3 Moral morphing by the Chinese media

By and large, representations of e-waste in the Chinese media draw a lot from the initial repertoire that BAN and SVTC, Greenpeace China, Li Jie and others put together. They usually mention several, if not all, of the following elements: Guiyu as the epicenter of the trade in e-waste; the exploitation of migrant workers; the foreign origin of (part of the) shipments and the fact that they have to be smuggled into the country; the inappropriateness and backwardness of the methods used by small workshops; the

⁵³ According to Li Jie, Greenpeace International dropped the issue of e-waste because it had come to the conclusion that any successful attempt to reduce e-waste on a global scale must involve brand-owning multinationals and the NGO had received guarantees from several of them that they would soon start reviewing the design of their products with the aim of making them "greener". As a result, Greenpeace China shifted its focus to other issues, including water pollution. Ten years later, however, it is obvious that little progress has been made in the field of "green electronics". This may explain why Greenpeace International has very recently become vocal again on this issue.

omnipresent and severe environmental pollution; and the contamination of human bodies. This applies, for instance, to a coverage of Guiyu entitled “E-waste ‘Gobbles up’ Guiyu” (*dianzi laji “tunshi” guiyu* 电子垃圾“吞噬”贵屿) that was aired on Sichuan Television (四川卫视) during a news broadcast in June 2012⁵⁴. It is also true of a another special feature, entitled “Survey of E-waste Pollution in Guiyu: 90% of Children Beyond Heavy Metal Limits, Their Constitution is Weak and They Fall Ill Easily” (*guangdong shantou guiyu zhen dianzi laji wuran diaocha: jiucheng ertong zhongjinshu chaobiao, tizhi ruo yi huanbing* 广东汕头贵屿镇电子垃圾污染调查：就成儿童重金属超标，体质弱易患病), that viewers of a television program called Good Morning Shanghai (上海早晨) saw in June 2014⁵⁵. The title of the first of these broadcasts evokes Greenpeace’s crushing wave exhibit; that of the second refers directly to the toxicology study commissioned by the same organization. Together with other elements (e.g. Sichuan Television’s use of a picture originally released during Greenpeace’s e-waste campaign as background image for its anchor), these titles testify to the profound and lasting impact of past NGO action on media reports in China. Reports released in the mid-2010s make much the same kind of observations as those that came out in the mid-2000s, which indicates that, at least with regard to the elements mentioned above, public discourse on e-waste has been remarkably stable and coherent in China. If anything, one can observe an increase in the perceived seriousness of the issue: while e-waste had arguably reached the status of public problem already in the mid-2000s, ten years later it could even embody pollution at large. Tellingly, the television program Good Morning Shanghai chose to illustrate the ecological plight faced by China as a whole by showing footage of Guiyu on World Environment Day.

This said, there are also crucial differences between the narrative found in *Exporting Harm* (and in most English-language publications influenced by this report) and that which developed in subsequent years in China, notably in domestic media. Chief among them is

⁵⁴ See <http://me.cztv.com/video-26607.html> (accessed January 26, 2018).

⁵⁵ See http://v.youku.com/v_show/id_XNTY2NjE2Mzky.html (accessed January 26, 2018).

the issue of responsibility and the identity of the culprit. In non-Chinese accounts, the detrimental impact of e-waste is usually blamed on Western governments (insufficient efforts at regulating and monitoring “transboundary waste movements”); on Western recyclers (inconsiderate practice of “externalizing costs” through export); and on Western consumers (ignorance and indifference as to the fate of their old possessions). As for the Chinese, their role is more or less limited to that of victims. By contrast, Chinese media accounts ascribe culpability to Chinese business entities as well, especially to those that operate independently of the Party-state, that is, outside regulatory frameworks and beyond official control. Chinese media accounts also stress, and object to the fact, that Chinese consumers tend to sell used or defunct EEDs to street peddlers instead of giving them away for free to licensed companies (see also chap. 6). This type of behavior, they note, contributes to feeding the wrong businesses entities and delays the advent of a truly effective, clean and high-tech recycling sector.

Rich, industrialized countries still bear some responsibility in Chinese media accounts, as e-waste is routinely presented as “foreign waste” (*yang laji* 洋垃圾, see chap. 3), but another category of perpetrators emerges: lawless and self-seeking Chinese citizens. Local scrap bosses’ ruthlessness, greed and illegal dealings, in particular, are commented upon disapprovingly, and so is corruption among local officials. Terms such as “unlawful” (*weifa* 违法), “illegal” (*feifa* 非法) and “criminal” (*fanzui* 犯罪) abound and allegations of links with “gangs” (*heibang* 黑帮) or the “underworld” (*dixia* 地下) are not uncommon. On the other hand, efforts made by government agencies — especially those at the national and provincial levels — to clean up pollution in places such as Guiyu, crackdown on criminal activities, and implement a “green” national recycling system are presented in a positive light. Thus, in Chinese media’s portrayal, Guiyu embodies not only severe environmental degradation but also rogue economic development powered by cupidity — and the two issues appear as being closely linked.

Indeed, in the social construction of e-waste as a public problem, pollution and profit are two sides of the same coin. A news article on e-waste talked for instance of “a contradiction [*maodun* 矛盾] within the scrap metal and foreign waste dismantling industry between high profit, on the one hand, and high pollution, on the other.” “[They] received wealth, [but they] lost health” (*huode le caifu, shiqiu le jiankang* 获得了财富, 失去了健康)⁵⁶, the journalist wrote regarding people who dismantle and process e-waste in rural areas. The cover of a news magazine’s special report on e-waste is another good example: golden eggs can be seen emerging between a pile of PCBs and a crowd of anonymous laborers (see fig. 2.4)⁵⁷. This picture calls to mind Aesop’s fable about “the goose that laid the golden eggs”, in which a farmer and his wife decide to slit the goose’s belly, in the hope that it would be full of gold, and soon realize their foolish mistake: they had deprived themselves of an ideal source of income. The magazine used the moral of this story, namely that greed motivates people to commit unprofitable actions, to condemn people’s attempts at becoming rich from dismantling and processing DEEE.

⁵⁶ “Confronted with Energy Saving and Emission Reduction [Requirements] as well as Close-downs, the Rich People from Taizhou Are Now Going Through “Pauper”’s Times” [渡过节能减排关——富起来的台州人过着“穷人”的日子], *Zhejiang Business Web* [浙商网], September 14, 2011. URL:

<http://biz.zjol.com.cn/05biz/system/2011/09/14/017841352.shtml> (accessed May 3, 2017).

⁵⁷ “The E-waste Quacks” [电子垃圾的江湖], *Economy & Nation Weekly* [财经国家周刊], No. 13, June 6, 2014. URL: <http://finance.sina.com.cn/chanjing/cyxw/20140626/122919530535.shtml> (accessed May 4, 2017).



Figure 2.4: The cover of a Chinese magazine. Source: Economy & Nation Weekly.

Chinese media's pro-state stance should not surprise, since media outlets in China are all either state-owned or subject to close state "guidance", monitoring and censorship. But their critique of Chinese consumers and independent scrap dealers and processors constitutes a significant shift in the social construction of e-waste as a public problem. What they give us to see is a brand-new politicization, involving a new scale, new protagonists and a new storyline, all of them unique to China. The discourse remains thoroughly moral but its terms change: concerns about injustice in the global arena start to mix with other concerns about depravity and backwardness within China.

2.1.4 Guiyu versus “green”

Representatives of companies participating in the Chinese state-run DEEE recycling system, or wishing to do so, understood quickly how crucial it was for them to distance themselves from small-scale recycling in Guiyu in order to avoid the associated stigma and bad press. Tong & Wang (2004), who conducted research on e-waste in the Yangtze River Delta in 2000 and tried to interview representatives of licensed companies write that:

“Because China’s public media by 2002 had created such a distinctly negative image of e-waste imports and subsequently of the Chinese recycling sector that relies on imports of secondary materials, most recyclers, including those approved by the government, were reluctant to respond to our request for interviews.” (p. 592) “The negative perception and attitudes toward the processing of imported e-waste has been one of the main concerns of the interviewed recyclers.” (p. 597)

Many a representative feared that his company’s reputation could be tarnished by a close association with (imported) e-waste, an issue rapidly becoming synonymous with severe pollution, which explains why Tong & Wang were confronted with these people’s reluctance to talk, especially on the record. I encountered much the same kind of hurdle while doing fieldwork in the mid-2010s: representatives of licensed companies repeatedly rejected my requests for interviews and plant visits. They often used industrial (or commercial or professional) “secrets” (*mimi* 秘密) as justification — even though there is a consensus on the unsophisticated nature of technologies and business models in the Chinese DEEE recycling industry.

However, company representatives who did accept to meet me were not reluctant to talk about the harmful effects of e-waste, or about Guiyu, for that matter. On the contrary, they brought up the town’s name themselves and showed eagerness to discuss e-waste’s deleterious environmental impact, in particular in connection with small-scale recycling. They seemed to have realized in the meantime that Guiyu’s negative image could serve their interests. E-waste remained a “sensitive” (*mingan* 敏感) issue, as many of my interviewees put it, but that did not have only disadvantages. It could also be put to good use.

In company representatives’ accounts, Guiyu epitomized all the negative repercussions of e-waste and stood for what recycling should not be like. They emphasized the town’s

backwardness, disorderliness and dirtiness, knowing that, in comparison, licensed companies and their facilities would stand out as being sophisticated, orderly and clean. They deliberately took advantage of Guiyu's negative image to make a case for their own work and for the regulatory system in which they participated. In other words, Guiyu served as a backdrop by which their own operations could be made to look better, if not faultless. During a guided visit of a large DEEE dismantling plant in Shanghai in November 2014 I was prompted three times to compare unfavorably recycling as (allegedly) practiced in Guiyu with recycling as (allegedly) practiced by the company owning the plant, i.e. Auspicious Wind Resource Recycling Co., Ltd.: the first time by a poster that hung on the wall of a huge dismantling hall (fig. 2.5); the second time by an exhibit on display in the plant's "museum for the popularization of scientific environmental protection" (*huanbao kepu guan* 环保科普馆) (fig. 2.6); and the third time by the chief engineer's presentation. Each of these instruments opposed "formal" (*zhenggui* 正规) to "informal" (*fei zhenggui* 非正规) recycling methods, facilities and operators in explicit and forceful ways, which left little doubt as to who should be preferred to whom.



Figure 2.5: A poster juxtaposing formal and informal DEEE recycling. Photo credit: the author.



Figure 2.6: An exhibit juxtaposing formal and informal DEEE recycling. Photo credit: the author.

As with most biased comparisons, however, this one relied on strategic shifts and silences. For instance, it featured pictures of Guiyu that were almost a decade old and contrasted them with recent ones from Auspicious Wind Resource Recycling. It focused on actual practices in Guiyu — some of which seem to have been abandoned in the meantime — but juxtaposed them with ideal ones in licensed companies, i.e. practices that those companies were supposed to adhere to, but — as I later found out (see chap. 5) — often neglected. It also obscured the fact that, at least up until November 2014, and maybe beyond, workshops in Guiyu and licensed DEEE recycling plants such as Auspicious Wind’s plant in Shanghai were in fact recycling different kinds of products, i.e. exclusively electronics for the former and exclusively household appliances for the latter. At the time of my visit, Auspicious Wind

had just acquired specialized industrial equipment for crushing printed circuit boards (PCBs) and sorting them into fractions (as recyclers call fairly homogenous material mixtures), but this “dismantling line” (*chaijie xian* 拆解线) had not yet started operating — which arguably explains just as well as “industrial secrets” why visitors were forbidden from photographing it. In other words, Auspicious Wind was not involved in the types of activities carried out by small, family-run businesses in Guiyu, and vice versa. Finally, while Auspicious Wind’s chief engineer emphasized that the latter only managed to salvage part of the materials and dumped a good deal of stuff, he carefully avoided getting into the fate of the fractions produced at his plant. As I later discovered, companies licensed to undertake DEEE dismantling in China are sitting pretty when it comes to pollution control, for, as a rule, they do not process fractions themselves, but sell them to other companies, who further sort and melt metals and plastics, or dispose of unrecyclable waste in incinerators and landfills. Hence, the comparison with Guiyu, where the latter activities do take place, only held to a certain degree (more on this in chap. 5).

2.1.5 What people knew

How did the claims described above affect public opinion? What did laypeople know about e-waste and what did they associate the issue with? Most of the people I talked to in the mid-2010s who were not particularly involved with the issue could tell me that “developed countries” (*fada guojia* 发达国家) such as Japan or the USA export their e-waste (*dianzi laji* 电子垃圾) to China, where it ends up in rural towns specialized in dismantling, sorting and processing, and causes severe environmental pollution. The many conversations I had with people such as friends, my daughter’s nanny, taxi drivers and restaurant or shop staff during my stay in China indicate that they understood it roughly in that way — unless they were oblivious about the issue, but few of them were. Many of those living in Guangdong Province had watched evening news on television, listened to a radio program or read an article in the (online) press that addressed pollution and health problems in Guiyu. Not all of them remembered the name of that place, but those who did not described it in ways that left little doubt they had been exposed to media coverage of Guiyu. In several cases, I asked: “Could it be that you are talking about a town called Guiyu?” and people confirmed.

By the time I embarked on my PhD research in 2013, Guiyu had become indissociable from e-waste in China, not only in the minds of people abroad but also in those of the Chinese

population at large. The town's fame and the attention it received within, as well as outside of, China followed me throughout my fieldwork. Several Chinese institutional experts I talked to were surprised to hear that I did not intend on focusing exclusively on either Guiyu or the large-scale recycling plants that have been set up in recent years at the central government's initiative and that operate under state supervision (see chap. 5). To them, those were the only two scientifically sound, or legitimate, topics of inquiry in connection with the issue of DEEE recycling in China — I hope this PhD thesis proves them wrong. Similarly, the two Chinese journalists who contacted me during my stay in China were looking for an update on “the situation in Guiyu” and similar places. What they expected from me was above all a pronouncement on the terrible environmental impact of e-waste; the victimizing effect of the global scrap trade; and the sheer inappropriateness of the recycling methods used in rural areas. They cared little for the knowledge and insights I could provide beyond those topics.

A widespread notion among the Chinese citizens I talked with who were not particularly linked to e-waste was that one could get rich easily by starting a dismantling and processing operation. My hairdresser in Guangzhou, for instance, had come across videos on Youku.com⁵⁸ explaining how to extract gold from computer or smartphone chips. When he heard about the topic of my research, he started asking me a lot of questions. He clearly wanted to know more about this process and the reason for this is that he thought it might allow him to make a fortune. Of course, those videos had been made public for a purpose and it was not exactly altruistic: I discovered later that some of them had been shot and released by schools located in various parts of China that offered training in “do-it-yourself” (DIY) precious metal extraction.

⁵⁸ Youku.com is China's main online video hosting service.

2.2 Homeowners strive for frame resonance

The previous section drew the outline of the dominant framing of e-waste I encountered in China in the mid-2010s. It also gave a glimpse of how certain claims-makers, more particularly industrialists, used this framing for their own purposes. In this section, I shall elaborate on this by studying a social movement that came into being in Qingyuan at the time of my fieldwork and presented itself as linked above all to e-waste. Social movements are geared towards mobilizing participants and securing support. An important way in which they achieve this is by referring to prevalent and powerful frames. This is known among social scientists as “frame alignment” and, when successful, “frame resonance” (Snow & Benford 1988). Here, I want to explore how a particular social movement, involving mainly people who had bought homes in the south of Qingyuan, strove to align its frames with preexisting ones, in particular those associated with e-waste, in order to advance its cause. These homeowners complained about the pollution caused by e-waste dismantling and processing operations taking place in their area. Many of the elements of the dominant framing of the public problem described above in connection with Guiyu surfaced in their discourse too. In particular, the homeowners aimed their criticism at owners of small dismantling workshops and local government officials, whom they saw as the main culprits, at least initially.

This case study shows how, in a concrete, everyday life situation, people invoked e-waste to draw attention to a series of issues that includes, but is not limited to, DEEE’s detrimental impact on human health and the environment. Fundamentally, homeowners complained about not only pollution but also about real estate investments losing value, about retirement plans being frustrated, about government officials’ interests prevailing over those of their constituencies (read “corruption”), about consumers and citizens not receiving protection because of missing institutional mechanisms, and, more generally, about injustices being ignored by the powers that be. However, they mainly spoke the language of e-waste, as if one issue could subsume all others. This they did, I want to put forward, because they identified e-waste, and environmentalism more broadly, as a strategically useful and politically safe language in which to convey ideas, make claims, and express concerns. As French sociologist and China scholar Jean-Louis Rocca (2010) rightly notes, the

fight against pollution and that against corruption have both become “official causes” in present-day China (p. 90).

2.2.1 Grassroots activism and middle-class investments

I initially heard about the homeowner (*yezhu* 业主) movement in Qingyuan from Liu Wei, the director of an environmental NGO based in the Pearl River Delta that helps citizens affected by pollution take action and address state authorities as well as the media. In December 2014, Liu Wei attended a talk I gave at Sun Yat-sen University and seized the opportunity to show the audience a video that homeowners from Longtang (龙塘镇), one of Qingcheng’s subdistricts, had shot some time earlier. The video featured aerial views of the villages located in the region. Using a camera-equipped drone, one of the homeowners had filmed a great number of “scrapyards” (*huochang* 货场) in which one could distinguish heaps of plastic and metal scrap, as well as forested hills and lakes, where a great deal of e-waste had been disposed of in the past, according to Liu Wei. He stressed that heavy metals concentrations in this “open-air dump” were “five hundred times higher than the maximum tolerated values”. After the screening, he passed around several small plastic bags containing “samples of e-waste” he had collected during a guided visit to the dump organized by some of the homeowners. One of these samples (a fragment of a printed circuit board) was unambiguously linked to electrical or electronic devices; the others (an unfathomable piece of plastic and a clump of clay) were not.

Visibly excited about this case of pollution and the great opportunity for grassroots environmental activism it offered, Liu Wei insisted on e-waste’s extreme toxicity and the necessity for people to denounce this form of environmental harm. A week or two prior to my talk, Liu Wei had been called by a group of homeowners and had gone to Longtang in order to learn more about their ordeal and, if possible, help them give more clout to their demands. He suggested that I, as a foreign researcher interested in e-waste, make the trip too and gave me the telephone number of a certain Mr. Yu, who acted as group leader.

A month later, I met Mr. Yu in Rosy City, a gated community located in Longtang where he lived with his wife. The couple originally came from Manchuria and had moved to the Pearl River Delta in the early 2000s because Mr. Yu’s job as executive in the car-making industry required it. They had first settled in Guangzhou, but in 2012, after their daughter left home,

they had decided to move to Qingyuan — or Guangzhou’s “backyard” (*houyuan* 后院), as the region is known⁵⁹ — in order to enjoy a more peaceful life surrounded by greenery⁶⁰. At 55, Mr. Yu approached retirement age and did not need to show up at the office more than once or twice a week; his wife had stopped working long ago. On the phone, Mr. Yu insisted that I take the private shuttle that connects Rosy City to Guangzhou several times a day and carries white-collar workers on their way to their workplace as well as children to their schools. But I went for public buses instead and, as a result, got off in a village located a few hundred meters away from Rosy City. The contrast between this village, which resembles most other settlements in rural Longtang, and the gated community could hardly have been more striking. On the one side: two- to three-storied brick houses, chicken running loose, lorries bringing in heaps of scrap, workers hammering some rusty motor or sorting bits of plastic, and rice paddies (many of them untended); on the other: high-rise blocks, an artificial lake with a promenade, a profusion of ornamental plants, shops and boutiques, a luxury hotel, a massive school building, and a lot of elderly people hanging out with babies and small children. Those two worlds were located next to each other (fig. 2.7 and 2.8) but had little in common. Walking from one to the other gave me the impression of having passed through an invisible gate.

⁵⁹ It may well be that this appellation originates in a popular song entitled “Qingyuan, The Pearl River Delta’s Back Garden” (清远，珠三角后花园).

⁶⁰ Real estate agencies’ main sales arguments when it comes to selling properties located in (the south of) Qingyuan is the region’s proximity to both the metropolis of Guangzhou and unspoiled natural settings.

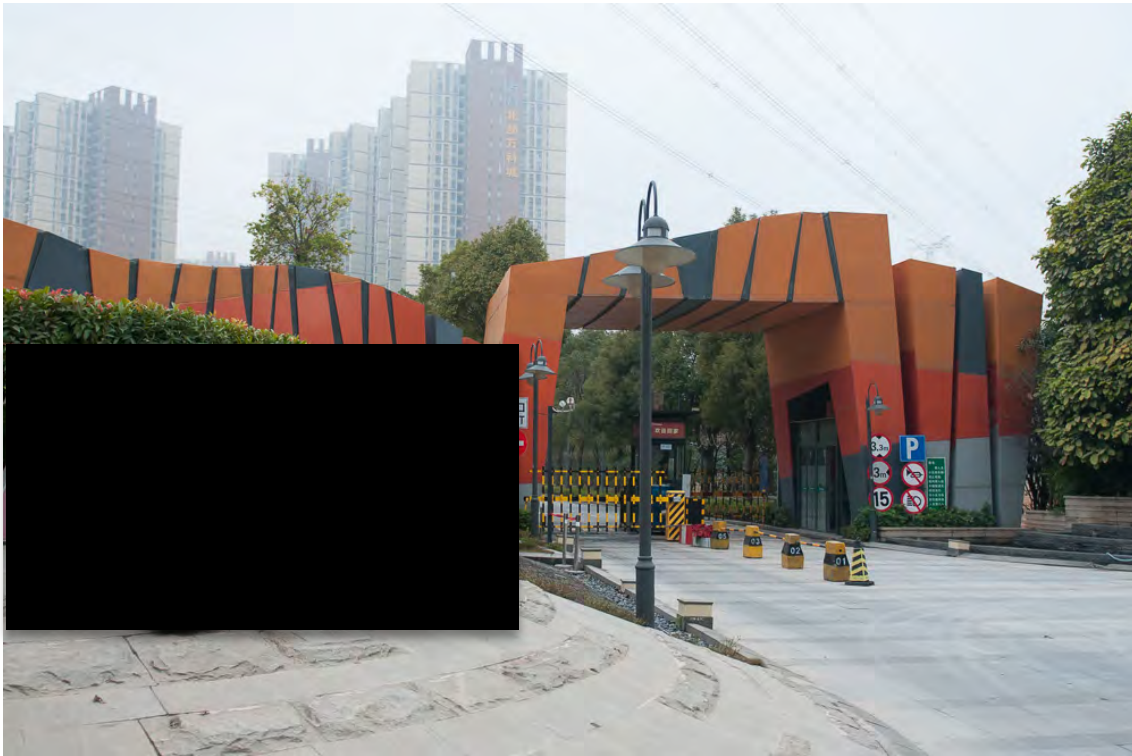


Figure 2.7: The main entrance to Rosy City. Photo credit: the author.



Figure 2.8: Rosy City seen from a distance. Photo credit: the author.

In their apartment on the twenty-seventh floor of a new and luxurious tower, Mr. and Ms. Yu explained to me that they had realized only after leaving Guangzhou that Rosy City was exposed to emissions from surrounding recycling operations. “Had I known, I would never

have moved in”, said Mr. Yu. “Up until last year, you could smell burnt plastic all day long.” He deeply regretted the contamination, because the region actually had a lot to offer, he argued. “Here, you find both mountains and water”, he said, echoing an ancient Chinese conception of what constitutes an ideal landscape⁶¹. Rosy City was also conveniently located on the highway linking Qingyuan to Guangzhou and close to two recently built high-speed railway lines, which put a lot more cities within easy reach. According to Mr. Yu, “dismantling workshops” (*chaijie hu* 拆解户) had been operating in the area for three decades. “They burn plastic waste in order to recover copper as well as other metals, which creates a very unpleasant smell”, he explained. “One of my neighbors is the first person to have become alert to this. He was sleeping with the window open and felt ill every night.” Mr. Yu was particularly concerned about bad air quality. When asked about other forms of pollution, however, he said he believed the soil and water must be contaminated as well. He emphasized the irony that, by moving to Rosy City, many of his fellow homeowners had wished to escape the pollution that affected Guangzhou. But it did not amuse him, quite the opposite.

Mr. Yu had a lot to share with me about the workings of Qingyuan’s scrap recycling industry and he appeared to be well informed — especially for someone who, as I later found out, had only exchanged a few times with local bosses and workers. He had conducted a thorough investigation of the situation in Longtang and come up with compelling explanations. Some of his statements did not tally with my own research data, which led me to suspect him of magnifying certain aspects of his story. Indeed, he might have been encouraged to indulge in sensationalism by the fact that I was accompanied during my first visit by a friend who worked as a correspondent for a foreign newspaper.

According to Mr. Yu, the scrap found in Qingyuan had a clear origin. He used the expression “foreign waste” (*yang laji* 洋垃圾), which Chinese state authorities coined to refer to illegal

⁶¹ *Shanshui* (山水), one of the terms for “landscape” in Chinese, consists of the characters “mountain” (*shan* 山) and “water” (*shui* 水).

imports of waste (see chap. 3), and explained that: “countries outside of China don’t want this stuff anymore, which is why it’s shipped to China”. He also tended to refer to all scrap in Qingyuan as e-waste, though the municipality, known as “China’s secondary copper capital” in the 2000s, abounded with scrap metal of all kinds in the mid-2010s. Processing e-waste could yield “huge profits” (*juda de liyi* 巨大的利益), he said: “some [bosses] are able to save 100 million RMB [approximately fourteen million USD] in five to six years” — a figure that far exceeds the profit range I came up with on the basis of other interviews. He described e-waste processing as an industry that allows people to make a fortune rapidly, but the expression he used, *baofa hangye* (爆发行业), implied that it also gives rise to a type of unscrupulous behavior proper to the nouveau riche. “Even those who know this activity has severe consequences still engage in it”, he stressed. In his view, the fact that many of the recyclers came from other provinces (*waidiren* 外地人) aggravated the problem: “they’ve come here with the sole aim of making money and don’t intend to stay anyway. That’s why they don’t care about the consequences.” Locals (*bendiren* 本地人) also benefit from the trade, Mr. Yu pointed out, as they rent out their land. “This allows some of them to make up to 250,000 RMB a year. Many of them have long left for Guangzhou, or to other large cities, and only come back on special occasions, so they are not affected by pollution”, he explained. As for local government officials’ attitude, Mr. Yu described it as mostly passive, which he attributed to the fact that scrap recycling accounted for a considerable part of the local economy (see chap. 4). He acknowledged that cracking down on polluters was not easy, but also judged the local government’s efforts to be insufficient, when not problematic. “The BEP patrols the countryside to spot people who burn waste and catch them red-handed, but when they arrive in a given place, these people are often gone”, he said, adding that as soon as controls weakened, illegal acts resumed. “[Illegal acts] often take place at night. It’s a cat and mouse game.” He acknowledged that the local government had recently taken steps to remediate pollution. At the end of 2014, “following the release of reports in the media”, slogans prohibiting open burning and threatening offenders had popped up on signposts

and walls throughout Longtang. I later photographed one of them, which read: “Those who ruin the environment will be punished using the weapon of the law” (谁破坏环境就用法律武器惩罚谁) (fig. 2.9)⁶².



Figure 2.9: A reminder by the Longtang government that polluters can be prosecuted. Photo credit: the author.

Mr. Yu welcomed the fact that the local government had taken action. But at the same time, he doubted the efficacy of this slogan campaign in preventing open burning. More generally, he questioned the local government's measures, claiming they were not up to the task. Corruption also posed a serious problem, he acknowledged. For instance, the former

⁶² Other examples include: “Launch a tough crackdown on the piling up of solid waste. Those who provide space [for the waste] will be fined” (严厉打击堆放固废行为，谁提供地方就处罚谁) and “Firmly punish all illegal acts of unqualified trade in household appliances, electronic parts, medical machines and radioactive substances” (坚决打击各类无资质经营家用电器、电子件、医疗器械及带放射性的物件违法行为).

director of Qingcheng District's Environmental Protection Bureau (EPB 环保局) had been arrested and imprisoned based on the accusation that he had accepted bribes from local recyclers. One of Mr. Yu's followers, whom I met at a later stage, indeed accused all local officials of being "corrupt, venal and bribe-accepting" (*tanwu fubai shouhui* 贪污腐败受贿).

However, it was not so much corruption that most disappointed and angered Mr. Yu as mismanagement and hypocrisy. Early in 2014, residents of Rosy City stumbled upon great quantities of waste, including "plastic dust" (*suliao fen* 塑料分) that had been dumped illegally in the forested hills that bordered their "community" (*shequ* 社区). According to Mr. Yu, this waste accounted for the unusual turquoise color of the lakes located in the forest, which meant that it might have contaminated the whole area, including the neighboring community. In order to draw attention to this case of pollution and defend their interests as owners of affected real estate properties, several residents joined forces and formed a "rights protection group" (*weiquan xiaozu* 维权小组), of which Mr. Yu became the spokesperson, and soon the most active member. They shot videos of the surroundings in order to document their case and even put them together into a movie. Mr. Yu screened it during our interview on the television set that stood in his living room. Entitled "The nightmare's origin: a report on pollution from e-waste burning in Qingyuan" (噩梦之起源——清远电子垃圾焚烧污染), the film combined aerial views of the region (fig. 2.10) with visual effects (including red smoke flowing from the picture frame), orchestral music of the kind often found in blockbusters, and statements such as "We don't want water that is contaminated with metals".



Figure 2.10: A still from the documentary shot and edited by citizen activists in Longtang. Source: Longtang Homeowner Group.

The homeowner “rights protection group” began by sending a petition to competent authorities at all levels of the Chinese administration (province 省, prefecture 市, county 区 and township 镇), but it received no reply and therefore decided to contact the media. As a result, a total of twelve newspaper and two television channels reported on pollution caused by e-waste in Longtang, according to Mr. Yu⁶³. Alerted by China Central Television (CCTV)’s coverage, in particular, district authorities decided to take action and, two days later, bulldozers and hydraulic excavators arrived at the dump and started burying the waste beneath a thick layer of earth. The group thereupon contacted the township-level authorities, who admitted having released an order to that effect, but also claimed to have acted in good faith. The authorities claimed that the South China Institute of Environmental Sciences (环境保护部华南环境科学研究所), whom they had mandated to conduct an

⁶³ See, e.g., “The Municipal Party Committee and the Municipal Government Pay Close Attention to the Problem of Burning Industrial Waste” [市委市政府高度重视龙塘焚烧工业垃圾问题], *Qingyuan Daily* [清远日报], December 12, 2014. URL: <http://www.gdqy.gov.cn/gdqy/400zwyw/201412/9a75afb7db1e4ffbabe07f8fa360ef92.shtml> (accessed 26.01.2017).

“environmental assessment” (*huanping* 环评 for *huanjin pinggu* 环境评估) of the dump, reported that burial was “workable” (*kexing* 可行) in that case.

Later, Mr. Yu brought my friend and me to the dump for a visit. We noticed that plastic flakes were still visible in some places — which may be an indication that the burying work had been carried out hastily. On one of the mounds, the propaganda (*xuan* 宣) department had placed a signboard with a slogan that read: “The environment and humanity coexist; simultaneously develop [the economy] and protect the environment” (环境与人类共存 开发与环保同步) (fig. 2.11). A few saplings had also been planted on the mound, but they were all in poor shape, which Mr. Yu attributed to soil contamination and saw as a proof of e-waste’s severe toxicity and harmfulness. He asked us if state authorities in Switzerland, our homeland, were also prone to such recklessness and deceitfulness. I tried to come up with a reply that would comfort Mr. Yu but failed, and he lost his temper for the first time in three hours. Not mincing his words, he declared: “We find this unacceptable and criminal!” Later, he stressed that, by covering the “waste mountain” (*laji shan* 垃圾山), the government had transformed it into a “hidden danger” (*henda de yinhuan* 很大的隐患), even a “time bomb” (*dingshi zhabao* 定时炸弹), whose toxic legacy would endure and poison future generations. That measure, he said, left homeowners feeling “perplexed” (*mimang* 迷茫) and abandoned.



Figure 2.11: Mr. Yu next to a signboard put up by the local government. Photo credit: the author.

In Mr. Yu's account, one could clearly hear contempt for the people who had contributed to Longtang's contamination or done nothing to prevent it. He portrayed them as greedy, reckless, ignorant and/or incompetent, and considered these flaws to be the source of the behaviors that degraded the region's environment. His criticism was aimed not only at former peasants directly involved in recycling but also at local officials. He made it clear that he did not trust the local government and that he believed officials at the lower levels of bureaucracy would only take action when forced by their superiors to do so. On the whole, Mr. Yu seemed to hold locals in low esteem, associating them with problems and never with solutions. His words were reminiscent of the kind of moral critique and social ordering typical of *suzhi* discourse, although Mr. Yu himself did not use the term during our conversations.

Another problem, Mr. Yu told us, was that China suffers from a "lack of democracy" (*quezhī minzhū* 缺乏民主) that makes it difficult for people like the inhabitants of Rosy City to put pressure on local authorities. As a result, the homeowner group's strategy had evolved towards addressing chiefly authorities at the national level. A member of the group had

recently contacted one of Guangdong Province's representative within the Chinese People's Political Consultative Conference (CPPCC), who promised he would mention their ordeal during the Conference's next meeting — given the CPPCC's limited powers, however, it is unlikely that this move would make any difference. A few days prior to our visit, Mr. Yu had also been interviewed by journalists from Xinhua (新华), China's official press agency, who hinted that they could report back to “leaders” (*lingdao* 领导) within the central government. This gave Mr. Yu hope that the latter would “pay attention” to the homeowner movement (or “take it seriously”, *zhongshi* 重视) and take action. Mr. Yu also had high expectations of the revision of China's Environmental Protection Law. “This new law will increase the pressure on polluters... if it is implemented”, said Mr. Yu. The revision made him confident that, on the whole, China was on the right track, so that his problems would one day come to an end. Yet he knew that a lot of laws and regulations in China become dormant due to local authorities' lack of implementation⁶⁴.

Like many other citizens, Mr. Yu seemed to believe in the notion that, in China, the center of power has good intentions, plans and leadership capabilities, but struggles to rule the country as it deems fit because its representatives at the local level tend to prioritize their own interests (see O'Brien & Li 2006). This notion runs as a trope throughout Chinese history and has deep roots in Confucianism. As a cultural repertoire, or an institution, it greatly enhances the legitimacy of the center and impairs that of the periphery. Emperors, chairmen, dignitaries and the like have always used it to their advantage. And this is also true if we look at e-waste: Beijing rarely takes the blame for anything.

Like other activists or protesters in China, homeowners in Longtang had to tread a fine line between trying to make the headlines — in order to alert central authorities to the “nightmare” they were living through — and avoiding exposing themselves to repression —

⁶⁴ See “Enforcement of the New Environmental Law: How Effective? How Problematic?” [新环保法实施 多少成效? 多少问题?], *New Environment* [新环境微信], December 10, 2015. URL: <http://huanbao.bjx.com.cn/news/20151210/690037-2.shtml> (accessed January 26, 2018).

a likely outcome given that powerful people such as local officials could feel threatened by their action. My journalist friend asked Mr. Yu how they addressed that challenge. “We are very careful not to do anything illegal, for example blocking a road. We strive to respect laws and regulations, and are careful to not disturb public order”, he said, later adding that: “local authorities have not been helping much. It would be the last straw if, on top of that, they prevented us from getting together and trying to find solutions!” Another homeowner, whom I interviewed later, insisted that although their group was “protesting” (*kangyi* 抗议)⁶⁵, its goal and action were legitimate:

“Actually, we don’t want to oppose [*duikang* 对抗] anyone, not the government, not bosses. We just wish that everyone would respect the law and cherish the environment. You produce, make profit, or start a company, that’s fine, but only if you don’t destroy the ecosystem or human health and safety, or cause people to fall sick. Doing that in order to make money is what we are firmly opposed to [*fankang* 反抗]. We’re happy if you earn money, but don’t affect us, don’t affect future generations. I mean, I don’t want to make enemies with anyone. [...] I’m not talking about rising up in rebellion [*zaofan* 造反], or using weapons to hit someone, but about using the law to protect rights. Why would I be afraid of you? Moreover, I’m not against the Communist Party’s regime. I’ve never been. That’s also why I tell homeowners that we are handling affairs according to the law [*yifa banshi* 依法办事]. There’s a bottom line: you can’t act foolishly [*luanlai* 乱来], you have to follow legal procedures. That’s the way it is.”

Clearly, this homeowner sought to bolster the homeowner movement’s legitimacy by framing its action as taking place within an officially acceptable, even desirable, framework. Aware of the risk that the homeowner movement be perceived and treated as a threat to public order, he tried to defuse it by emphasizing the movement’s respect of the law and its non-confrontational approach. His statement not only refers explicitly to legal procedures and the Chinese Communist Party, but also has an undertone evocative of the ideal of an

⁶⁵ He pronounced the word *kang* 抗 a great number of times, in expressions such as “to make a stand against” (*kangzheng* 抗争), “stand up to” (*dikang* 抵抗), “protest” (*kangyi* 抗议), and “resist toxicity” (*kangdu* 抗毒).

“harmonious society” (*hexie shehui* 和谐社会), a core concept in early twenty-first century CCP propaganda.

When I met Mr. Yu, he was sparing no effort to make Rosy City live up to its name. Asked what his incentives were, he first explained that he was a Buddhist and that, as such, he sought to “garner merits” (*jide* 集德): by improving the well-being of other living beings, he believed that he was also taking care of himself. He also mentioned another motivation, namely his investment in real estate. In contrast to religious belief, this is something all homeowners had in common. “This complex covers a large area”, he explained, “it is planned to host 30,000 households or 100,000 inhabitants. As of today, however, only 1200 households, or 4000 people, have moved in”. In other words, the residential complex was almost empty — and construction would be completed only in 2020. At a time when real estate prices in Guangdong Province were constantly on the rise, the price per square meter of apartments in Rosy City (around 5000 RMB) had been stagnating for three years. Some 10,000 apartments had been sold already, but it was becoming hard to resell them. “The occupancy rate remains very low”, acknowledged Mr. Yu. He himself intended to move back to Guangzhou, where he and his wife still owned an apartment, if the situation did not improve. “I won’t sacrifice my health”, he explained. Leading a healthy lifestyle was the reason why he had come to Qingyuan in the first place, so he would not compromise on that. Finally, Mr. Yu thought that the timing was right: concerns about the quality of the environment had become commonplace in China, so a movement that pushed for better environmental protection had good chances of success.

After our interview, Mr. Yu invited my friend and me to visit the region, together with another homeowner. We all climbed in his car and drove through several settlements involved in recycling. We stopped a few times along the way, but never stepped out of the car. Mr. Yu and the other homeowner were vigilant, at times almost tense, as if we were taking a risk by venturing into rural Longtang the way we did. This contrasted with my experience of exploring the region on my own, mostly by foot, and feeling rather safe — though it must be noted that, as foreigner in China, I have a special status, unlike Mr. Yu. Given the widely differing — one could almost say opposite — interests of these two groups of people (homeowners and recyclers), one can understand the former’s wariness and reluctance to go out and meet with the latter. But I would argue that the antagonism had

deeper roots. It testified to the sizeable, and still growing, rural-urban divide that affects twenty-first century Chinese society (Lai 2016) as well as to the portrayal of e-waste-related work carried out by self-employed migrants and independent small businesses as criminal.

The way in which Mr. Yu guided us through Longtang and commented on what we saw gave me the impression that every pile of stuff amounted, at least potentially, to a dangerous source of toxic waste, every boss or worker to a violator. According to him, all the scrap under our eyes definitely qualified as e-waste and “foreign waste”, and it needed to be cleared out entirely. On this topic, he mentioned that the district government had given bosses in Longtang until September 30, 2015 to either shut down their scrapyards or move them to one of the “industrial parks” (*chanye yuanqu* 产业园区) located in Shijiao (石角镇), the neighboring subdistrict (see chap. 4). “Those who comply will be allowed to continue operating, the others will be sanctioned [*qudi* 取缔]”, Mr. Yu explained. He seemed unsure whether the government’s plan to “move away” (*qianzou* 迁走) small workshops would materialize and suggested that implementation would take more time than expected, but he liked the plan. It represented a drastic solution likely to free Longtang from polluting activities.

Mr. Yu and the group of homeowners he represented can clearly be analyzed as a NIMBY movement:

“The acronym NIMBY stands for ‘not in my backyard’. It is a term that has been used to characterize local, grassroots movements that are endeavoring to resist the siting of some unwanted land use in a particular neighborhood, community, or region. NIMBY movements have formed to oppose a wide array of undesirable entities that include environmental hazards (landfills, waste incinerators, polluting industries), [...] Critical perspectives emphasize that the term can be applied in a pejorative, dismissive sense, where the motivations behind the movement are viewed as selfish and exclusionary.” (Driscoll 2013)

What mattered most to the homeowners I studied was that the places where they lived and/or had bought property (i.e. Longtang and to a lesser extent also Shijiao) be made free of what they perceived as a terribly polluting activity. Their fight was limited to a circumscribed geographical area that affected them directly. What happened outside of this area did not seem to matter much for them. At least, they rarely talked in general terms, e.g. of e-waste as being problematic throughout China or of polluting activities in the countryside as affecting the country as a whole (see Deng & Yang 2013). Research has shown

that some NIMBY movement eventually abandon their geographical focus and start making claims about an issue that are not place-specific (see, e.g., Johnson 2013). Some even morph into larger NOPE (for “not on planet earth”) movements (Driscoll 2013). When I met Mr. Yu and his acolytes, however, they were preoccupied above all by their own health and well-being, as well as with the monetary value of their property. This fight alone kept them quite busy.

Mr. Yu and the other homeowners in the group actively tried to raise awareness among local inhabitants, but they were selective in whom they addressed. They concentrated their efforts on those people living in gated communities, like themselves. In other words, their efforts at mobilizing participants were focused on their own socio-economic category. People who did not belong to that class or category were not formally excluded from joining the movement but also not particularly welcomed to do so. Yet, homeowners were not the first people in Qingyuan to raise their voice and present themselves as victims of pollution. I learned from Mr. Yu himself that protests had taken place in Longtang as soon as 2012, when “locals who don’t benefit from scrap recycling” had demonstrated in front of the government’s headquarters. One might therefore have thought that homeowners in Rosy City and other gated communities would take this as a starting point and build on it. This is not what happened. They did not seek to join or relaunch this preexisting movement, or to contact the initial protesters in order to coordinate their respective action, but preferred instead to start from scratch and create their own movement. This, in my sense, is symptomatic of the gap that separates (originally) urban, middle-class Chinese from their (originally) rural, working-class compatriots.

By targeting e-waste and the people who make a living by trading and transforming it, Mr. Yu and his fellow citizen activists managed to achieve considerable frame resonance. As we have seen in the first section, the phenomenon and the people associated with it had already received plenty of bad press in China. They could be considered to be ready-made culprits. Blaming them was easy, as it required only picking from a set of received ideas and commonplace arguments. However, this strategy also had its limits. Homeowners in Qingyuan became aware of that when they realized this, by focusing exclusively on the e-waste recycling sector, they had ignored other sectors of industrial activity that shared responsibility in the damage done to the local environment.

2.2.2 One problem can conceal another

As the context in which they operate changes, social movements need to adapt, which requires them to seek new alignments between their frames and others'. That became particularly obvious in Qingyuan in January 2016. A year had elapsed since my first visit to Mr. Yu. In that time, most small workshops in Longtang had been forced to close (see chap. 4), so DEEE dismantling and processing barely took place anymore, at least not close to Rosy City. And yet, homeowners continued to be confronted with pollution. "There is no more open burning by dismantling workshops, but a new problem has surfaced", Mr. Yu told me. "The air is not pure yet. We've noticed an improvement compared to the original situation, but the problem hasn't been solved entirely and thoroughly". A pungent smell lingered in the area, which Mr. Yu attributed to the fact that "licensed small companies" (*youpai youzheng de xiao qiye* 有牌有证的小企业) "stealthily discharge" (*toutou paifang* 偷偷排放 or *toupai* 偷排) waste water. "These companies are adjacent to dismantling workshops, so we didn't notice their emissions until recently," he explained.

The new situation forced homeowners in Longtang to revisit the origins of their pollution problem as well as to look for new ways of tackling it. "[Thus far], responsibility for the contradiction [between economic and environmental interests] lay with dismantling workshops," Mr. Yu acknowledged, "but now that they've all been done away with [...], licensed companies that possess credentials and comply with environment-protecting and energy-saving standards are stealthily discharging [waste water]. We're faced with a major new issue." Mr. Yu managed to garner support within the region's five large gated communities, which, he claimed, were all affected, and to discuss the new situation with local government officials. But these actions yielded "weak concrete outcomes", he conceded. "It's not as easy as with e-waste dismantling workshops, [because] these companies received their licenses from the government itself", Mr. Yu remarked. "They are not up to environmental protection standards, but if they were to be hit suddenly, they would not have any income anymore and the government would lose tax revenues. I think it would be difficult for [the government] to cut itself with its own knife." Besides, some of these companies belonged to industries that were "pillars of local economic development" (*dangdi jingji fazhan de zhizhu chanye* 当地经济发展的支柱产业), Mr. Yu said. He doubted that the

local government would do anything to strengthen controls on them. On that front, frames were badly misaligned.

As long as Qingcheng District hosted e-waste dismantling workshops, they were the ones who took the blame for pollution. Other industrial actors, such as manufacturing plants and metal smelters, which also abound there, were largely sheltered from public scrutiny. This holds true in connection with discourse produced not only by homeowners or the media but also, and more generally, by all social actors claiming to be concerned about the quality of the environment in the district. Dismantling workshops constituted an easy target for criticism and repression, as they were: small in size; mostly operated by bosses and/or workers from other provinces; and unregistered and/or unlicensed. As poster-children for backwardness, risk and contamination, they made perfect scapegoats. But they had no sooner vanished than other industrial actors came to the fore with equally unscrupulous practices. All of a sudden, homeowners realized — or were forced to recognize — that economic development in the region relied on several types of business entities and several sectors of activity — not just one — that were all, to a certain extent, responsible for its negative repercussions on the environment.

Mr. Yu seemed determined to denounce polluters regardless of their size, identity, background and connections. He was aware of the difficulties that entangled loyalties and legal legitimacy might pose, but they did not hold him back. According to him, homeowners now sought not only “regular dialogue” (*jingchangxing de duihua* 经常性的对话) with the local government but also direct “exchange” (*jiaoliu* 交流) with officials higher up in the hierarchy. Many of them had signed an official letter asking for an audience (*shangfang shumian cailiao* 上访书面材料) with the municipal bureau for complaints (*xinfang ju* 信访局), the provincial government and EPD, the MEP, and competent disciplinary commissions. But the fight against licensed companies presented itself as more difficult than that against dismantling workshops — which, all things considered, had been relatively straightforward. As Guobin Yang (2010) observes, environmental issues that are “contentious” and “linked to the interests of powerful business and political actors” rarely make it into the public sphere in China, unlike “politically safe and innocuous” ones (abstract).

This new fight also risked exposing Mr. Yu and his fellow homeowners to a new kind of danger. Ma Ming, a professional environmentalist working for a Beijing-based NGO who

had heard of Qingyuan's citizen activists and whom I introduced to Mr. Yu, remarked that he found it "a bit annoying" (*youdian mafan* 有点麻烦) — a euphemism — that homeowners now had to confront legitimate actors such as registered, licensed companies, and were poised to do so by attracting media attention. Ma Ming knew first-hand what that could trigger: he had got into trouble a year earlier for accompanying a Japanese journalist on a coverage of a case of pollution in Jiangsu Province that involved a large, licensed company. The two men were arrested by the local Security Bureau (公安局) and subsequently released without charges, but not without consequences: Ma Ming later realized that he was often being followed by strangers. As a result, he tended to remain on his guards at all times. He recommended that homeowners adopt similar precautions, even that they start "working in coordination with a lawyer" (*lüshi xietong* 律师协同), who could provide much needed help in case things went wrong. From Ma Ming's perspective, Mr. Yu was right to consider theirs a "thorny matter" (*jishou de wenti* 棘手的问题). Fundamentally, the homeowners' fight remained the same, but its political implications had shifted.

2.2.3 Invoking other health and environmental woes

Homeowners referred principally, but not exclusively, to e-waste to bolster their message and strengthen their case. At times, they also mentioned other issues that have long reached the status of public problem in China, always with the aim of achieving frame resonance. This is most apparent in a series of statements made by Mr. Zhu, a retired policeman who owned two apartments in another gated community called Precious Woods. I met him in January 2016 during a meeting with homeowners organized by Mr. Yu for myself and a couple of Chinese environmentalists (fig. 2.12).



Figure 2.12: A meeting grouping together homeowners, professional environment activists and a foreign academic researcher. Photo credit: Mr. Yu.

During this meeting, Mr. Zhu made more or less explicit references to several of China's most prominent health and environmental issues, in a clear effort to advance his and his fellow homeowners' cause. First, he claimed that Longtang and Shijiao abounded with "cancer villages" (*aizheng cun* 癌症村), i.e. places notorious for their rates of cancer, which soar far above the national average on account of industrial (or, in some cases, agricultural) pollution⁶⁶. He said that he had conducted a personal investigation of villagers' health and found that, in every village in the area, one to two deaths per year were due to cancer, and that the disease struck not only adults and the elderly, but children too. Portraying Qingcheng District as an agglomeration of "cancer villages" would attract much (negative) publicity, and therefore attention, if it were to be recognized as such. And attention was

⁶⁶ See, e.g., "Inside China's 'Cancer Villages'", *The Guardian*, June 4, 2013. URL: <https://www.theguardian.com/world/2013/jun/04/china-villages-cancer-deaths> (accessed January 26, 2018).

precisely what homeowners in Longtang and Shijiao were after⁶⁷: like participants in any social movement, they sought sustained media coverage as a way to trigger action from state authorities, in this case the provincial and central governments. As Mr. Zhu himself summarized the situation: “What are we aiming at? Having a bigger impact in resisting toxicity [*hangdu* 抗毒] and protecting rights. Letting society as a whole know [about our movement]. If higher authorities pay more attention, we will have achieved our aim.”

Mr. Zhu referred most often to air pollution, the type of pollution arguably deemed most problematic in present-day China.

“Children often cough and get headaches breathing these things. The same goes for old people. I’m neither old nor young, but I can’t stand it either. Every morning, when the wind blows from the north, I go to the northern part of my garden, I take a deep breath and all I can smell is this [odor] [...]. It hasn’t stopped, it’s been the same kind of pollution all along: the air.”

Similarly, when Mr. Zhu created a banner to mobilize homeowners in Precious Woods, he printed it with the following slogan: “Resist [*dizhi* 抵制] e-waste burning. Protest [*kangyi* 抗议] against companies stealthily discharging noxious gases [*toupai duqi* 投排毒气]. Give back fresh air to proprietors.” Foregrounding air pollution — instead of, say, water or soil pollution — was a way for Mr. Zhu to not only relay homeowners’ main preoccupation, but also give their message more teeth, since air quality plays a prominent role in discussions of, discontent about, and protest against environmental degradation in twenty-first century China. Mr. Zhu’s message thus resonates with that of many more people in China, especially other members of the urban middle-class, where citizen mobilization against air pollution is most pronounced.

⁶⁷ It must be noted, however, that not all homeowners in Longtang and Shijiao agreed with, and backed up, the protest movement. Mr. Zhu acknowledged that some of them opposed it and regretted its repercussions. One man, in particular, told him to stop making so much noise around pollution. He wanted to avoid any form of publicity for fear that the ten properties he had bought would become difficult to resell at a profit or at least without loss.

Indeed, issues such as smog and emissions from incineration plants have regularly hit the headlines in recent years. Smog tends to reach alarmingly high levels in wintertime and in the north, which forces residents in that part of the country to radically change their lifestyles, factories to halt or reduce production, and companies to consider moving elsewhere. It also infuriates a great many people in China and generates apocalyptic imagery that appalls readers and viewers throughout the world. Smog has been a hot topic in China for the best part of a decade and is now a source of widespread concern among the Chinese population. The great success of *Under the Dome* (*qiongdong zhi xia* 穹顶之下) (Chai 2015), a documentary addressing the issue shows this particularly clearly. Released in 2015, the film immediately went viral, triggering a staggering 300 million views within a week — after which the Communist Party’s propaganda department (中宣部)⁶⁸ confidentially ordered the film to be pulled offline. Today, most people in (Northern) China agree that smog must urgently be brought back to more bearable levels. Hence, governments at both the central and municipal levels are at pains to tackle the issue and publicize their efforts.

Another major area of contention regarding air quality in China centers on the siting of incinerators dealing with municipal solid waste (MSW). Several factors (including incinerators’ large size, Chinese MSW’s high water content, low pollution control requirements, and companies’ partial compliance)⁶⁹ come together to make waste burning in urban China a cause of serious concern among the local population (Johnson 2013). Incinerators tend to be built in city outskirts, sometimes in close proximity to residential areas populated by middle-class Chinese, who are then exposed to toxic fumes and foul odor on a daily basis. Disgruntled, and fearing for their health as well as for the value of their

⁶⁸ The department is officially referred to in English as the Publicity Department of the Communist Party of China (CCPPD) so as to avoid the negative connotations of the word “propaganda” in that language.

⁶⁹ See “China’s Trash Is Getting Dirtier”, *Bloomberg View*, September 18, 2004.

URL: <https://www.bloomberg.com/view/articles/2014-09-18/china-s-trash-is-getting-dirtier> (accessed January 26, 2018).

property, these citizens often group together to oppose incinerators being built or operating in their area or, at least, call for pollution abatement measures. These NIMBY movements pop up frequently, attract considerable media attention, and enjoy sympathy among the wider population, so that municipal governments are forced to study facility siting carefully⁷⁰.

2.2.4 When two worlds clash

The above case study around Qingyuan's homeowner movement reveals the haphazardness that characterizes economic development in late twentieth and early twenty-first century China. The region, originally involved exclusively in farming, experienced rapid growth and was transformed as a result of two successive booms triggered by, first, scrap recycling, and later, real estate development. This led to the coexistence of three different types of land use (fig. 2.13) and to a situation fraught with tensions. In Longtang and Shijiao, people who have little in common occupy the same territory, but use it in ways and for purposes that differ greatly. Conflict of interests abound and create a gap between communities.

⁷⁰ See "As China Pushes Waste-to-Energy Incinerators, Protests Are Mounting", *Yale Environment* 360, April 20, 2017. URL: <https://e360.yale.edu/features/as-china-pushes-waste-to-energy-incinerators-protests-are-mounting> (accessed January 26, 2018).



Figure 2.13: A map of Longtang. Source: Google Earth, annotation by the author.

The striking thing about the homeowners' discourse is that it expressed these tensions primarily through one language, that is, the language of e-waste. Out of all the frames available to them, homeowners chose to align first and foremost with those of e-waste, more specifically: pollution, illegality and backwardness. This is significant. It proves the issue's established status as a public problem and the solid anchoring of its dominant framing. For homeowners, referring to e-waste was an obvious choice. The dominant framing of e-waste represented a potent tool that would allow them to draw more interest than if they were to speak of, say, "scrap metal" (*fei jinshu* 非金属) — which probably made up the bulk of what got dismantled and processed in Qingyuan. By protesting against e-waste, and everything that it is associated with, they could more effectively oppose what they saw as an outdated model of development — in which profit and pollution go hand in hand, state authorities cannot be trusted, long-term investments lead to bad surprises, and so on — and denounce its negative repercussions on their lives.

2.3 Conclusion

This chapter gives an account of how the issue of e-waste came to matter in China. In the first section, I have analyzed how this issue developed into a public problem, focusing on

the claims-making process and the progressive emergence of a dominant framing. I've done so by looking at a variety of claims and claims-makers. I began by tracing the roots of the inextricable link between e-waste and the town of Guiyu, in Guangdong Province. This led me to observe that environmental activists, both foreign and Chinese, had played a key role early on (see Yang 2005): they are the ones who defined the nature of the problem (pollution and global injustice), explained why action needed to be taken (to protect Chinese people) and recommended a certain course of action (put an end to DEEE exports from abroad). These frames have had a great influence on all subsequent ones, as the following chapters shall make clear. Most importantly, environmental activists defined the problem as arising at the consumer, and not at the producer level. This crystallized into one of the dominant framing's main features. With respect to the Chinese media, I argued that they not only reproduced the activists' frames but also added to them. In particular, they ascribed responsibility to a different set of social actors: the very people involved in the trade and transformation of DEEE in China. By doing so, they politicized the issue in a whole new way. As I observed, a third group of claims-makers, namely industrialists, used this new frame for their own purposes. They realized that it could give them an edge over their competitors and were determined to take advantage of that.

In the second section, I have looked at how a social movement that came into being in Qingyuan in the mid-2010s used the dominant framing of e-waste to pursue its own objectives. Focusing on homeowners, the main protagonists in this movement, I have shown how they used e-waste and its typification to mobilize resources around them and generate approval and support for their cause. In particular, I have highlighted how they established connections with journalists, activists and experts so as to publicize and legitimize their claims. This suggests that there was a consensus in China about how problematic e-waste is, what the problem consists in, and what solutions are called for. Homeowners felt confident enough about this consensus to make the fight against e-waste the cornerstone of their strategy and to ask for support from state agencies at China's highest administrative level, the central government. However, seeking resonance with the frames of e-waste could also lead homeowners astray, as I have demonstrated. Fundamentally, their fight had to do with more general processes of industrialization and urbanization, and with the coexistence of multiple and conflicting types of land uses.

In this chapter, I have focused exclusively on e-waste, which is only one among many social and environmental issues linked to the activities of the electronics industry. This is partly because I have personally conducted little to no research on other issues. However, more importantly, this is also because e-waste, unlike many of those other issues, did reach the status of public problem in China. It is clear from the literature that working conditions inside Chinese factories manufacturing electronics, for instance, are dire. The world was made aware of this when a series of young migrants working for Foxconn, a company that produces EEE for many of the world's most famous brands and employs millions of people in China, committed suicide in 2010, making headlines and putting the company under sustained scrutiny, at least outside of China. More generally, many Chinese workers employed in electronics factories in the Pearl River Delta have been diagnosed with severe illnesses, including cancer, and some have died. These issues have been denounced for years by a small but dedicated community of activist and academics (see, e.g., Pun 2005, Leong & Pandita 2006, Chan & Pun 2010, Pun & Chan 2012, Chan et al. 2013, White 2017), many of whom are based abroad, or in Hong Kong, and collaborate with workers and activists based within mainland China. And yet, they did not develop into full-blown public problems within China. The same could be said about environmental degradation arising from highly toxic industrial processes, such those linked to microchip production.

How come? What is the difference between these issues and that of e-waste? To put it simply, these issues strike at the heart of the electronics manufacturing industry, a key sector in the Chinese economy, whereas e-waste does not. In its crystallized form, or what I have referred to above as a dominant framing, e-waste has very little to no links with China's manufacturing industry. It appears as a separate, almost unrelated issue. It is therefore unlikely to draw attention to the negative impact of an industry cherished by Chinese state authorities, and Chinese and foreign corporations alike.

In the account of the social construction of e-waste given above, one aspect should come as a surprise: the absence of controversies. Generally, the various claims made about an issue in the process known as the social construction of a public problem are not necessarily compatible with one another. Claims-makers may disagree with and oppose each other. A controversy occurs when they engage each other in the public arena with the aim of strengthening their own claims and weakening those of their opponents. Controversies are a

fundamental aspect of the social construction of public problems and can be observed in just about any field. They have triggered particular interest among social scientists in relation with science and technology (see Latour 1987, 2005). E-waste can be approached from this angle as well, and several prominent controversies about e-waste, or waste more generally, can be found in the English-speaking world.

One of them concerns the question of environmental dumping. BAN, the American environmental NGO, has consistently framed the e-waste problem as having to do first and foremost with environmental dumping. Several experts, both academics and specialized reporters, have questioned this frame and its relevance for explaining the transnational trade in DEEE (see, e.g., Minter 2013, Lepawsky 2014). Graham Pickren (2014) argues that the environmental dumping narrative constructs the e-waste problem in ways that render it “governable”, but simultaneously produces an abstraction that oversimplifies and reworks the “fetish” of what e-waste is, where it goes, and how it should be managed. This discourse serves BAN’s objectives, Pickren remarks, one of which is to put an end to DEEE exports from the USA and similar countries. Indeed, BAN has been a staunch advocate of a blanket ban on DEEE exports for years. This, in turn, has drawn more criticism from researchers and academics who argue that such a radical measure would not solve the problems at hand, contrary to what BAN and others claim, and might even aggravate them (e.g. Burrell 2016, Williams 2013).

Another prominent controversy concerns e-waste’s status as post-consumer waste. Thus far EEE-related waste has been tackled by national policies in most countries as a subcategory of municipal solid waste. Several experts question this dominant framing, in which e-waste appears first and foremost as a back-end problem. Geographer Josh Lepawsky (2012, 2018), for instance, stresses that the end-of-pipe approach to e-waste characteristic of national legislations found in North America emphasizes the harmful impact of consumption and obfuscates that of production. This approach, Lepawsky argues, shifts the burden of dealing with e-waste away from corporations to government authorities and local communities (see also MacBride 2010 and Liboiron 2014). That would not be the case with a more holistic approach (see, e.g., Gabrys 2010), which would define e-waste in less restrictive terms and therefore include, among others, byproducts from the manufacturing of microchips or the mining of metals.

Such controversies are part and parcel of the social construction of e-waste as a public problem. They can be encountered quickly by anyone who takes an interest in the issue. One would therefore expect that controversies of some kind would have found their way into debates in China as well. Yet, I was not able to identify a single one. Did I miss something obvious and inadvertently paint a picture of the claims-making process within China as being more coherent than it actually was? Or did I not notice any controversy simply because there was none? I would argue that it is neither one thing nor the other. These questions raise a third one, which is more fundamental, namely: could it be the social construction of public problems follows somewhat different rules in a country like China, which has many of the features of authoritarianism, than in countries described as “liberal democracies”? The social constructionist literature on public (or social) problems developed deep roots in the USA and influenced researchers in other countries as well (including in France, see Cefaï 1996 and Cefaï & Terzi 2012), but it cannot be said to have engaged with a variety of geographical contexts. Quite to the contrary, the vast majority of contributions are based on studies carried out in the USA or at least in other countries described as liberal democracies. There is little indication that the key insights and concepts found in this literature can be applied universally. To a certain extent, it may well be based on an ethnocentric bias.

Obviously, I am convinced that most of these insights and concepts can be applied fruitfully to the Chinese context, otherwise I would not have opted for doing so. But the idea of controversies as an essential part of the process by which public problems are socially constructed, and a part that can be relatively easily studied and described, strikes me as being more relevant in some national contexts than others. To be sure, controversies exist in China, like anywhere else. But I would argue that they have less chances of taking shape in public, growing in importance and remaining accessible in China than they do in countries where criticism of government action permitted and freedom of the press, freedom of speech and academic freedom are protected by legal rules and acknowledged as crucial to a lively “public sphere”. In China, the state has progressively retreated from many areas of social life since the late 1970s, thereby making room for increased public debate, but the government remains very invested in the control of critical opinions. Today, it dedicates a considerable amount of resources to preventing those critical opinions from ever making it into the public arena or, when they do, to making sure that they disappear quickly and

without a trace, as we have seen with the “disappearing” of the documentary *Under the Dome* (Chai 2015).

I experienced personally how difficult it is to create and sustain controversies in China through the reception of my research in China — though lack of reception would be more appropriate. A professor at the Sun Yat-sen University in Guangzhou had kindly accepted to grant me the status of visiting scholar at his research center in 2014. The only requirement was that I give a talk as part of a monthly “academic salon” and publish an article presenting the work I had done so far. A mere fifteen people attended the talk and, judging by the composition of the audience, half of the participants were stand-ins while the other half had been hand-selected and dispatched by someone. Later, I started working on the written version of my paper and enrolled a graduate student experienced in publishing papers in Chinese academic journals to help me translate mine from English to Chinese. The paper was basically an early formulation of the ideas found in the present chapter. I wondered whether it would pass the review process, not so much because I thought it was not good enough but rather because I feared that reviewers might disapprove of my critical stance, especially my description of the “formal recycling system” set up by Beijing. I also wanted to avoid negative repercussions for myself or my student colleague, who had contributed to the paper to such an extent that she was mentioned as co-author. She agreed that there was a strong likelihood that our paper would be rejected on ideological grounds but suggested that we submit it anyway. “It’s worth giving it a try”, she said, “you never know.” I therefore sent it to the professor, from whom I never heard back. Several months and follow-up emails later, I met him at a conference and asked him about my paper. He mumbled something about the topic being “sensitive” (*mingan* 敏感) and the timing less than ideal. Later, I submitted the paper to two academic journals in mainland China, but never heard back from either of them. I know that the paper made it to the pre-review stage in at least one of them. Annoyed and embarrassed about the waste of time and energy, I decided to give up. My student colleague did not hold it against me. One of the ways in which she explained our failed attempt is by saying that that: “It’s very difficult to publish in China if you don’t use quantitative data. Qualitative research involves assessment, judgement, which opens the door to discussion [*pinglun* 评论] of state action. Since the Chinese government doesn’t allow criticism, this type of research doesn’t make it into academic publications.”

Looking back, I can see that my encounter with a dominant framing and a lack of controversies had a strong influence on my thinking and my research plan. In particular, it prompted me to take nothing for granted and to shape my research agenda around ideas and perceptions that, I felt, badly needed to be challenged.

3 NO LONGER THE WORLD'S DUMP

Policies and regulations in China distinguish DEEE according to geographical origin and provide for different rules for domestically generated and imported DEEE. I have decided to follow this distinction in my thesis, even though it has limitations, as it allows me better to speak to various bodies of literature. Two separate chapters therefore deal with these two issues: transboundary movements of DEEE and DEEE generation within China. The present chapter addresses the first of these and covers border crossing in both directions: from foreign countries or territories to China and vice versa.

As we have seen in the previous chapter, the circulation of DEEE on a global scale lies at the heart of the construction of “e-waste” as a public problem. From the early 2000s onwards, a series of media reports, academic studies, artistic depictions, state policies and legal instruments have linked this circulation closely to the severe pollution that affects rural and peri-urban recycling hubs and their inhabitants in various parts of the world. An environmental justice perspective informs much of this work, which, when based on careful empirical study, tends to highlight the complex workings of global inequality and, when more polemic in orientation, reduces transnational trade to environmental dumping (Goldstein & Schulz 2015). In China, the approach to e-waste as a foreign threat likely to materialize through environmental damage also played a key role at the turn of the century. It prompted the central government to develop the first DEEE-specific policies and regulations in the 2000s, became the core of state rhetoric and tactics on transboundary

movements of DEEE (as well as other forms of scrap) in the 2010s, and consistently informed media reporting on e-waste throughout these years.

In this chapter, I scrutinize the emphasis laid upon “e-waste”’s distant origins, undesirability and dirty and dangerous character, focusing mainly on state action. I note that this informs many of the official measures adopted with the aim of dealing with the issue of e-waste in China, in particular a ban on imports of DEEE that was first imposed in 2000 and later expanded. I seek to explain why this emphasis not only appeared in the first place but also, and more surprisingly, remained strong throughout the first years of the twenty-first century.

This was anything but predictable. Several key developments in those years suggest that a significant change in the official stance towards DEEE imports could have occurred, or at least that it seemed plausible. First, during the same period China also experienced a boom in domestic DEEE generation. Figures on the amount of DEEE discarded within the country grew at such a rapid rate that it was obvious it would soon dwarf DEEE sourced from abroad. That could have made the latter issue seem less problematic and pressing than the former, at least from a pragmatic perspective. Second, the country’s demand for material resources kept on rising. One might have expected that this would make foreign scrap, an abundant and easily accessible source of raw materials at the time, ever more attractive and that state authorities, among others, would prize it. Third, and linked to the two previous points, the expansion of the domestic DEEE recycling business in China from the late 2000s onwards meant that the country was on its way to acquiring the technologies, capacity and know-how necessary to treat large quantities of DEEE using industrial methods and to control pollution at the same time. Tellingly, in the early 2010s, some foreign experts thought it likely that the ban on imports of DEEE would be lifted at some point (see, e.g., Yoshida 2013:48).

There were good reasons to believe that state authorities might grow more tolerant towards, perhaps even welcoming of, foreign DEEE over the years. Yet, the opposite actually happened: instead of reversing its policy, the Chinese central government reinforced it and put more resources into its implementation. The conditions under which scrap was allowed into the country grew increasingly restrictive. Imports of DEEE became forbidden not only in the form of devices or components but also materials, in particular plastics. A strong

official rhetoric developed that portrayed “foreign rubbish” (*yang laji* 洋垃圾) as a nuisance and dictated that it should be prevented from penetrating the national territory. Joint ministerial operations were launched to put an end to “smuggling” (*zousi* 走私) and clamp down on the independent scrap recycling sector that DEEE imports had brought into being and fed.

Why is that so? What motivated the higher levels of government in China to maintain a coercive and prohibitory stance towards DEEE from abroad? According to official sources, the purpose of the import ban and associated enforcement measures was to prevent further pollution from e-waste and bring order to an unruly recycling sector — a justification that has been remarkably consistent over the years. Below, I make clear that this official version — one could even say party line — should be taken seriously, but not at face value. It is a powerful and at the same time incomplete explanation. Most crucially, it is an explanation that obscures other factors and considerations, some of which seem to weigh more heavily in the government’s decision to ban scrap imports. Therefore, I argue, we need to look beyond environmental protection and legal compliance if we are to understand the overarching goals that motivate the state’s refusal of non-Chinese DEEE and its demonization of the traders.

Three sections make up this chapter. The first one explains how and why China became the world’s main destination for scrap. It contextualizes the growing influx of DEEE to China and recounts the transformation of the recycling sector that accompanied it. A second section presents, in chronological order, the major policies, regulations and organized actions through which authorities in China, in particular those at the central and provincial levels, sought to tackle the issue of DEEE imports. On the face of it, their stance may appear consistent and their strategy successful, but upon closer scrutiny we find inconsistencies, loopholes and a lack of enforcement and effectiveness. In the third section, I turn my attention to the issue of exports and show that it has actually been a non-issue thus far. I identify several explanatory factors, among which the fact the official rhetoric and stance on DEEE, which positions China as having to defend itself against a foreign nuisance, hardly leaves any room for acknowledging the country’s role as an exporter.

Compared to other chapters in this thesis, this one contains less ethnographic material and relies more on written sources, primary and secondary. This is largely due to the difficulties I

faced while conducting fieldwork. For instance, I tried to establish contact with Chinese customs officials at various levels of government (provincial, municipal and local) as well as with traders directly responsible for moving DEEE across the border to China, in general to no avail. The people who agreed to meet me either referred me to publicly available documents and data or stuck to general and vague statements and comments. I found it very hard, not to say impossible, to bring them to talk about their own work, express a personal opinion, or simply say something about issues not already addressed widely, on the Internet in particular. From this I concluded that, as far as transboundary movements of DEEE into China are concerned, any information is sensitive information.

3.1 The world's scrap heads to China

China's economic boom and fast-paced industrialization and urbanization during the reform era meant that the country needed massive amounts of raw materials. One way it procured them is through importing scrap paper, plastics and metals as well as DEEE and other discarded goods from abroad. This line of business grew to such an extent that it gave birth to a whole new recycling sector in China, which provided a livelihood for hundreds of thousands of people. Of all the places from which scrap and discarded goods penetrated into China, Hong Kong is by far the most important.

3.1.1 Impressive figures and inconclusive data

Flows of scrap from affluent regions of the world to China grew quickly to attain gigantic proportions in the 2000s. According to UN Comtrade data, China's waste imports increased ninefold between 1995 and 2005, from less than 5 to almost 40 million tons (fig. 3.1). What made this impressive evolution possible? What transformed China into "the world's largest recyclable waste importer" (Yoshida 2005), as the country became known at the beginning of the twenty-first century — or into "the world's scrap magnet and magnate", as Goldstein (2012:342) puts it somewhat more poetically? The answer resides in a mix of several economic forces or factors, among which: (1) a mismatch between offer and demand on the domestic level: China needed much more scrap than it could produce, but the opposite was true for countries like the USA, the UK or Japan; (2) liberal import-export regulations with respect to both exports of scrap from foreign countries and imports of scrap into China; (3) low labor costs in China; (4) low transportation costs as shipping companies offered huge

discounts in order to fill empty containers returning to China from other parts of the world; (5) loose pollution controls and related requirements; (6) interests from Chinese importers at the provincial level and below, keen to promote economic development in their jurisdictions (Minter 2013; Tong & Wang 2004; Geeraerts et al. 2015a:41; Lora-Wainwright 2016).

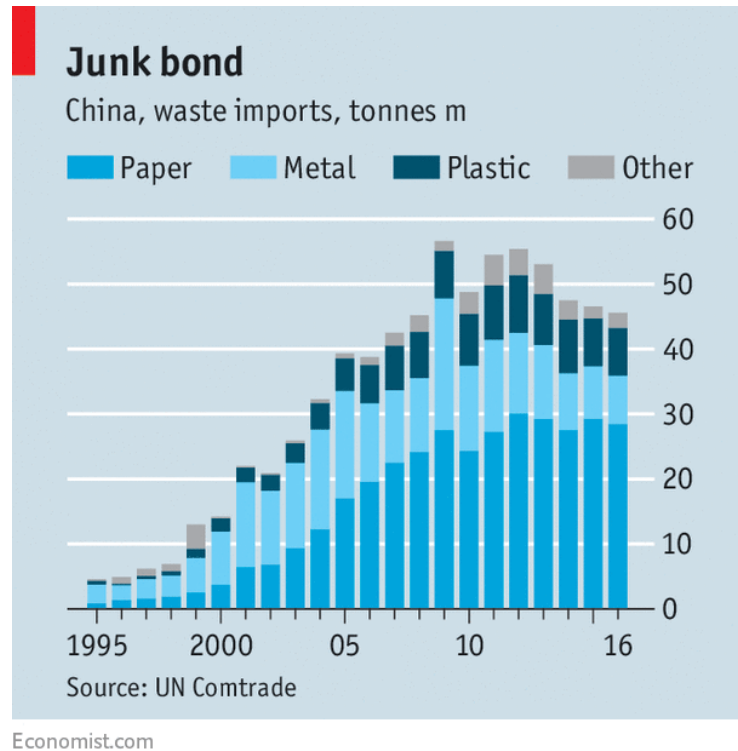


Figure 3.1: Imports of recyclable solid waste into China for the period 1995-2016, according to UN Comtrade data. Source: Economist.com.

How much DEEE found its way into China over the years? DEEE represented only a fraction of China's total scrap imports, but the conventional wisdom is that incoming flows were considerable nevertheless, and that the central government's decision to ban them, though it was taken early on, at first did little to curb the phenomenon:

A remarkable amount of e-waste is imported into China to meet the demand for second-hand equipment and for secondary resources. China now appears to be the largest e-waste dumping site in the world, receiving shipments from the US, Europe and neighboring Asian countries, including South Korea and Japan. Despite the fact that the Chinese government banned the import of e-waste (for both domestic re-use and recycling) in 2000, large volumes of imported e-waste and second-hand EEE still flow into the country. (Wang et al. 2013:15)

The question of how big the phenomenon of DEEE imports to China was may be central but it is also difficult to answer, due to the uncertainty that characterizes available figures. Many

experts have attempted to quantify the influx of DEEE into the country, but the estimates they have come up with vary by at least one order of magnitude. The authors of the seminal report *Exporting Harm* (Puckett et al. 2002:11-12) write for instance that: “informed industry insiders [in the USA] have indicated that around 80% of what comes through their doors will be exported to Asia, and 90% of that has been destined for China”. Based on the figures they rely on to evaluate the overall e-waste volume generated in the USA⁷¹, these percentages translate into a range of 3.6 to 5 million tons of DEEE being shipped to China in 1998. Referring to studies conducted by the Beijing Zhongse Institute of Secondary Metals (also quoted in Tong & Wang 2004:597) and the Hong Kong Environmental Protection Department (HKEPD), Wang et al. (2013:15) speak of 1.5 million tons of “e-waste” being imported into China in 2001, almost half of which landed in Zhejiang Province and the other half in Guangdong Province. Yoshida (2005) calculated that 14-35 million tons of DEEE reached China’s coasts annually in the early 2000s. The Basel Convention Regional Centre for Asia and the Pacific puts the figure at 33 million tons for the Asian region in 2004, with a majority of that finding its way into China (BCRC 2005). Finally, the United Nations Office on Drugs and Crime (UNODC 2013:ix) claims that: “approximately eight million tons of e-waste are smuggled into China every year”.

The main reason why these figures differ so widely is that little is known about the scale on which DEEE has been, and is still, flowing to China. Experts themselves acknowledge this. Wang et al. (2013:15) explain for instance that: “the actual quantity of illegal e-waste and second-hand EEE shipped into China is difficult to estimate due to a lack of systematic accounting and first-hand investigation”. The authors judge that “existing estimations in the literature regarding the total volume of e-waste imported into China are very rough and

⁷¹ BAN quotes the National Safety Council’s estimate that the USA generated 5 to 7 million tons of “e-waste” in 1998. See “Electronic Product Recovery and Recycling Baseline Report: Recycling of Selected Electronic Products in the United States”, *National Safety Council*, May 1999. URL: <http://infohouse.p2ric.org/ref/30/29292.pdf> (accessed January 26, 2018).

outdated". Similarly, for Yu et al. (2010:991), "the total magnitude of the problem remains unclear as there is no official data on the illegal importation of e-waste".

That the literature nevertheless abounds with figures on these flows attests to the need policy-makers and their advisors have to grasp phenomena through quantification. But this need becomes problematic here, for in the absence of official data and reliable sources, experts tend to make very rough estimates, back-of-the-envelope calculations and a lot of assumptions. Two colleagues and I fact-checked another report that addressed transboundary movements of "e-waste" extensively (Rucevska et al. 2015) and found, for instance, that many of the claims it makes are either: "falsifiable on their own terms; founded on weak or non-existent evidence; or built on self-referential foundations of weak evidence" (Lepawsky et al. 2015[no pagination]). What often happens in the literature on e-waste, and presumably not only there, is that one team of researchers quotes another team's findings without verifying the origin of its data and the conditions in which this data was produced. Information on DEEE imports and exports therefore tends to circulate in loops and to gain legitimacy through the process even when it has only a narrow empirical basis — or none at all. The above-mentioned figure of 50-80 percent of e-waste being exported from the US, for instance, started out as a rough estimate in *Exporting Harm* (Puckett et al. 2002) and subsequently spread to a great number of other publications (Lepawsky 2014). This "floating statement", Lepawsky shows, eventually acquired the status of established fact. Some experts invoked it in front of high-profile political instances, notably the US Congress, which in turn prompted other experts to recommend dismissing the figure of 50-80 percent as unfounded.

A safe conclusion to draw with regard to DEEE imports to China is therefore that we simply have not been able thus far to evaluate its scale with any degree of precision, and that we probably never will. This is regrettable, of course. Not having an idea of the scale of this phenomenon makes it difficult to judge, for instance, how serious the "e-waste problem" actually was, and still is. It also makes a comparison with the amount of DEEE generated within China impossible. Such a comparison would have been interesting, though, as it would have allowed us to test, and perhaps even qualify, the accepted view on China's "e-waste problem", namely that it first became manifest through massive quantities of DEEE from abroad hitting the shores of China and was only later compounded by a boom in

domestic generation (see, e.g., Tong & Wang 2004, 2012; Tong et al. 2015). Perhaps this classical way of sequencing the elements of China's e-waste story owes more to the social construction of e-waste as a public problem (see chap. 2) than to the respective sizes of those two material flows. But that will have to remain an untested hypothesis.

3.1.2 Thriving on others' discards

In parallel with growing scrap imports in the late 1980s and 1990s, the Chinese recycling sector's composition and role changed dramatically. More and more people in China became involved in recycling scrap from abroad. This brought a whole new subsector into being, composed mainly of family businesses and small enterprises. State-owned enterprises, which had long been the main protagonists in this field, made way for this newly created private sector, in which workers and self-made entrepreneurs with origins in the countryside now played a predominant role. Imported scrap, which until then had largely fed the export industry, also increasingly served to fulfill the needs of a domestic economy.

"Basic trends in recyclable waste imports to China from 1995 to 2010 show that as recyclable waste imports increase, the shares of ordinary trade [i.e. imports for domestic consumption] and private enterprises have increased. The majority of recyclable waste imported to China was recycled in coastal areas. At the beginning, the processing trade business of recyclable waste provided job opportunities. As domestic demand for materials increases in China, ordinary trade becomes dominant and it has supplemented the resources necessary for rapid economic growth in coastal areas of China." (Yoshida 2013:39-41)

Rural recycling hubs emerged in several parts of China and soon grew at tremendous speeds. As Yoshida stresses in the above excerpt, not all regions in China qualified as destinations for foreign scrap. Proximity to the sea was a key factor since it facilitated the transportation of goods (Tong & Wang 2004:594, Minter 2013:148). Accordingly, most hubs were to be found along the coast: in Guangdong Province (e.g. Guiyu and Qingcheng, which I have mentioned already, and Nanhai 南海区, a district that belongs to the city of Foshan 佛山市); the Yangtze River Delta (e.g. Luqiao 路桥区 and Wenling 温岭市 south of the city of Taizhou 台州市); and Hebei Province in the north (e.g. Wen'an 文安镇 just outside Tianjin 天津市). Unsurprisingly, these three regions also acted as China's main industrial and manufacturing centers at the time. Raw materials were needed there more than anywhere else. A good example of the importance of being located close to the coast or at least to convenient

waterways is the classic route for shipments of DEEE that I observed in Guangdong Province at the time of my fieldwork: it involved Hong Kong as a transit hub, Nanhai mainly for unloading and resale, and then Qingcheng or Guiyu for sorting, dismantling and processing (fig. 3.2).



Figure 3.2: A map of Guangdong Province with key sites for the trade and transformation of DEEE. Source: Apple Maps, annotations by the author.

The new subsector grew to such proportions and had such an impact on the villages and small towns that had transformed into rural recycling hubs that Chinese state authorities decided in the early 2000s to start monitoring it and regulating scrap imports. The MEP required companies that wanted to import scrap from abroad and recycle it in China to apply for a license. Overall, EPDs had trouble achieving control over the sector, however, because most of it was made up of small, unregistered businesses that could easily evade such obligations. Besides, larger companies discovered regulatory loopholes that allowed them to lend or rent their recycling licenses and let others do the difficult work of dismantling, sorting and processing (e.g. melting or leaching) the scrap they imported (Tong et. al. 2015:33-4). More profit could be made that way, so the practice became commonplace.

Initially, businesspeople in rural recycling hubs sourced most of their DEEE from abroad. But this changed with time. The progressive maturation of China's own economy led to domestic DEEE becoming ever more plentiful. Based on interviews and field observations, my impression was that it accounted for a significant and growing part of input in rural recycling hubs in the mid-2010s (but one that I am not able to put a figure on). Interestingly,

this contrasts with the classic representation of China's DEEE recycling sector as having developed into two distinct and separate subsectors, one in charge exclusively of imported goods, the other exclusively of domestic goods (see, e.g. Tong et. al. 2015:33-4). In practice, exchanges took place between one and the other. In Guiyu, for instance, workers in several small workshops located in the town's industrial park told me that their bosses sourced PCBs from a large licensed plant across the road that dismantles exclusively domestically generated DEEE. That plant belonged to a company called TCL Shantou (汕头市 TCL 德庆环保资源有限公司), which itself belonged to TCL Corporation (TCL 集团), a huge Chinese multinational electronics company and a state-owned enterprise. So the boundary between those two allegedly separate sectors was less clear-cut in practice than in theory.

Rural recycling hubs engaged mostly in dismantling and processing activities and the pollution linked to these activities is what made them infamous. What is less known, however, is that component reuse was key to the success of the hubs that specialized in DEEE. Adam Minter (2013), an American reporter who spent a decade in China covering the country's recycling industry, went to Guiyu several times in the 2000s and early 2010s, and each time interviewed local recyclers. He insists that component reuse was their cash cow:

“For the old farmer, it's the reuse of chips that makes the real money. [...] According to [several sources, among which Guiyu's trade association], [Guiyu's] top customer is in fact Chenghai, a nearby town nicknamed ‘Toy City’ due to its high concentration of toy manufacturers. Many of the toys manufactured there are electronic, and they require microprocessors of the sort that are recovered and sold in Guiyu.” (Minter 2013:201)

One of Minter's recycler friends, who does not come from Guiyu but accompanied Minter there and introduced him to locals, told him that it is the reuse value, and not the scrap metal and plastic value, that really drives profitability for Guiyu traders. Minter quotes him as claiming that: “The reuse is maybe eighty percent of the profits in Guiyu. [...] Huge, huge, huge business” (ibid.:196). This is interesting because it contrasts with most accounts of Guiyu, which emphasize enrichment through polluting practices and do not mention component reuse.

3.1.3 All roads lead to China

There were various ways in which DEEE got into China: Wang et al. (2013:14-15) identify four of them: direct shipments to Chinese ports; mixed shipments with bulk steel and copper

scraps; transit through Vietnam; and transit through Hong Kong. According to the authors, and based on official data, the first way may have been used in the past but had pretty much been abandoned in the early 2010s: “direct shipments of full containers of e-waste into the ports of mainland China are rare nowadays [...] scrap dealers and smugglers today tend to use less direct and less visible routes and means”.

The second way, namely mixed shipment, represented a loophole for many years (see also Terazono & Yoshida 2012:155). Traders could include some DEEE in lots of mixed-metal scrap bound for China⁷² and get away with it. This is because imports of mixed-metal scrap for recycling are legal in China and it is unclear how much DEEE makes a shipment illegal⁷³ — though this may have changed recently. Based on their interviews, Wang et al. portray mixed shipments as a nuisance. They claim that Chinese recyclers had trouble separating DEEE from the rest because what they received were “small and mixed shredded fractions”. My field research suggests, however, that the loophole sometimes benefited not only foreign exporters, but also Chinese scrap dealers and recyclers, who sought to take advantage of it. Recyclers I interviewed in Qingyuan, for instance, approached mixed-metal scrap as a lottery: they had to make educated guesses as to what a lot might be worth and buy it without knowing if they would make any profit. Only while sorting through the lot could they assess its true economic value and find out if they had been lucky or not. Sometimes their risk-taking would be rewarded by a spectacular find, sometimes it would be punished with the discovery of a high proportion of worthless refuse. The high level of uncertainty is what made this business risky but also what made it attractive for Chinese recyclers.

The third way, namely transit through Vietnam, involved several places along the sino-vietnamese border and at least one major port. Shinkuma & Huang (2009), who conducted research in northern Vietnam and southeastern China in the mid-2000s, observed substantial flows of DEEE between the towns of Mong Cai (Móng Cái in Quảng Ninh

⁷² Wang et al. (2013:14) quote recyclers from Zhejiang Province as saying that 10 percent was common.

⁷³ Shinkuma & Huang (2009:29) put that limit for PCBs at a maximum of 3 percent.

Province) and Dongxing (东兴市 in Guangxi Autonomous Region). However, Chinese state authorities tightened controls at this point of entry in the early 2010s, and it was not being used anymore by the time I embarked on fieldwork, at least not for smuggling DEEE. Evidence gathered by a French journalist in 2014⁷⁴ suggests that the port of Haiphong (Hải Phòng) in northeastern Vietnam received considerable amounts of foreign DEEE, which was pre-processed in one of the surrounding villages, shipped up north to the border, and brought across into China at a point further inland than Mong Cai.

It seems likely that DEEE trade and traffic across China's southwestern border involved not only Vietnam but also other neighboring countries. In late 2014, I met Paul Dawson, an environmentalist working for an NGO, during an international conference on DEEE and discussed with him the issue of transboundary shipments of DEEE into China. From his experience of placing tracking devices inside DEEE in the USA and following its travels to the other side of the world, Mr. Dawson suspected that there must be large companies in China that imported television sets from abroad and refurbished CRTs⁷⁵. He also estimated that only about half of those CRTs would arrive in China undamaged and assumed that the rest was simply dumped. "I take it there are thousands, maybe even millions of tons, of leaded glass", he told me. Mr. Dawson wanted to locate this material and to expose this dumping. As he said himself, he was looking for a new story:

Paul Dawson (PD): "I know how old TVs come out of the US, I know how they get into China, because I followed them. But for now, I don't know where the CRTs end up, so, I can't tell the whole story. Actually, without this final part, it's not much of a story!"

Yvan Schulz (YS): "Do you think they end up in Guiyu? Have you seen any there?"

⁷⁴ "Sur La Piste Des Mafias De l'Environnement: La Route Clandestine

Des Déchets Electroniques", *Le Monde*, January 31, 2015. URL:

http://www.lemonde.fr/planete/article/2015/01/31/sur-la-piste-des-mafias-de-l-environnement-la-route-clandestine-des-dechets-electroniques_4567377_3244.html (accessed January 26, 2018).

⁷⁵ Mr. Dawson developed such a suspicion after going to the places in China where his tracking devices had stopped emitting signals and never finding any CRTs.

PD: "No... or very few... one here and there. I know they used to cross the border in Mong Cai. But there's been a massive crackdown on smugglers recently, involving almost a thousand Chinese customs officers, so they had to find another way into the country."

YS: "It could be that they now come from Myanmar and cross the border into Yunnan."

PD: "How do you know? Who told you that?"

YS: "It's not hard to guess. That stretch of the border is really porous and features all kinds of traffic. Local authorities don't have much control over it and some officials themselves are certainly involved in shady dealings."

PD: [He explains that, during a recent investigation trip to Hong Kong, he stumbled upon evidence that this route is actually being used at present.] "I was surprised. It's such a long way from Guangdong."

In a follow-up email exchange, Mr. Dawson told me that BAN had conducted a field investigation in Myanmar in 2015 and found that DEEE did indeed find its way into China from that country:

"What I can tell you is that the flow is not as great as was taking place on Viet border. Not even close and yet there is some flow. It apparently comes into Rangoon on ships, is loaded onto trucks, is driven to Northern Myanmar border and then crosses into China by barge without the small trucks being opened or unloaded. These are then driven to a warehouse for onward shipping to Kunming and then beyond. In this way it is difficult to track or spot them."

I happened to have a short trip to Ruili (瑞丽), in Western Yunnan Province, lined up for June 2015, so I seized the opportunity to conduct research there. But I found no signs of DEEE traffic. The border crossing point between Ruili and Muse (မုဆွယ်) is the main gateway to and from China and a major point of entry and exit for both people and goods. I spent several days there, and also visited another, smaller crossing point located not far from Ruili. The presence and relatively high visibility of such commodities and services as precious stones, illegal wildlife products, drugs, prostitution, and gambling in and around Ruili made it look like a good candidate for e-waste trafficking. However, I found no evidence of transboundary movements of DEEE in that region. Obviously, this does not rule out the possibility that such goods did flow from Myanmar into China. They may for instance have involved another segment of the border than the one I visited.

As for the fourth way mentioned by Wang et al., namely the route via Hong Kong, it was by far the preferred solution for shipping DEEE to mainland China, at least to Guangdong

Province, which was a stone's throw away, but likely also to ports located elsewhere, including in Zhejiang Province. The vast majority of the people I interviewed in the Pearl River Delta and in the Chaoshan area told me that DEEE transited through Hong Kong before reaching the shores of mainland China.

3.1.4 Hong Kong: transshipment heaven

Numerous factors made Hong Kong an attractive hub for shipments of scrap in general, including DEEE. A report published in 2003 by Greenpeace China on the Special Administrative Region (SAR)'s role in the transshipment of "e-waste" (Greenpeace 2003) identifies a few of them. First of all, import-export regulations in Hong Kong required that traders complete customs formalities within 14 days after cargo arrival. This gave them enough time to transfer goods to neighboring Guangdong Province without even declaring them in Hong Kong. In some case, Greenpeace claims, it even allowed them to unload goods, move them to the New Territories (Hong Kong's backyard, so to speak), dismantle them there, repack them and reload them for shipment to China⁷⁶. Third, the Hong Kong government adopted a passive attitude towards the development of a domestic recycling industry. Apart from setting requirements for environmental protection and enforcing them, it let companies arrange business as they saw fit. In particular, Hong Kong laws and regulations were devoid of rules on how DEEE should be dealt with in the SAR. Thus, nothing stood in the way of trading DEEE with other countries, including China. Finally, Greenpeace denounces a lack of cooperation between the government of the Hong Kong SAR and that of the People's Democratic Republic of China on the issue of transfers of hazardous waste between their respective jurisdictions.

⁷⁶ See also: "Greenpeace Exposes Hong Kong's Role as a Free Port for China's Electronic Waste Trade", *Greenpeace*, March 28, 2005. URL: <http://www.greenpeace.org/eastasia/news/stories/toxics/2005/greenpeace-exposes-hong-kong-s/> (accessed January 26, 2018).

Since the handover in 1997, the relationship between Hong Kong and China is based on the principle “one country, two systems”, according to which Hong Kong can retain its economic and administrative system for a transitory period of 50 years. The SAR therefore has its own government and laws, including with regard to trade. China is a party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (hereafter Basel Convention)⁷⁷, an international treaty that applies to DEEE. The Basel Convention is applicable on all Chinese territory, including Hong Kong. Given the SAR's relative autonomy, however, the central government and the Hong Kong government signed a memorandum of understanding in 2000 with the aim of strengthening controls. In its report, Greenpeace claims that the two governments failed to enforce this memorandum in the ensuing years. The document was updated and renamed as "Cooperation Arrangement on Control of Waste Movements Between the Mainland and HKSAR" in 2007. It requires the transboundary movements of waste between the two areas or waste shipments to overseas via the ports of the mainland or the Hong Kong SAR to follow the Basel Convention's prior informed consent mechanism⁷⁸. Unfortunately, I do not know if the newer version of this legal text was enforced more robustly than the older one.

A few more factors need to be added to those mentioned by Greenpeace. During a short research trip in Hong Kong in March 2014, I interviewed Brian Leung, senior inspector at the Hong Kong Customs and Excise Department (香港海關). Asked why most DEEE that penetrated into mainland China first transited through Hong Kong, Mr. Leung replied that:

“This has to do with one of Hong Kong's key characteristics, which differentiates it from other territories or states: Hong Kong is a free port. This has several consequences. First, we [i.e. the Hong Kong customs] do not demand from import-export companies that they register with us. That's a big difference with other countries. [Mr. Leung mentions explicitly Australia and New

⁷⁷ See <http://www.basel.int/TheConvention/Overview/tabid/1271/Default.aspx> (accessed January 26, 2018).

⁷⁸ “Control on Import and Export of Waste: Frequently Asked Questions”, HKEPD, [no date], [no pagination]. URL: https://www.epd.gov.hk/epd/english/environmentinhk/waste/guide_ref/guide_wiec_faq.html (accessed January 26, 2018).

Zealand]. In those countries, import-export companies are required by the law to provide a lot of information to the government: their address, the type of cargo they typically ship into the territory, and so on. And they must do that within a certain time frame. In Hong Kong, they are only asked to fill in an online declaration, but it is used for statistical purposes only, not for border control. [Mr. Leung goes on saying that this makes his work as an inspector much more difficult.] Second, Hong Kong imposes no duty on imported or exported goods, except for cigarettes and liquors. This is a big difference with mainland China, where you have duties on everything, even waste. It makes Hong Kong really attractive for transit, especially when goods are not declared in transit but disguised as imports [which is almost always the case for DEEE, according to the data Mr. Leung shows me, see fig. 3 and 4]. [Third,] I think the main reason why Hong Kong became a major transit hub for all sorts of goods is the quality of services. [Mr. Leung explains that numerous companies based in Hong Kong offer trade facilitation services. He also points out that logistics are efficient and judges that the overall system works well thanks to proper regulation and organization.] [Finally,] Hong Kong was the second largest port in the world and this year it's the third largest. The total volume of goods that transit through Hong Kong is considerable, which makes it almost impossible for us [i.e. the customs] to monitor it closely. So dealers have less of a hard time evading custom inspections in Hong-Kong than elsewhere. On top of that, large import-export companies that are based or active in Hong Kong form powerful trade unions [Does Mr. Leung actually means trade associations or lobbies?]. Those trade unions put pressure on the government to ensure that customs inspections do not interrupt or slow down the circulation of goods. [Mr. Leung gives me an example of a recent protest staged by these trade associations to denounce measures taken by the government: fifty 40-foot containers were delivered to Central, Hong Kong's business district and political and financial heart, and left there to block traffic.] So our work is pretty sensitive. We have to be careful. [Mr. Leung hints at the fact that the customs are sometimes asked to put their action on hold.]⁷⁹

The above except shows that Hong Kong's role as a shipping hub was clearly to facilitate and accelerate the global circulation of goods. The absence of many of the barriers found

⁷⁹ Many of those features are also highlighted by the shipping industry to woo customers from all over the world. See "The World's Leading Cargo Transshipment Hub", *The Hong Kong Maritime Hub*, [no date]. URL: <http://www.hongkongmaritimehub.com/the-hub/the-worlds-leading-cargo-transshipment-hub/> (accessed January 26, 2018).

elsewhere made the HKSAR a very attractive place for dealers of all countries and dealings of all kinds. People doing business with DEEE, in particular, could operate undisturbed in the autonomous territory, as long as they did not cause pollution there. During our conversation at the international conference, Mr. Dawson told me that he had once contacted a buyer in Hong Kong and passed himself as an American seller for the sake of investigating the global DEEE trade. The Hong Kong buyer had given him an appointment at his warehouse in Kowloon, a densely populated urban area. Here is how Mr. Dawson described what he saw there:

“I was amazed! This guy’s warehouse is in the city center, in the middle of a high-rise. There’s even a special elevator that can carry sea containers up to the warehouse. We went in and I saw three floors full of e-waste. The guy told me that there are 50 to 100 containers of e-waste coming from the US into Hong Kong every day. He also said that he had an associate in Guiyu and he was sending a lot of stuff there.”

According to data shared with me by Brian Leung (fig. 3.3 and 3.4), he and his colleagues seized 201 shipments of DEEE during the period 2009-2014 and found that almost all of them were bound for Hong Kong (not mainland China) and roughly half of them originated from the USA. However, Mr. Leung explained that those figures compiled by the Hong Kong customs painted a distorted picture, as DEEE’s main final destination was in fact mainland China, even if that was not reflected in customs declarations, and shipments sometimes transited through several countries before reaching Hong Kong. That the SAR served mainly as a gateway to mainland China for shipments of recyclable wastes is particularly obvious if we look at the trade in scrap plastics — which, it should be noted, includes plastics from DEEE. In that case, the entire volume imported into Hong Kong gets re-exported to mainland China (Kojima & Yoshida 2005 and Velis 2014 (based on UN Comtrade data for 2012)).

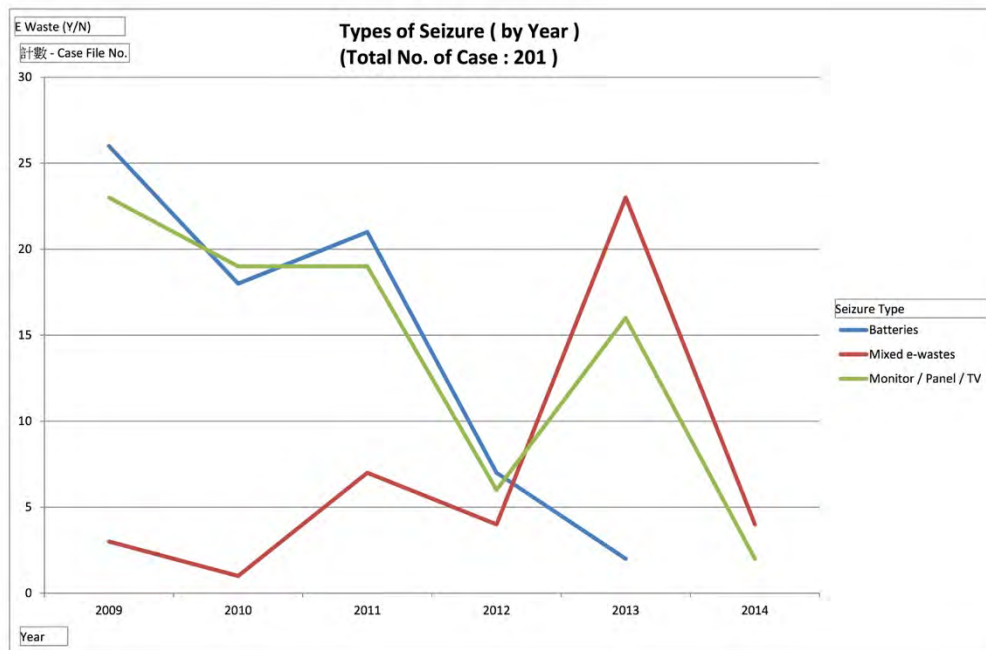


Figure 3.3: Data on shipments of DEEE seized by the customs in the port of Hong Kong from 2009 to 2014 classified according to type of good. Source: Hong Kong Customs and Excise Department.

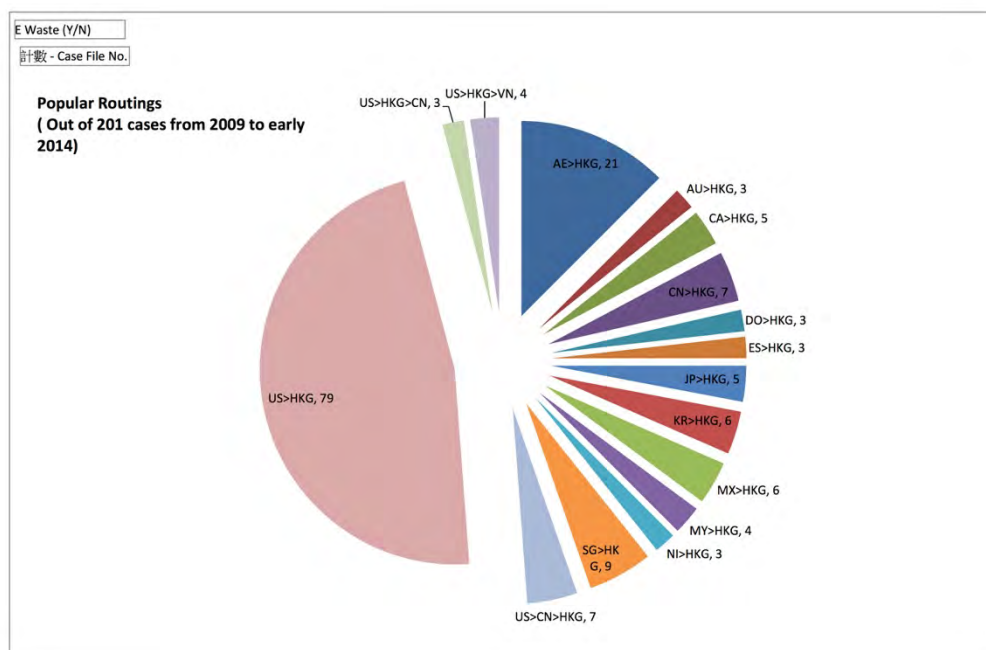


Figure 3.4: Data on shipments of DEEE seized by the customs in the port of Hong Kong from 2009 to 2014 classified according to origin and destination. Source: Hong Kong Customs and Excise Department.

In Mr. Leung's account, two distinct and separate networks of organizations, goods, routes and vessels were responsible for transferring DEEE from Hong Kong to mainland China. One of them featured trading companies that dealt in DEEE of foreign origins (i.e. not collected in Hong Kong) and sought to avoid custom inspections. These companies used established logistics solutions and port infrastructure (in Hong Kong as well as in mainland China). In most cases, this network involved "river trading vessels" (RTVs), a kind of ferry that moves back and forth between Hong Kong and ports in Guangdong Province, and can carry up to a hundred containers maximum. More rarely, it relied on smaller vessels not equipped to carry containers. The other network featured crime "syndicates" (also known as "triads" in this region of the world) that occasionally dealt in EEE — but only secondhand goods, never waste, according to Mr. Leung — sourcing it directly from the Hong Kong territory, sought to bypass border control altogether, and shunned established logistics solutions and port infrastructure, preferring to use their own.

Interestingly, Mr. Leung associated the latter network rather closely to "smuggling" and the former less so. The way he described it gave it an aura of risk and clandestinity:

"The goods are transported to Shekou [蛇口, a district in the city of Shenzhen that lies right on the other side of the border from Hong Kong] by speedboat or fisherman's boat. They are placed in cardboard boxes sealed with adhesive tape to make them waterproof, then in foam boxes. That way, if something happens and they are thrown overboard, they float and can be recovered. The electronic devices are very recent and costly. It's usually laptops, tablets, smartphones, and so on. Some of them are secondhand, but most are new. Those devices can also cross the border by land. They are hidden in lorries or brought over by people who cross the border by foot. Those people go back and forth several times a day. They are allowed to carry only one or two devices at a time but sometimes have more."

It is noteworthy that Mr. Leung, a senior customs officer with more than ten years of experience in conducting inspections at the Hong Kong border, mostly talked about "smuggling" and criminal syndicates in connection with EEE that is, more often than not,

new and highly valuable⁸⁰. He clearly held a different view of scrap and companies dealing scrap than these criminal networks. For example, he seemed to rank filling in customs declarations with imprecise or incorrect information, as import/export companies often do, lower on the scale of illegality. Mr. Leung's take on the level of illegality of these various actors and actions reflects widespread representations of white-collar or corporate crime as less reprehensible than organized crime⁸¹. But it also contrasts with the type of discourse on e-waste that the media, among others, have accustomed us to, where the terms "trade" and "traffic", "crime" and "mafia", and "import" and "smuggling" are used interchangeably. Based on transboundary movements' (assumed or verified) illegality, many journalists conclude, all too readily it seems, that mafia-like organizations are necessarily involved⁸².

3.2 From purely formal obstacle to real game changer

The first efforts at regulating DEEE in China were aimed at stopping the inflow of e-waste to the country and date back to the late 1990s. The central government adopted an import ban at the turn of the century, which it clarified, expanded and reinforced throughout the following years. Enforcement remained weak for at least a decade. Then, in the early 2010s, the central and provincial governments tightened up control on the sector by monitoring it more closely and increasing the frequency and scale of inspections. Recently, the conditions under which scrap (including some of materials found in DEEE) can be imported into China were made extremely restrictive, with far-reaching consequences for a wide range of actors, markets and politics.

⁸⁰ That new EEE gets smuggled from Hong Kong to the rest of China can be explained by the fact that, unlike the mainland, the SAR does not collect value-added tax on this type of product.

⁸¹ This representation has been questioned ever since Edwin H. Sutherland (1949) wrote his seminal book on the topic but it remains strong to this day.

⁸² See, e.g., *ibid.* "Sur La Piste Des Mafias De l'Environnement".

3.2.1 Beijing puts up a “no entry” sign

In 1995, the Chinese central government laid down the principle that was to apply to imports of waste from overseas for the next twenty years. It passed the Law on the Prevention and Control of Solid Waste Pollution to the Environment⁸³, which prohibits the import of solid wastes that are unusable as raw materials and regulates the import of those that are usable as such. In February 2000 it issued the Notification on Import of the Seventh Category of Wastes⁸⁴, which states explicitly that, even though DEEE constitutes a potential source of raw materials, certain categories will not be allowed to enter the Chinese territory. This first document only mentioned: television sets (*dianshiji* 电视机), picture tubes (*xianxiangguan* 显像管), refrigerators (*dian bingxiang* 电冰箱), air conditioners (*kongtiaoqi* 空调器), microwave ovens (*weibolu* 微波炉), computers (*jisuanji* 计算机), monitors (*xianshiqi* 显示器), CRTs (*xianshiguan* 显示管), photocopiers (*fuyinji* 复印机), video cameras (*shexiangji* 摄录像机), camcorders (*luxiangji* 录像机), game consoles (*youxiji* 游戏机), rice cookers (*dianfanguo* 电饭锅) and house telephones (*dianhuaqi* 家用电话机). But the central government extended this list over the next ten years through the adoption of a series of catalogs⁸⁵. At the end of the 2000s, a total of fifty-five categories were affected, which were

⁸³ “Law of the People’s Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes” [中华人民共和国固体废物污染环境防治法], NPCSC (*The Standing Committee of the National People’s Congress*) [中华人民共和国第八届全国人民代表大会常务委员会] October 30, 1995 [revised in 2004 and 2013]. URL: <http://www.lawinfochina.com/Display.aspx?lib=law&Cgid=13136> (accessed January 26, 2018).

⁸⁴ “Notification on Import of the Seventh Category of Wastes” [关于进口第七类废物有关问题的通知], SEPA (*State Environmental Protection Administration*) [国家环境保护总局], January 26, 2000. URL: <http://210.73.66.144:4601/law?fn=chl324s820.txt> (accessed January 26, 2018).

⁸⁵ “Catalog of Goods Prohibited From Import” [禁止进口货物目录]. MOFTEC (*Ministry of Foreign Trade & Economic Cooperation [now MOFCOM]*) et al. [外经贸部等], July 3, 2002. URL: http://www.mep.gov.cn/gkml/hbb/gwy/200910/t20091030_180691.htm; “Catalog of Solid Waste Prohibited From Import” [禁止进口固体废物目录], SEPA (*State Environmental Protection Administration*) [国家环境保护总局], January 29, 2008. URL: http://www.mep.gov.cn/gkml/zj/gg/200910/t20091021_171792.htm; and

grouped into: mechanical and electrical products and equipment (*jidian chanpin he shebei* 机电产品和设备, a category that includes all consumers electronics and house appliances) and all parts, components and accessories thereof; batteries and accumulators (*dianchi* 电池); cold cathode fluorescent lamps (*yingguang dengguan* 荧光灯管); medical appliances (*yiliao qixie* 医疗器械) and radioactive equipment (*shexian yingyong shebei* 射线应用设备); and electronic components such as capacitors (*dianrongqi* 电容器), printed circuits boards (*yinshua dianluban* 印刷电路版, i.e. with surface-mounted components) and cathode-ray tubes (*yinji shexianguan* 阴极射线管)⁸⁶.

It is important to stress that the ban on imports does not apply to all categories of “waste” or “discarded” (*fei* 废) EEE. Chinese state authorities allowed some of them to enter the country as long as they conformed to established standards in terms of lot homogeneity, metal content, date of production and toxicity⁸⁷. Among those were: electric machinery (*dianji* 电机); transformers (*bianyaqi* 变压器); wires (*dianxian* 电线); cables (*dianlan* 电缆); distribution board (*peidianpan* 配电盘); instruments and meters (*yiqi yibiao* 仪器仪表); radiators (*sanrequi* 散热器); machinery spare parts (*jixie lingjian* 机械零件); and printed circuit boards (*xianluban* 线路板, i.e. without surface-mounted components). The rationale was that those “wastes” made a good source of raw materials by virtue of being relatively harmless (low heavy metals content) and valuable (high base metals content).

The distinctions made among the various categories of DEEE and the positioning of those categories close to one or the other end of the spectrum that runs from trash to treasure

“Announcement on the Adjustment of the Catalog on the Management of Imported Waste” [关于调整进口废物管理目录的公告], *MEP (Ministry of Environmental Protection)* [环境保护部], March 7, 2009. URL: http://www.mep.gov.cn/gkml/hbb/bgg/200910/t20091022_174566.htm (accessed January 26, 2018).

⁸⁶ See legal documents above.

⁸⁷ “Standards for the Imports of Wastes from the Seventh Category” [进口七类废物标准], *MyMetal.net* [我的有色网], July 6, 2016. URL: <http://www.mymetal.net/16/0706/11/87FC754217FADD3A.html> (accessed January 26, 2018).

may have been justified on the basis of material composition but other criteria certainly played a role as well. The fact that imported DEEE was used in China as a source of components for the manufacture of “new” EEE, in particular, posed a series of problems for Chinese state authorities. Following the massive relocation of the global electronics industry to China at the end of the twentieth century, the country had transformed into the world electronics factory. It was producing huge quantities of electronic devices and components, including consumer electronics and house appliances. State authorities sought to protect the interest of Chinese producers, especially those of state-owned companies, and to help them move up the value chain. Because it is labor intensive and involves mostly low-tech processes, component refurbishing and reuse stood in the way of those plans.

Robin Ingenthron, an American recycler and staunch advocate of export for reuse, visited China in the early 2000s and came up with this interpretation of the Chinese ban on imports of DEEE⁸⁸:

“There are entire factories in Asia dedicated to repair and refurbishing used electronics. These ‘white box’ manufacturers do things like purchase capacitor-plague Optiplexes which USA companies were shredding, and... GASP... fix the capacitor! Just like Americans did with their TV capacitors in the 1960s and 1970s. [...] I was standing inside factories in China which were refurbishing USA ‘stuff’ by the shipload [...]. Most of these factories had originally been ‘contract manufacturers’ for companies like Foxconn, which in turn was a contract manufacturer for companies like Dell, Compaq, HP, and IBM. The Geeks of Color [Ingenthron’s term for repairmen in the Global South] could not believe their luck when parts worth \$110 — like a good, non-trinitron, 17", uncanceled cathode ray tube — were being sold to them for \$5. They quickly stopped buying brand new CRTs and started assembling monitors and televisions from 5-10 year old USA monitors which had been ‘upgraded’. This hurt the brand names which did not like competing with their own product in the secondary market. But even worse, it hurt the largest shareholder in new Cathode Ray Tube manufacturing in the world: The Chinese Communist

⁸⁸ “Why We Should Ship Our Electronic ‘Waste’ to China and Africa”, *Motherboard*, March 31, 2011. URL: https://motherboard.vice.com/en_us/article/d77w9m/e-waste-recycling-exports-are-good (accessed January 26, 2018).

Party. The Chinese had tried to ‘corner the market’ in CRT production at about the time the Guiyu story hit the press. They bought out Technoglas, Corning and Thomson CRT glass furnaces. [...] In 2002, the Chinese tried to close the secondary market, calling refurbished CRTs ‘dumping’. While in China I had it translated: that’s ‘dumping’ in the below-tariff sense. The junk was allowed as a raw material, and ‘treatment’ meant breaking stuff so it would not be resold.”

Sure enough, in the above excerpt, which stems from one of his many opinion pieces, Ingenthron is too dismissive of the rationale of environmental protection — presumably because setting it aside the way he does allows him to pursue more easily his own interests as an activist and a businessman⁸⁹. However, his description of electronics refurbishment and reuse as a phenomenon taking place on a large scale in China, and in Asia more generally, is by no means far-fetched. It tallies with others’ experience and accounts, including my own. Thus, there are good reasons to believe that this phenomenon has, if not dictated, as Ingenthron claims, at least influenced the Chinese government’s decision to ban imports of consumer electronics and components thereof.

A key consequence of the differential treatment of DEEE operated by Chinese laws and regulations is that much of the stuff I saw in scrapyards in Guangdong Province, especially in Qingyuan had not been smuggled into the country but lawfully brought in. This deserves to be highlighted because it clashes with the prevalent representation of transboundary movements of e-waste as resulting from criminal acts committed by law-breaking traffickers (see, e.g., Dannoritzer 2014).

The issue of DEEE that potentially qualifies as second-hand or simply used is an interesting one in terms of unlawfulness. It shows how legal requirements can make compliance impossible for all but a few actors and leave those who nevertheless want to continue doing business little choice but to operate illegally. In theory, second-hand or used EEE can be

⁸⁹ Ingenthron supplies used EEE to “geeks of color” in the Global South and runs a blog on “ethical electronics exports” in which he fights relentlessly for used EEE to be recognized as fair trade instead of environmental dumping. As an author, he also displays a penchant for provocative statements and heated controversies. See *Good Point Ideas Blog*, URL: <http://retroworks.blogspot.com> (accessed January 26, 2018).

imported into China legally. In practice, however, very restrictive conditions apply⁹⁰, which lead some authors to judge that imports of such DEEE are actually “substantially prohibited” (Terazono & Yoshida 2012:145). First, traders must obtain an import license from the MOFCOM, which can be limited to a single category of goods or even shipment. Then, each consignment must pass a pre-shipment inspection at the port of origin (e.g. Oakland, CA) conducted by a commodity inspection agent duly authorized by the AQSIQ and receive a certificate. This procedure involves several steps and a lot of paperwork. It requires a capacity to work one’s way through the maze of officialdom that only large companies possess. And even they sometimes see their applications denied, as I learned while doing fieldwork on refurbishing in Guangdong (see chap. 7).

Despite the total ban on certain categories of DEEE and the restrictive conditions applied to others, it seems that great quantities of DEEE of all kinds and in all conditions passed through the Chinese border, at least up until the early 2010s (Grossman 2007:199). The Chinese central government opted for a ban early on but for a long time this did little to curtail inflows of DEEE (Wang et al. 2013). Part of the explanation lies in a lack of implementation and enforcement (Ni & Zeng 2009:3993, Shinkuma & Huong 2009:27, Chung & Zhang 2011:2639). Looking for factors that might account for the ban’s ineffectiveness, BAN wrote⁹¹:

“The reasons China’s own laws appear to be poorly enforced are unclear. Is this widespread flouting of the national law due to a lack of enforcement will or capacity? Likely it has to do with both a lack of will on the part of local officials and a lack of capacity on the part of the central government.”

⁹⁰ See “Administrative Measures for the Import of Electromechanical Products” [机电产品进口管理办法], *General Administration of Customs* [海关总署] et al., April 7, 2008. URL: <http://www.lawinfochina.com/display.aspx?lib=law&id=6842&CGid=> (accessed January 26, 2018).

⁹¹ “How the West’s Obsession with New Technology is Poisoning China”, *Human Rights in China (HRIC)*, February 23, 2003 [post written by S. Westervelt and J. Puckett from BAN]. URL: <http://www.hrichina.org/en/print/content/4619> (accessed January 26, 2018).

It could even be that imports were unofficially tolerated in some cases. At least, this is what Shinkuma & Huong (2009:27) claim with regard to the transnational trade that took place between Vietnam and China in the mid-2000s. According to these researchers, Chinese authorities tended to turn a blind eye at that time on imports of scrap PCBs and secondhand DEEE intended for re-export (see also Yoshida 2006).

Then, there were also loopholes, several of which I have already mentioned above: shipments of mixed metal scrap for recycling could contain a certain amount of DEEE and still be deemed compliant; and importing secondhand EEE into China was legal, so some merchants tried to facilitate border crossing by passing off defunct, broken, dismantled or shredded EEE as secondhand EEE (Chi et al. 2011:734).

3.2.2 Codename: crackdown

The import ban on DEEE, which remained pretty much inoperative during the 2000s, was given some teeth in the following decade. Chinese state authorities at the central and provincial levels began to enforce it seriously from 2013 onwards, thereby producing a noticeable impact on the recycling industry, both in China and abroad. Working in close collaboration — or so we are told⁹² — the MEP, the customs and (to a lesser extent) the AQSIQ embarked on a series of crackdowns on illegal waste imports throughout the country. “Special joint operations” (*lianhe zhuanxiang xingdong* 联合专项行动) bearing such evocative names as “Green Fence” (*lǜli* 绿篱) and “National Sword” (*guomen lijian* 国门利剑)⁹³ were launched from the early 2010s onwards with the aim of doing some serious clean-up.

⁹² The official rhetoric of highly concerted state action should be taken with a pinch of salt. Several of my informants pointed out during interviews that the various ministries, departments and offices that make up the Chinese bureaucratic apparatus have a limited ability to share information among themselves and efficiently coordinate their efforts.

⁹³ A more literal translation would be “A Sharp Sword at the Border”, which also conveys the image better. See “Customs throughout the Country Deploy Operation ‘National Sword 2016’ to Combat Smuggling” [全国海关

There were early signs that such a change might occur. In August 2011, for instance, five ministries jointly issued new administrative measures⁹⁴ that grouped together and reaffirmed the principles and mechanisms that form the fundament of the Chinese central government's policy on solid waste imports, in particular environmental protection and pollution monitoring. These administrative measures also explicitly addressed several of the unlawful yet common practices that characterized the Chinese recycling sector at the time, such as the borrowing, renting or selling of scrap import licenses, the reselling of imported waste, and the importing of wastes that do not qualify as raw materials. They made clear that perpetrators were subject to punishment and specified which penalties applied to which violations. Those new measures clearly set the tone for what was to follow.

The official rhetoric accompanying Operation Green Fence was aimed at protecting China, the Chinese environment and the Chinese people. For instance, the customs of the municipality of Shantou (汕头市) justified the operation in an online interview⁹⁵ by talking of “building a beautiful China/Eastern Guangdong Province” (*jianshe meili zhongguo/yuedong* 建设美丽中国 / 粤东)⁹⁶, “tightening the focus on the building of an ecological civilization” (*zhuaqin zhuahao shengtai wenming jianshe* 抓紧抓好生态文明建设), “protecting the country's ecological security and citizens' life and health” (*weihu guojia shengtai anquan he renmin qunzhong shengming jiankang* 维护国家生态安全 and 人民群众生命健康), and “leaving clear waters and blue skies for the generations to come” (*wei zisun*

部署“国门利剑2016”打私行动], *General Administration of Customs* [海关总署], [no date]. URL:

<http://www.customs.gov.cn/publish/portalo/tab70740/info788930.htm> (accessed January 26, 2018).

⁹⁴ “Administrative Measures for the Import of Solid Waste” [固体废物进口管理办法], *MEP (Ministry of Environmental Protection)* [环保部] *et al.*, August 4, 2011. URL:

<http://www.lawinfochina.com/display.aspx?lib=law&id=8862&CGid=#menu1> (accessed January 26, 2018).

⁹⁵ “Conducting ‘Operation Green Fence’, Building a ‘Beautiful East Guangdong’” [开展“绿篱行动”建设“美丽粤东”], *Shantou Customs* [汕头海关], December 4, 2013 [online forum]. URL:

<http://www6.customs.gov.cn/shantou/tabid/66133/Default.aspx?interviewid=1> (accessed January 26, 2018).

⁹⁶ The concept of a “beautiful China” sounds like a lofty ideal, but it is more than that (see chap. 1).

houdai liuxia bishui lantian 为子孙后代留下碧水蓝天)⁹⁷. The Shantou Customs' self-produced public relations stunt stated clearly that cracking down on the "smuggling" (*zousi* 走私) of "foreign rubbish" (*yang laji* 洋垃圾) would bring all kinds of benefits for the country. Besides improving the quality of the environment, it would also make development more "sustainable" (*kechixu fazhan* 可持续发展) and boost the domestic economy.

In appearance at least, Chinese state authorities were particularly tough in their controls. They brandished a heavy stick, which was necessary given the scale of scrap imports and the entrenchment of recyclers' and dealers' practices. Among others, they claimed that there would be no tolerance for imports of any of the items set out in the law as prohibited from import⁹⁸. They also cut acceptable contamination levels from between 3 and 10 percent to 1.5 percent⁹⁹ and set high standards in terms of acceptable moisture levels as well. All shipments that did not comply with those rules and requirements, state authorities warned, would be refused entry into China and sent back to their country of origin (fig. 3.5).

⁹⁷ These phrases are not of the Shantou Customs' own making but belong to the standard set of concepts and expressions used in twenty-first century party-state propaganda.

⁹⁸ For a more exhaustive list of measures, see "Operation Green Fence is Deeply Affecting Export Markets", *Resource Recycling*, April 12, 2013. URL: <https://resource-recycling.com/recycling/2013/04/12/operation-green-fence-is-deeply-affecting-export-markets/> (accessed January 26, 2018).

⁹⁹ See "China's Green Fence Changed Recycling – What Does It Mean For You?", *Advanced Disposal*, November 20, 2014. URL: <http://www.advanceddisposal.com/whywasteblog/chinas-green-fence-changed-recycling-what-does-it-mean-for-you-2/> (accessed January 26, 2018). The author notes that: "Contaminants may sound like a bad word, but in recycling it refers to any material included in a bale other than the material being sold, so a piece of newspaper in a bale of cardboard is considered a contaminant."

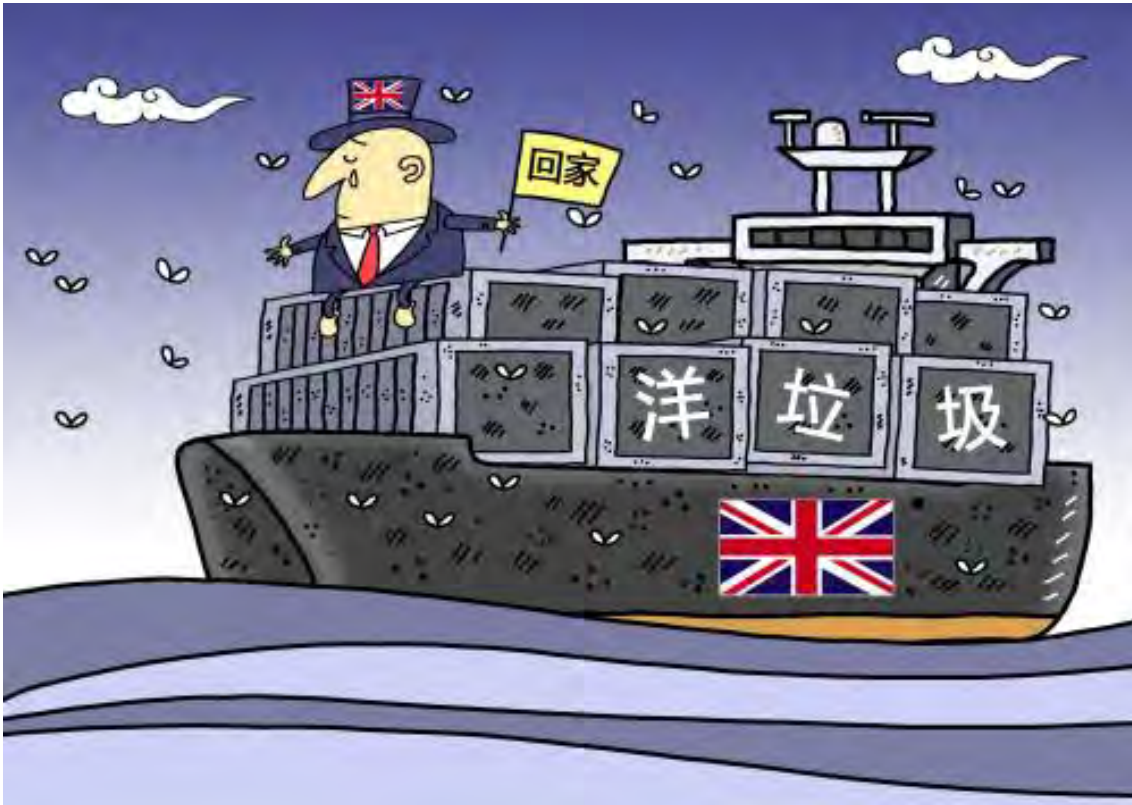


Figure 3.5: A container vessel loaded with “foreign rubbish” (*yang laji* 洋垃圾) headed to China from the United Kingdom is forced to turn back and “return home” (*huijia* 回家). Source: unknown, posted on Sohu.com.

More strikingly, the Chinese customs claimed that they would inspect (*chayan* 查验)¹⁰⁰ 100% — no less — of the incoming containers that contained scrap. I heard this claim over and over, including at least a dozen times during the China International Scrap Conference (Chinascrap 中国国际废料大会), an event that took place in Guangzhou in November 2014 and featured numerous talks by high-ranking government officials. An officer at the Guangdong Customs (Guangdong Sub-Administration of China Customs 海关总署广东分署) with whom I exchanged emails in 2014 also mentioned the figure of 100% and gave me details on how controls were performed:

Yvan Schulz: “How many containers do you need to inspect every year? How many do manage to inspect? And where do you inspect them?”

¹⁰⁰ See *ibid.* “Conducting ‘Operation Green Fence’”.

Customs officer: “Based on the numbers of containers that are declared to the customs, we inspect (*chayan* 查验) 100% of those that contain waste (*feihuo* 废货). We do it in [dedicated] inspection areas [that are located] either in storage yards or in LCL [i.e. less than container load] warehouses, or by first running the H986 [i.e. a mobile X-ray imaging system used by the Chinese customs to scan cargo on large vehicles] and then sending staff onsite if we notice a problem.”

YS: “How do importers usually avoid inspections?”

CO: “They make false declarations to get through (*weibao guangguan* 伪报闯关). They do this with regard to classification (*pinming* 品名), specification (*guige* 规格), categorization (*guilei* 归类) and so on.

YS: “Will you continue implementing the Green Fence policy this year [i.e. 2014]? Will the inspection be more thorough this year? Why?”¹⁰¹

CO: “This year, the implementation of Operation Green Fence will focus on the smuggling of agricultural products [after having focused on foreign garbage in 2013], but in terms of waste [*feihuo* 废货] there won’t be any slackening, we will still inspect 100% [of containers].

The message delivered by Chinese state authorities at the central and provincial levels was clear: there would be zero tolerance, high standards and flawless control. But could the customs really inspect 100% of the containers containing scrap? How realistic is this?

A basic calculation combining evidence provided by some of my interviewees with publicly available data on transnational commerce and global logistics indicates that the figure of 100% must be taken with a grain of salt. Asked about the proportion of incoming containers that are inspected by the customs in the port of Hong Kong, Brian Leung estimated it to be “less than one percent” (he did not have the exact figure). Similarly, Liu Lei, whom I met in April 2015 when he was working as recycling plant manager for a Sino-American plastics recycling joint venture in Guangzhou, told me that customs authorities in large European ports only

¹⁰¹ The question of Operation Green Fence’s duration and focus is slightly confusing. Documents only mention a period of ten months, from February to November 2013, and an exclusive focus on solid waste, but declarations by state officials suggest that controls remained stringent for longer and affected other types of goods as well.

manage to inspect “one in every one or two hundred containers”. His company specializes in recycling plastics from DEEE and sources its entire feedstock abroad, mostly from Europe, and goes through customs procedures on a daily basis.

Based on this evidence, if we consider that 1 percent of total container throughput is likely to undergo inspection (which corresponds to the high end of the range defined by Brian Leung and Liu Lei) and assume that customs authorities in mainland China possess and deploy roughly the same amount of resources for inspection as their colleagues in Hong Kong or their counterparts in Europe, and further apply this percentage to the 175.8 million TEU¹⁰² (twenty-foot equivalent units)¹⁰³ figure for total volume of containers arriving at Chinese sea ports (Hong Kong excluded) in 2013 (the year Operation Green Fence took place), we arrive at a figure of 1.785 million TEU that could, realistically speaking, have been inspected in China in 2013. If we then compare this figure with the volume of scrap that China imported from the USA¹⁰⁴ in the same year — more than 1.3 million TEU¹⁰⁵ — and take the 100% rate of inspection at face value, this leads us to the conclusion that the customs must have spent close to all their inspection resources on containers of scrap.

This is not plausible. There is a long list of items that are forbidden from entering China, including: arms, ammunition, and explosives; counterfeit currencies and counterfeit

¹⁰² See “Container Port Traffic” [2000-2016, broken down by country] from “Containerization International Yearbook”, *The World Bank*, [no date]. URL: <https://data.worldbank.org/indicator/IS.SHP.GOOD.TU?locations=CN-HK&view=chart> (accessed January 26, 2018).

¹⁰³ TEU are the smaller of the two standard sizes of container.

¹⁰⁴ Obviously, it would make more sense to do a comparison with the total volume of scrap-containing containers that penetrated into mainland China in 2013, but I was not able to find this figure.

¹⁰⁵ See “US Scrap Exports to China Losing Their Luster”, *Journal of Commerce*, June 3, 2013. URL: https://www.joc.com/international-trade-news/trade-data/united-states-trade-data/us-scrap-exports-china-losing-their-luster_20130603.html (accessed January 26, 2018). This figure takes into account only the major categories of scrap, i.e. paper, plastics and metals.

negotiable securities; printed matter, magnetic media, films, or photographs which are deemed to be detrimental to the political, economic, cultural and moral interests of China; lethal poisons; illicit drugs; disease-carrying animals and plants; foods, medicines, and other articles coming from disease-stricken areas; old/used garments; and local currency (RMB). Those goods must have required that customs officers in mainland China devote at least part of their time to monitoring them. Operation Green Fence may have required them to concentrate their action (*zhongdian gongzuo* 重点工作 in official jargon) on scrap imports, but certainly not to stop paying attention to those other goods, or conducting related inspections. Besides, if customs inspection practices in mainland China were even remotely comparable to those elsewhere, then officers there might have had other fish to fry. In Hong Kong, for instance, Mr. Leung explained that:

“We have a list of ports that we think are suspect and we prioritize controls of cargo from those ports. Cargo from a port that is not suspect is less likely to be checked. We also look for particular types of goods. Drugs are at the top of our list, followed by cigarettes [both contraband and counterfeit]. We inspect in priority cargo suspected of containing those types of goods. E-waste and other types of waste are not very high on our list.”

What are we to conclude on the basis of this demonstration? Mainly that the figure of 100% should not be interpreted literally. It may not be absurd, but it is not plausible either. This suggests that its importance lies elsewhere. The same is arguably true for the figure of 1.5% for acceptable contamination levels, which is an impressive departure from the previous standard and would have required investing a lot of resources into the meticulous analysis of shipment content. A more productive way to interpret these figures is as symbols or displays of state power. The message they convey is that the state, if it so wishes, has the capacity to exercise absolute control. Whether or not it does that — in this case, whether or not containers are actually scanned, opened and visited, and how many of them are — matters little. Utterance of the figures already gives the threat some efficacy, especially when those figures are repeated, as they are, by all those who represent state power. Likewise, the question of whether the state can actually carry out this threat in practice is largely irrelevant. In an authoritarian regime like China, chances are that it will not be denounced as idle, because state authorities run the media, monitor public opinion, and can prevent information that clashes with the officially approved version from circulating.

Uncertainty often suffices to influence behaviors. In the case of Green Fence, however, plenty of signs indicated that the customs were actually conducting inspections. Seizures of “foreign rubbish” were highly publicized¹⁰⁶ (fig. 3.6) and covered extensively by the media¹⁰⁷. Reading press articles and watching television reports in Chinese gave me the impression that the customs were taking decisive action throughout China and getting good results. I believed — and was certainly meant to — that Operation Green Fence represented a major success.



Figure 3.6: Customs officers inspecting bales of PVC bottles in the port of Qingdao, Shandong Province, during Operation Green Fence. Source: Qingdao Customs.

¹⁰⁶ See, e.g., “Operation ‘Green Fence’ Leads to the Seizure of Large Batches of ‘Foreign Rubbish’” [“绿篱”行动查扣大批“洋垃圾”], *People Television* [人民电视], June 21, 2013. URL:

<http://tv.people.com.cn/n/2013/0621/c39805-21931886.html> (accessed January 26, 2018).

¹⁰⁷ See “Special Operation ‘Green Fence’” [“绿篱”专项行动], *General Administration of Customs* [海关总署] URL: <http://www2.customs.gov.cn/tabid/49589/Default.aspx> (accessed January 26, 2018).

After the launch of Operation Green Fence, volumes of imported scrap dropped sharply. Towards the end of 2013, large processors in China reported that they were operating at only 60-70 percent of capacity, with very low margins. Small facilities were affected even more: their activity dropped by 50-60 percent, which drove many of them out of business in Guangdong Province¹⁰⁸. Significantly, the drop had nothing to do with the number of incompliant shipments detected by the Chinese customs. As it turns out, very few of the containers entering the Chinese territory in 2013 actually contained prohibited waste. Inspections revealed that only 0.04% of containers were unqualified for import¹⁰⁹ — a low figure by any standard and one that puts the heavy rhetoric against “foreign rubbish” into perspective: China was not exactly at risk of being buried under a thick layer of dirty and dangerous refuse from abroad.

What can explain the fact that Operation Green Fence caused a dramatic slowdown of transnational movements of DEEE towards China? Is it something that Chinese state authorities had aimed for? Is it something they had planned and expected, and worked for all along? Likely not. As the Shantou Customs put it, by the early 2010s imported solid waste had become “a strategic resource indispensable for ‘stabilizing [economic] growth and supporting the development’ of China” (*woguo “wen zengzhang, cu fazhan” bukehuaque de zhanlüe ziyuan* 我国“稳增长、促发展”不可或缺的战略资源). The country badly needed raw materials and getting them from scrap remained an attractive option. So what happened? More realistically, the operation must have acted as a red alert for businesspeople everywhere and discouraged them from even trying to send or bring stuff over to China. Why? Because it went against the grain of established business processes and practices.

¹⁰⁸ “An Inside Look at Operation Green Fence”, *Resource Recycling*, October 18, 2013. URL: <https://resource-recycling.com/recycling/2013/10/18/inside-look-operation-green-fence/> (accessed January 26, 2018).

¹⁰⁹ See “What Operation Green Fence Has Meant for Recycling”, *Waste 360*, February 10, 2016. URL: <http://www.waste360.com/business/what-operation-green-fence-has-meant-recycling> (accessed January 26, 2018).

Let us take the 100% inspection rate as an example: customs inspections can have a huge impact even when carried out at a much lower rate, like the one characteristic of large European ports. As Liu Lei from the Sino-American joint venture explained to me, they can cause delays in logistics and production, raise container rental fees, and, in some cases, increase costs to such levels that business becomes prohibitively expensive. In other words, a 100% inspection rate on scrap cargo to China signaled a no-go area for transnational traders. Scrap dealers worldwide started to refrain from using the Chinese channel, just to be on the safe side. In the US, for instance, many of them reported that they had stopped shipping to China and were looking for domestic channels instead.

It seems that the message Chinese state authorities wished to send by launching Green Fence was not so much “stop shipping scrap” as “stop shipping low quality scrap”. Theirs was a call for purer and more valuable raw materials that would be not only less harmful for the environment but also more useful to the domestic industry. This, at least, is the conclusion many foreign analysts arrive at. One of them explains that: “Operation Green Fence was as much about economics as it was about the environment. China had found a way to help its manufacturers lower their costs at the expense of U.S. recyclers”¹¹⁰. The promotion of China’s domestic economic interests, which foreign experts see as an important rationale behind Operation Green Fence, was rarely ever mentioned by Chinese officials. Tellingly, I found only one instance where a representative of the central government attributes the operation above all to “government desires to see better-quality recycled materials to help local industries upgrade”¹¹¹. For the rest, they all stuck to the official rhetoric around the necessity to protect China against “foreign rubbish” and “smugglers”.

¹¹⁰ See *ibid.* “What Operation Green Fence Has Meant for Recycling”.

¹¹¹ See “Recyclers Told to Expect More China ‘Green Fence’ Actions, Even as Scrap Plastic Imports Rise”, *Plastics News*, May 18, 2015. URL: <http://www.pnchina.com/en/PrintArticle.aspx?id=1361249557> (accessed January 26, 2018). Those are the words of Ju Hongyan from the MEP’s Solid Waste and Chemicals Management Center (环境保护部固体废物与化学品管理技术中心).

Interestingly, Green Fence had other effects that Chinese state authorities did not fully master, to say the least. For one thing, it alienated quite a few scrap dealers whose business depended on transborder trade with China and for whom the operation proved quite destructive. Dave Huang was one of them. He and I met during a plant visit in Singapore in 2014. Mr. Huang had built his career on the transnational scrap trade and dedicated his life to it. It had always been his “dream” (*mengxiang* 梦想) to make a living through trading scrap, he told me, and he had worked hard to make that dream come true. In the mid-2000s, Mr. Huang founded what went on to become one of China’s main online business platforms for trading scrap, both domestically and on a global level, and getting price information. Later, he launched his own company and he was exporting scrap — only authorized goods, no DEEE, Mr. Huang insisted — from all over the world and importing it into China. His company was headquartered in Ningbo (宁波 in Zhejiang Province) and had offices as well as scrapyards in many other countries, including Spain, Pakistan and the USA. Half joking, Chen said that his family never knew where he was: he spent only a third of his time in Ningbo, another third in scrapyards abroad and the last third in hotels, airplanes and rental cars. Operation Green Fence created major hurdles for his professional activity. It harmed his business and made his life in general more complicated. He did not mince his words:

“Instead of making our lives impossible, the government would do better to look at the last mile: recycling [Mr. Huang means treatment]. That’s where the pollution is. But requiring us to get a license and meddling in how we use it, what’s the point? [...] Operation Green Fence? Do you know what it’s about? I’ll tell you what it’s about! It’s a strategy by the Chinese customs to leverage their power [*quanli* 权力]!”

With anger in his voice, Mr. Huang explained that customs in China can only collect little in the way of taxes, unlike the AQSIQ, for instance, so leaders of that department, who witnessed the massive flows of goods coming into and getting out of China, had no way of deriving wealth from them. Seeking to change that, they came up with the idea of imposing more stringent controls on “waste” (*feiliao* 废料) flows, Mr. Huang claimed. He accused

Chinese customs of being “corrupt” (*fubai* 腐败) and of trying to get rich on the back of scrap traders. His rant against Chinese customs may fail to convince¹¹², but it should be viewed as symptomatic. It shows that Operation Green Fence was highly unpopular because it jeopardized the interests of companies, not only those of small smuggling operations, which were the state’s alleged target, but also those of large and legitimate companies like Mr. Huang’s.

Operation Green Fence also had other unanticipated consequences. New smuggling routes emerged as a result of the increased level of controls. In 2014, Chinese customs reported¹¹³ that they had “busted” three “smuggling gangs” that were together responsible for moving 72,000 tons of DEEE into China from Japan, Western Europe and North America in 2013, the year Operation Green Fence officially began. The gangs had created an amazingly long detour:

“The e-waste was first shipped to Hong Kong, then transshipped to a country in Northeast Asia and from there imported in China through smaller ports in Liaoning province where customs control is less strict or non-existent. From this province in the northeast of China the e-waste was shipped via inland roads to Guangdong province for resale or recycling. A huge indirect smuggling route of around 6,000 kilometers was set up to ship the e-waste from Hong Kong to Guangdong province (which is only 48 nautical miles away from Hong Kong) in order to circumvent the strict customs control in the ports in Guangdong. (Geeraerts et al. 2015a:35)

Finally, the operation also raised the prices of DEEE that did find its way into China despite inspections. In May 2015, passing myself for a businessman trying to sell scrap PCBs collected by a company located in Italy, I met with Chen Qiang, a young DEEE recycler based in Guiyu. While we were chatting over dinner, Mr. Chen told me that goods now

¹¹² Greed and corruption, as a register, are commonly used in China — and not only there — to air grievances, especially towards the state. It is doubtful that they account for the launch of a coordinated, nationwide crackdown such as Operation Green Fence.

¹¹³ See “Police Bust ‘E-trash’ Smugglers, Seize 72,000 Tons of Goods”, *Global Times*, 26 February 26, 2014. URL: <http://www.globaltimes.cn/content/844788.shtml> (accessed January 26, 2018).

became much more valuable once they had crossed the border into mainland China. He mentioned one shipment in particular whose price had increased tenfold between Hong Kong and Guiyu. He recommended that I deliver goods to Nanhai (南海区 in Foshan), because I would get more money out of them there than in Hong Kong. Alternatively, he said, I could simply have a warehouse in Hong Kong and let specialized companies take care of shipping them across the border. I complained about how hard it was to identify and contact such companies in Hong Kong, and Mr. Chen commented that they protected themselves, but were actually numerous and quite big. His account suggests that some DEEE was still entering into China in 2015 (notably through Nanhai), that some professional traders still conducted that kind of business, and that smugglers still found ways to cross the border, no doubt commanding higher fees than before.

3.2.3 An ending is also a new beginning

Through Operation Green Fence, the Chinese government announced its intention to reshape the global scrap trade and to move the Chinese industry higher up the value chain. The message was clear enough to trigger a reaction among recyclers throughout the world. Those exporters who intended to continue doing business with China made sure they met the new requirements, those who did not simply looked for other countries to send their scrap to. In 2017, a follow-up operation codenamed National Sword¹¹⁴ (see fig. 3.7) was launched by Chinese customs officials. It focused on smuggling of several categories of goods, including scrap, and acted as booster shot for foreign scrap dealers, reminding them that China had become serious about quality, compliance and controls.

¹¹⁴ See “Arrests and Delays Mark First Weeks of ‘Second Green Fence’”, *E-Scrap News*, March 2, 2017. URL: <https://resource-recycling.com/e-scrap/2017/03/02/arrests-delays-mark-first-weeks-second-green-fence/> (accessed January 26, 2018).



Figure 3.7: A cartoon featuring a Western businessman and a Chinese warlord. Source: Plastic News.

By that time, importing scrap into China had already become a lot more complicated than it was only five years earlier. But things took a whole new dimension in July 2017, when the Chinese central government imposed a total ban on no less than 24 categories of scrap materials, including postconsumer plastics, unsorted waste paper, tires, textiles, and glass¹¹⁵. DEEE does not appear as such on the new list¹¹⁶ but is likely to be affected, indirectly through the ban on plastics, a type of material that makes up a large share of the composition of DEEE. A month later, the central government filed a notification with the

¹¹⁵ "Implementation Plan for Prohibiting the Entry of Foreign Garbage and Advancing the Reform of the Solid Waste Import Administration System" [禁止洋垃圾入境推进固体废物进口管理制度改革实施方案], *General Office of the State Council* [国务院办公厅], July 18, 2017. URL: http://www.gov.cn/zhengce/content/2017-07/27/content_5213738.htm (accessed January 26, 2018).

¹¹⁶ See "Electronics Not Named in China's Imports Ban", *E-Scrap News*, July 20, 2017. URL: <https://resource-recycling.com/e-scrap/2017/07/20/electronics-not-named-chinas-imports-ban/> (accessed January 26, 2018).

World Trade Organization (WTO)¹¹⁷, thereby making its decision known to the entire world. The move made the headlines in both specialized and mainstream media, and remained the talk of the recycling industry during the following months. Dispositions in the law leave some ambiguity as to whether other types of scrap might be affected as well. That set the alarm bells ringing for all those involved in the export of scrap metals (especially copper and iron), who could not afford to lose a market like China, worth several billion US dollars annually. The governments of several countries made submissions to the WTO to contest China's ban¹¹⁸. This was scrap politics conducted through an unusually official channel and at an unusually global scale.

The WTO notification came very much as a surprise. Few people, if any, expected the Chinese government to act so quickly and radically. Many foreign scrap dealers were still adapting to China's new requirements, procedures and controls when they learned that, in the near future, they would not be able to export anything to China anymore. That caught most of them off guard and put them in a tricky situation. Plastic recyclers in Europe, for instance, had grown extremely dependent on China. In the mid-2010s, upwards of 87 percent by weight of plastic exports from Europe went to China (Velis 2014:5). Like their colleagues operating in other regions of the world or involved with other materials, European recyclers now had to reconsider their business model — and act fast. In the autumn, reports came out that massive amounts of recyclable waste would have to be

¹¹⁷ “Catalogue of Solid Wastes Forbidden to Import into China by the End of 2017 (4 classes, 24 kinds)”, MEP, July 18, 2017. URL: <http://tbtims.wto.org/en/RegularNotifications/View/137356?FromAllNotifications=True> (accessed January 26, 2018).

¹¹⁸ See “China's Import Ban on Solid Waste Queried at Import Licensing Meeting”, *World Trade Organization*, [no date]. URL: https://www.wto.org/english/news_e/news17_e/impl_03oct17_e.htm (accessed January 26, 2018).

landfilled in Europe¹¹⁹. There was simply no other option. The recycling sector would have needed more time to adapt.

What is the rationale behind this most recent ban? The Chinese central government justified its decision by invoking the necessity to better protect China against dirty and dangerous “foreign rubbish”, much like it had in the past for the Operations Green Fence and National Sword. In its notification to the WTO, it argues that:

“we found that large amounts of dirty wastes or even hazardous wastes are mixed in the solid waste that can be used as raw materials. This polluted China's environment seriously. To protect China's environmental interests and people's health, we urgently adjust the imported solid wastes list, and forbid the import of solid wastes that are highly polluted.”

Yet, the argument that the ban was motivated first and foremost by the fight against “foreign rubbish” appears to be spurious. Adam Minter makes this point quite clearly¹²⁰:

“It's a crowd-pleasing stand. But far from solving China's environmental problems, this crackdown will actually worsen them -- and do so at the expense of jobs and economic growth around the world. The rhetoric itself is nothing new. China's government has long played up stories about foreign waste, partly to deflect attention from unmanageable garbage problems at home. But it has also encouraged the import of scrap recyclables since the 1980s. [...] If the goal is to improve the environment and public health, then, the ban on foreign garbage is counterproductive. For all the problems with imported recyclables, those generated in China are far dirtier -- which is why Chinese recyclers want to continue importing foreign garbage.”

In terms of waste, China has long been faced by a series of other problems within its own borders. To give only a few examples, municipal authorities in large cities throughout the country have struggled for at least a decade to implement official schemes for household

¹¹⁹ See, e.g., “China's Ban on Imported Plastic Leads to ‘Impending Crisis’ for UK Waste Recycling”, *The Independent*, December 7, 2017. URL: <http://www.independent.co.uk/environment/china-plastic-import-ban-uk-recycling-landfill-options-waste-crisis-disposal-a8097166.html> (accessed January 26, 2018).

¹²⁰ “China's War on Foreign Garbage: Imported Recycling Has Been a Boon for China. So Why Ban It?”, *Bloomberg View*, July 20, 2017. URL: <https://www.bloomberg.com/view/articles/2017-07-20/china-s-war-on-foreign-garbage> (accessed January 26, 2018).

waste sorting, to no avail. Much potential scrap gets contaminated and becomes unfit for recycling. Rural areas are still largely devoid of waste collection, sorting and processing facilities, which makes dumping and burning the only available solutions. Finally, a lot of products manufactured for the domestic market are made using cheap materials whose low economic value prevents any recycler from making a profit.

A more convincing explanation for the recent ban is that the Chinese central government is seeking to boost domestic waste collection, sorting and recycling by cutting supplies of foreign scrap and forcing Chinese recyclers to source their inputs within China. Thus far, this goal has been overshadowed by the “foreign rubbish” rhetoric and rarely acknowledged by Chinese state officials, which gives the impression that it is secondary. Occasionally, however, it does come to the fore, as in this declaration by the China Council for International Cooperation on Environment and Development (CCICED), a think-tank that includes such highly official figures as Liu Yandong (刘延东), China’s Vice Premier, and Li Ganjie (李干杰), its Minister of Environmental Protection: “A further stop to waste material imports will be in place by 2019 through replacement of imports by substitution with domestic sources of raw and recycled sources”¹²¹. Such a move fits with some of the Chinese government’s more general objectives and policies such as upgrading China’s industry and increasing its resources autonomy. But demand for raw materials in China is huge and it is likely that, following the cut in foreign supplies of scrap, many companies will increase their consumption of primary materials in addition to, or even instead of, turning to domestic secondary materials.

From a less pragmatic and more symbolic point of view, China’s most recent ban on scrap imports can be interpreted as yet another display of state power. On the national stage, it shows Chinese citizens that their government is taking action to defend them against a

¹²¹ See “Ecological Civilization Shaping China’s New Era”, *CCICED*, December 2017. URL: <http://www.cciced.net/cciceden/Events/AGM/2017/file/201712/P020171204603690948624.pdf> (accessed January 26, 2018).

foreign aggression and put an end to their country's exploitation as "the world's dump". On the international stage, it asserts China's political and economic clout and announces a radical reworking of its competitive advantage in the form of a move away from its traditional role as provider of cheap labor and low-end industrial services. Both aspects are characteristic of the country's path in recent years, especially since Xi Jinping assumed office in 2012. "Chairman Xi" (*Xi zhuxi* 习主席) has been striving to boost patriotism and obedience to the party-state within China and to place the country high up in the hierarchy of nations.

3.3 A look in the mirror: China exports too

At the time of my fieldwork it was taken for granted that DEEE imports into China represented a huge problem, whereas exports of such goods from the Chinese territory, by contrast, did not provoke even a fraction of the interest and concern. For at least a decade and a half, likely more, large volumes of DEEE had been collected in Hong Kong, aggregated and sent abroad. At first, the main destination was mainland China. Later, it became Southeast Asia, South Asia and Africa. State authorities in the HK SAR acknowledged this phenomenon and claimed that they had begun to tackle it. But there were signs that their action would not suffice to put an end to exports. State authorities on the mainland, by contrast, seemed oblivious to the fact that China not only imported but also exported DEEE. They paid no attention to such outgoing material flows, much less regulated them, although, in all likelihood, these flows would grow in the future.

3.3.1 Hong Kong: waking up to the phenomenon

From at least the late 1990s onwards, Hong Kong exported the bulk of DEEE generated on its territory to other territories and countries¹²². The issue of how to deal with DEEE was not one the government of the SAR needed to concern itself with solving, as it was basically solved by others, through export. That was still the case when I conducted fieldwork in the

¹²² See *ibid.* "Hong Kong: A Duty-Free Port for Electronic Toxics?".

mid-2010s, though a change was about to occur. In an interview with Clarence Wong, senior environmental protection officer at the HKEPD, in April 2014 I learned that close to 80 percent of DEEE collected in Hong Kong was shipped abroad, according to the HKEPD's estimations. The rest mostly ended up in landfills: the HKEPD conducted excavations there and dug out DEEE that, they calculated, accounted for the remaining 15-20 percent. Those were mostly low-value items such as keyboards and mice or old refrigerators. "For the moment, we don't control e-waste", Mr. Wong explained. The Hong Kong government did not require a license to collect DEEE, so basically anyone could get involved in this line of business. The senior officer described this situation as "unsustainable", as it was both risky for Hong Kong and irresponsible towards the rest of the world:

"Some countries are already ramping up restrictions on WEEE imports. Imagine what would happen if all countries suddenly refused them! WEEE would accumulate in Hong Kong and we would be unable to address the problem. [...] By tolerating exports, we basically export Hong Kong's WEEE problem. Everyone knows how e-waste is handled in developing countries. Somehow, we contribute to this terrible pollution by doing nothing to prevent exports."

According to Mr. Wong, Hong Kong residents who wished to get rid of their EEE had little choice in the mid-2010s but to call independent collectors. There was no other channel, except for a handful of computer brands that ran optional take-back schemes for their own products and one charity that accepted all types of EEE but collected less than 1 percent of the total amount of DEEE generated in Hong Kong every year¹²³.

¹²³ For several years, the St James' Settlement collected DEEE, repaired and refurbished it, and donated it to poor families and individuals through a program called WEEE Go Green. URL: <http://weeegogreen.sjs.org.hk/> (accessed in 2015, not accessible anymore). Those services were taken over in 2016 by ALBA Integrated Waste Solutions (Hong Kong) Limited (ALBA IWS), a private company with a public mandate. URL: <http://www.weee.com.hk> (accessed January 26, 2018).

However, this situation would soon change, Mr. Wong announced. A law, to be adopted in 2016 or 2017, would institute an official collection system¹²⁴. At some point in the future, he announced, Hong Kong residents would be free to decide whom to hand their DEEE over to: officially recognized and licensed companies (financed through a mandatory extended producer responsibility system) or independent dealers. Asked what would push residents to choose the former instead of the latter, Mr. Wong replied: “free pick-up services” and “proper treatment”. However, it seemed unlikely that the HK SAR’s upcoming official system would manage to collect more than a third of the 70,000 tons of DEEE generated in total every year by the Hong Kong population. That, according to Mr. Wong, was because: only one specialized recycling plant was to be built in Hong Kong in the near future and it had a planned total capacity of only 30,000 tons per year¹²⁵, so even at full capacity it would manage to process only a small half of the total amount. Further problems lay in the fact that the proposed law concentrated on large DEEE, which made up 85 per cent of the total weight, but excluded small equipment. Also, computers, though included in the legal catalogue, would probably not be collected through official channels due to their high economic value. In sum, there were good chances that Hong Kong would still be exporting a considerable amount of DEEE in the short and medium terms.

It seems that, in the 1990s and 2000s, Hong Kong exported DEEE mainly to mainland China. This, at least, is what Greenpeace claims with regard to computers¹²⁶. According to the NGO,

¹²⁴ See “Promotion of Recycling and Proper Disposal (Electrical Equipment and Electronic Equipment) (Amendment) Ordinance 2016”, *Hong Kong Special Administrative Region*, 2016. URL: https://www.elegislation.gov.hk/egazettedownload?EGAZETTE_PDF_ID=11961 (accessed January 26, 2018). The bill was introduced in 2015, passed as an ordinance in 2016 and took effect in spring 2017.

¹²⁵ See also “A Model for the Metropolis”, *E-Scrap News*, September 15, 2017. URL: <https://resource-recycling.com/e-scrap/2017/09/15/a-model-for-the-metropolis/> (accessed January 26, 2018). Actually, this capacity compares favorably with those of other plants, but it remains insufficient in a wealthy and technophile metropolis like Kong Kong.

¹²⁶ See *ibid.* “Hong Kong: A Duty-Free Port for Electronic Toxics?”.

only 10-20 percent of all computers discarded in the SAR ended up in landfills in the early 2000s. The rest of them, an estimated 380,000 pieces a year, were collected and “returned to the motherland” (*huigui zuguo* 回歸祖國) through “smuggling” (*touyun* 偷運). There, they were disassembled and resold. Depending on their condition, parts and components were used either directly as secondhand goods or indirectly for salvaging other components or recovering materials. Greenpeace also notes that some discarded computers travelled further away from Hong Kong, to Southeast Asia and even Africa (but gives no estimates of those latter flows).

The fact that Hong Kong acted as not only a gateway to China but also an exporter, sending its own DEEE to mainland China, deserves to be stressed. It suggests that the country’s problem with inflows of DEEE hardly rested only with foreign countries. In this case, the same country both suffered from the problem and contributed to causing it, since Hong Kong officially belongs to China, at least since 1997, regardless of its status as a SAR. This undermines the “foreign rubbish” rhetoric, which gives the problem distant origins. It also reveals the nationalist defensiveness that informs this rhetoric. For it is doubtful that officials in mainland China had Hong Kong in mind when they delivered their diatribes against dirty and dangerous rubbish into China from “abroad” (*guowai* 國外).

Another import aspect to highlight is that exports largely financed DEEE collection in Hong Kong and that they were themselves driven by the reuse value of goods. The fact that, say, a television set removed from an apartment in Kowloon could be shipped to Ghana and sold to a hotel in Accra for a price that allowed several middlemen to make a profit is what best accounts for its collection in Hong Kong in the first place.

A short description of this network and how it mobilized to move goods, funds and people around would look like this. Following a pattern common throughout the world, the people who specialized in collecting DEEE from households, offices or small businesses in Hong Kong were not originally from that territory, but had a migration background. Most of them came from South Asia, or had been born to South Asian parents, and some of them had lived in the SAR long enough to hold a local passport or permanent residency permit. Their professional activity consisted in driving around Hong Kong and meeting with whoever called them to remove something from their home, office or small business. Besides DEEE, these mostly Pakistani and Bangladeshi men were also interested in furniture, clothing and

products that the Chinese traditionally offer as formal presents (*lipin* 礼品 such as liquor). They looked in priority for goods that had a high residual value and could easily be sold secondhand. Occasionally, they also accepted to buy back valuable scrap, in particular metals and defunct DEEE.

In the evening, these mobile collectors converged in a district of the Kowloon peninsula called Sham Shui Po (深水埗), where they sought to resell the DEEE they had collected during the day (Ho 2010, Ta 2017). They put small and cheap DEEE (dumbphones, gadgets) on display at the long-running flea market that opened every evening and attracted bargain hunters from the low-income segments of the local population. More expensive and larger DEEE was either offloaded at crossroads and left to the custody of family or friends (fig. 3.9), as in the case of refrigerators, washing machines and hi-fi or fitness equipment, or offered to shops operated by Chinese that specialized in high-value devices such as computers and television sets (fig. 3.8). In both cases, this larger and more valuable DEEE then changed hands again as it was acquired by wholesale buyers. It was loaded on trucks, into containers (fig. 3.10) and eventually shipped away. In the mid-2010s, countries from South Asia and Africa had surpassed mainland China and countries in Southeast Asia as the main destination.



Figure 3.8: A Chinese trader specialized in secondhand television sets waits for foreign buyers in his boutique in downtown Hong Kong (Kowloon). Photo credit: the author.



Figure 3.9: South Asian junk collectors in downtown Hong Kong (Kowloon) keep an eye on secondhand household appliances and wait for buyers. Photo credit: the author.



Figure 3.10: A 40-foot container parked in downtown Hong Kong (Kowloon) and loaded with secondhand CRT television sets destined for export. Photo credit: the author.

For the most part, DEEE collected in Hong Kong was ultimately intended for reuse. I made several observations that support this. The first one is that, with the exception of obsolete computers, it was not disassembled or dismantled before shipment. Shipping whole items over a long distance only really makes business sense if one intends to market them as functional products. If, on the contrary, they later serve only as bundles of materials, the logical thing to do is to preprocess them so they take up less space and one can fit more of them into a container. One exception is obsolete computers, which usually underwent dismantling in Hong Kong — sometimes in the middle of Sham Shui Po, right on the pavement. This is because, unlike other DEEE, obsolete computers have a low reuse value but contain valuable materials. Gold and silver, in particular, can be recovered from PCBs and are found in high concentrations in old models of computers (less so in newer ones).

The second observation is that collected DEEE that is still in working order tended to be labeled as such. This practice would have been pointless if it was to end up in a shredder anyway. Finally, the third observation is that secondhand markets in mainland China contain DEEE that undoubtedly originates from Hong Kong. While visiting such markets in the city of Guangzhou, for instance (fig. 3.11), I realized that they were filled with DEEE equipped with British-style power plugs and bearing writings in traditional Chinese characters. Since the combination of those two features is unique to EEE manufactured for the Hong Kong market, I assume that it had been sold, used and discarded there before finding a new home in mainland China.



Figure 3.11: Secondhand DEEE from Hong Kong on sale in a specialized street market in downtown Guangzhou in 2014. Photo credit: the author.

In sum, DEEE collection in Hong Kong in the mid-2010s was driven in no small part by export for reuse. This can be explained by the fact that living standards in Hong Kong at that time were high, so residents tended to buy higher quality devices and to renew them frequently, which created a windfall economy for people elsewhere. Secondhand EEE is popular among buyers in poor regions of the world, as it usually costs less than new EEE and allows them to save money (see chap. 6 and 7). Tellingly, Lepawsky & Connolly (2016) come to the same conclusion regarding DEEE collection in Singapore, a city that resembles Hong Kong in many ways. Thus, we can conclude that highly connected and wealthy global cities in Asia avoided the burden of ageing EEE by transferring it to the developing world and, by doing so, simultaneously improved access to EEE in those countries.

3.3.2 Mainland China: “exports? Which exports?”

In mainland China, unlike in Hong Kong, DEEE exports were still a non-issue. For instance, a representative of Guangdong Customs whom I met during the Chinascrap conference in Guangzhou told me that she was not aware of any data on exports of e-waste from China. The phenomenon must be “limited anyway” (*fanzheng buduo* 反正不多), she said. According

to her: imports were the real issue in China as far as e-waste was concerned; exports were unlikely to take place since demand for raw materials was very high in China; and inefficient waste sorting mechanisms in China meant that DEEE possibly was not even be extracted from the waste stream. None of those arguments are really convincing and I had the feeling that the customs official came up with them as she was speaking to me. It seems that she knew little to nothing about DEEE exports. But the fact that she assumed the phenomenon to be very unlikely is nevertheless revealing. It shows how little room the “foreign waste” rhetoric, which foregrounded China’s role as a victim of imports, left for the country’s parallel role as a perpetrator of exports.

In fact, China did export DEEE, both in the form of sorted waste and secondhand devices. Shinkuma & Huong’s research (2009) on movements of DEEE at the sino-vietnamese border shows for instance that exports of secondhand EEE from China to Southeast Asia were a big thing in the mid-2000s (p. 27). Part of this DEEE may have been first imported into China and refurbished there before having been re-exported, but that does not change much. More recently, field investigations conducted by Jiang Yingyue, a Beijing-based environmental activist who studied DEEE recycling for her master thesis when I met her, indicates that markets selling secondhand EEE in large Chinese cities are populated by both Chinese and foreign buyers, who source devices there and ship them out of China. Finally, Yue Dongbei, assistant professor at Tsinghua University, found that that 50-70 percent of fluorescent lamps collected in China were sent abroad for recycling in 2012 (Yue 2014)¹²⁷.

Legally speaking, very little stood in the way of DEEE exports from China. Perhaps this also explains why some people, like the customs officer quoted above, assumed that the

¹²⁷ Absolute figures may be less impressive since, as Prof. Yue’s research also reveals, collection rates for lamps in large Chinese cities were usually around 3-6 percent. Nevertheless, the sheer size of China and the number of large cities in this country suggest that the total quantity of exported lamps must be considerable.

phenomenon did not exist. According to a guidebook released by the Chinese customs¹²⁸, the only category of DEEE that could not be sent out of the country was cooling equipment that used chlorofluorocarbons (CFCs or *lǚfuting wuzhi* 氯氟烃物质) as refrigerant gases. The restriction applied only to old generation refrigerators and air conditioners. Apart from that, “everything c[ould] be exported”, as the customs officer from Guangdong confirmed to me via email in 2014.

The door out of China was open to DEEE in the mid-2010s and the likelihood that it would be used more in the future seemed high. Several factors indicated that the country might soon join the club of large-scale DEEE exporters. These include a considerable rise in living standards, especially in large cities; more consumerism, especially among the young generation; and a reduced willingness among the population at large to buy secondhand devices. These factors have already led to increased consumption and a quicker turnover of DEEE, thereby creating an ever-growing mass of DEEE within China, including easily reusable DEEE.

3.4 Conclusion

In this chapter, I spelled out a paradox: for the last three decades DEEE imports, and scrap imports more generally, have been a boon to the Chinese economy, yet in recent years they have been treated as a bane by Chinese state authorities. The latter first welcomed them or at least tolerated them, but later became increasingly picky. The 2010s marked a turning point: restrictions were imposed, requirements raised, and controls strengthened. Chinese state authorities justified these measures by insisting that they had to protect China from dangerous and dirty wastes from abroad that crossed the border illegally and polluted the country's environment. I revealed some of the limitations of this rhetoric. In particular, I noted that it fuses “foreign” and “forbidden”, thereby creating the illusion that China's

¹²⁸ “Guidebook on Customs Clearance Customs” [中国海关通关指南], *China Customs Head Office Supervision Department* [海关总署监管司], Beijing: China Customs Press, 2011:107-110.

problems with waste can largely be blamed on the outside world. It also attaches the label of “rubbish” to any shipment that does not comply with China’s import regulations, thereby devalorizing anything but high quality, pre-sorted, expensive secondary raw materials. Finally, it equates non-compliance with “smuggling”, thereby painting Chinese scrap dealers and recyclers who cannot hold such high standards with the colors of the underworld.

The rhetoric on “foreign rubbish” and “smuggling” is fundamentally political: it blows one issue out of proportion and does so for a purpose. In the mid-2010s, things were more complicated, as I realized while conducting fieldwork, and I suspect that they always were, including in the 1990s and 2000s. For instance, through banning imports of DEEE, the central government also sought to stem refurbishing, for reasons that have little to do with a fight against pollution or contravention. But the systemic use of a simple and impactful rhetoric has advantages. It allows Chinese state authorities to conveniently obscure other issues, some of which they have been grappling with for years, as well as other objectives, many of which lack the noble or indisputably positive character of environmental protection, law enforcement and the upholding of state sovereignty. For me, if we are to understand the recent evolution of China’s policy on scrap imports, we need to project it against the background of the Chinese central government’s efforts to assert its control over the industry, and of China’s growing clout in the global arena. Beijing has been confidently transforming the international scrap trade and ushering in a new era both at home and abroad. It is acting on its own terms and with an agenda that requires deciphering. Its objectives obviously go beyond the safeguarding of the Chinese population’s health and safety, though this is what it systematically foregrounds. Those objectives include reshaping the domestic recycling industry, and domestic industry more generally, and reducing China’s reliance on fully industrialized countries like the United States, the United Kingdom and Japan for a steady supply of raw materials.

One needs to put this into historical perspective. Not incidentally, these countries also happen to be current and former icons of imperialism and to have played an important part in China’s “century of humiliation” (*bainian guochi* 百年国耻). Foreign observers might remain oblivious to this symbolical dimension of a ban on scrap imports, but it certainly has not been lost to the Chinese population, trained as it is to spot signs of China’s recovered sovereignty and autonomy, and to interpret them in light of their country’s lost grandeur

(Wang 2014). In that regard, the progressive ban on scrap imports may be less significant than the handover of Hong Kong in 1997 or the 2008 Beijing Olympics but, like these events, it serves as a proof of the end of China's status as a dominated country.

In terms of contribution to existing scholarship, this chapter shows how discourses on e-waste are linked to the interest of those who propagate them. Previous research had already done something similar. Based on a study of e-waste recycling standards in the USA, Graham Pickren (2014) demonstrates for instance that various organizations, such as trade associations or environmental NGOs, have differing interests and promote narratives on e-waste that conflict with each other. Some of them advocate certain solutions that others explicitly reject. In particular, their respective positions on the question of whether transnational trade in DEEE amounts to environmental dumping are miles apart. My research reveals a similar phenomenon, but one that plays out on a much larger scale since it involves a government that rules over the world's most populous country and largest economy, and several ministries within that government, and several administrative levels within those ministries. It is environmental justice at the service of a state's larger interests, embedded in its propaganda and disseminated through the society it governs as well as the wider world.

This chapter also buttresses arguments made in the literature against the use of dichotomies in portraying, regulating or even trying to understand transnational flows of DEEE. All too often, accounts of e-waste take for granted that it gets exported abroad and flows from rich, "developed" countries of the "Global North" to poor, "developing" countries of the "Global South". This assumption has been challenged by numerous scholars studying transnational flows of e-waste (see, e.g., Salehabadi 2013, Yoshida 2005 and 2013, Huisman et al. 2015, Bisschop 2012). It has also been tested for certain categories of products and disproved. Lepawsky and his team (Lepawsky and McNabb 2010; Lepawsky 2015b) demonstrate, for instance, that it does not hold for batteries and chargers. In that case, material flows from

“developed” to “developing” countries decreased dramatically in the 2000s and recently accounted for only a very small portion of total transnational trade. On this basis, they conclude that it is necessary to “rethink the e-waste problem” and to decouple it from the pollution haven hypothesis¹²⁹.

Yet, the “Global North” versus “Global South” dichotomy persists. One reason why is that the Basel Convention is built on a representation of the world as “bi-modal” (Lepawsky 2015a): it classifies countries into two categories, Annex VII countries (Organization for Economic Cooperation and Development (OECD), the European Community (EC) and Lichtenstein) and non-Annex VII countries (all other signatories), and basically forbids exports of hazardous waste from the former to the latter. No room is left for a more differentiated approach. The Basel Convention no longer reflects the reality it was meant to regulate (Lepawsky 2015a, 2018). Many authors are therefore calling for a revision (Kirby & Lora-Wainwright 2015a; Lepawsky and Connolly 2016) but changing a legal instrument like the Basel Convention requires following complex amendment procedures, which make a recast difficult and unlikely. Thus, for now at least, the Basel Convention remains in place despite its shortcomings.

My research shows how problematic dichotomous representations of the world can be. Depending where one looks, China bears resemblance to both the most and the least developed regions on this planet. How are we to judge its status as “non-Annex VII country”? It is obviously not appropriate, since the country has been exporting DEEE on a massive scale from Hong Kong for decades and will presumably continue to do so from other large Chinese cities as well in the future. But then, should China be considered as an “Annex VII” country instead? Not necessarily, given the fact that industrial facilities and environmental controls are still lacking in many parts of the country. However one classifies the country, the results are not satisfying. A related problem is how do we consider a place

¹²⁹ The pollution haven hypothesis posits that polluting industries tend to relocate to jurisdictions with less stringent environmental regulations.

like Hong Kong, which belongs to China and yet has a high level of autonomy? Legal instruments like the Basel Convention are informed by a country-centric view of the world that leaves no room for subdivisions. Likewise, vast swathes of the literature on e-waste suffer from methodological nationalism, which treats territories as belonging to either one country or another. My research, by contrast, offers a fine-grained analysis capable of taking into account Hong Kong's special status as both part of China and independent from China. By doing so, it sheds a new light on transboundary movements of DEEE.

This chapter also speaks in unison with recommendations to look at DEEE through not only the “waste” lens but also the product lens. Many researchers emphasize that global flows of DEEE are largely driven by reuse (Yoshida 2013; Minter 2013; Salehabadi 2013), but this has yet to be acknowledged more broadly. Most reports from NGOs and international organizations, for instance, tend to ignore reuse or downplay its importance as a driving factor (see Goldstein & Schulz 2015 on Rucevska et al. 2015). A notable exception is the investigation on DEEE exports from Europe recently carried out by several United Nations agencies together with Interpol. According to their report (Huisman et al. 2015), out of close to 10 million tons of DEEE generated in the Europe Union (EU) in 2012, 1.3 million tons (or close to a seventh of the total) “departed the EU in undocumented exports”, 70 percent of which consisted in “functioning second-hand items” and only 30 percent in “e-waste” (“repairable items” included). The report clearly states that “the main economic driver behind these shipments is reuse and repair and not the dumping of e-waste” (p. 16) and explains this, among others, by highlighting that “the magnitude of the reuse value is multiple times the material value of the contents” (p. 18). My case studies on Hong Kong and mainland China confirm these insights and point to some of the implications.

One of these implications is that the transnational trade in DEEE produces not only negative effects but also positive ones. It has a bright side in addition to a blight side, one could say. Exports of DEEE contribute to bridging the “digital divide”: they distribute objects and technologies deemed central to life in our contemporary world more fairly and improve living conditions for people in poor areas of the world (Williams et al. 2008). They also extend product lifespans, thereby reducing the need for new EEE. Most regulations recognize this. The Basel Convention, for instance, forbids its many member states from shipping “hazardous waste” abroad, but permits exports of repairable and/or reusable DEEE,

even of the potentially hazardous types, for it does not qualify as “waste”. In this regard, approaches based on environmental dumping have a serious limitation, namely they omit reuse and related benefits. They ignore the fact that DEEE collected in rich areas of the world often enjoys a new life in poor ones. Sometimes, this is done willfully, as when BAN advocates a blanket ban on transboundary movements of “e-waste” in order to solve the environmental problems it can cause. In fact, such a “solution” would be one only in name. Jena Burrell (2016) warns that it might do more harm than good and I agree with her. It would put an end to the benefits of reuse on a global scale but do nothing to prevent the increasing volumes of EEE consumed in poor countries from becoming obsolete or to accelerate the establishment of a domestic recycling industry in those countries. But the solution put forward by BAN is simple and drastic, which makes it attractive as well — much like the Chinese state authorities’ rhetoric on “foreign rubbish” and “smuggling”.

Finally, this chapter questions assumptions made in the literature on the link between e-waste and high levels of criminality. Allegations that organized crime is responsible for transboundary movements of e-waste are common, but rarely supported by solid empirical evidence. Most sources adopt a teleological approach to the question of criminal organizations’ possible involvement in DEEE trading and trafficking. They wish to condemn the latter and are therefore attracted by the thoroughly negative connotation of the label “organized crime” and tempted to use it. Geeraerts et al. (2015a)’s report on “illegal e-waste export” from the EU to China is a good example. The authors acknowledge that the question of: “whether e-waste traffickers are best described as organised criminals has [...] raised some controversy” (p. 34), but they do not attach much importance to the said controversy. They seem even keen to use the label “organized crime”, even if that requires stretching its definition to a point where it could apply to just about any business transaction:

“Organised crime groups are often behind illegal trafficking of e-waste to China, although these groups are usually more loosely and informally structured than traditional mafia-like groups. Nevertheless, traditional organised crime groups might also be involved, but rather keep a low profile and act as facilitators of the e-waste crimes.” (Geeraerts et al. 2015a:20)

“Overall, the illegal export of e-waste is less structured and centralised than other organised pollution crimes. Rather than demonstrating the traditional hierarchical, centralised structure of organised crime, the involvement of organised criminality in illegal e-waste shipments is more loosely structured. Small groups organize for a short period of time to commit crime to obtain

financial or other benefits, but dissolve more easily to form new groups [...].”(Geeraerts et al. 2015a:34)

Like the authors they quote, Geeraerts et al. conducted very little primary research. Their study is based on a literature review and a “limited number” of semi-structured interviews — “to fill in the gaps”, they explain. Their findings are too vague to be of much help and their conclusion fails to convince me. As far as I can judge, organized crime groups are only marginally involved in importing or smuggling DEEE to China. Therefore, it makes little sense to insist on bringing them into the picture. Not only that, but emphasizing their involvement makes it seem like criminal intentions account for illegality in DEEE trading and trafficking, while the main problem in that regard lies elsewhere.

Much of the literature acknowledges that the transnational trade or traffic in DEEE occurs at the blurred boundary between the legal and the illegal, and that many of those who contravene the law do so unwillingly or without even being aware of it (see, e.g., Bisschop 2012 and Huisman et al. 2015). This is well illustrated by the few borderline cases I highlighted in this chapter. One of the implications of this blurred boundary is that merchants involved in transnational shipments of DEEE do not know if they can be blamed for committing an offense. In my view, that explains much of the difficulty I had in getting in touch with them and finding out about their activities: they avoided people who ask questions (e.g. researchers, like myself) like the plague. Some of them might have engaged in not entirely legal practices and adopted furtive behaviors in order to avoid exposition. But others might also have had nothing to hide and nevertheless feared attracting publicity just because they were conscious that their business forced them to walk a thin line between legality and illegality, and they wanted to protect themselves.

4 RURAL RECYCLERS' CHANGING FORTUNES

The previous two chapters have already touched upon the topic of rural recycling hubs. The first one showed how Guiyu came to epitomize the “e-waste” problem, both in China and abroad, and how pollution caused tensions around conflicting land uses in Qingcheng District (Qingyuan), while the second one addressed the emergence of a new recycling subsector in various places along the coast in connection with a rapid growth in scrap imports to China and hinted at some of the underlying factors. The present chapter elaborates on the topic. It recounts the history of rural recycling hubs by asking the following questions: Why did these towns and villages get involved in recycling? How did they transform into hubs, i.e. important centers of activity? What effects did recycling activities have on the environment, the local economy and social structures? What did recycling consist in, and how was business organized? What stance did state authorities take on rural recycling hubs? What policies did they adopt and with what repercussions?

It is not a coincidence that the first people who undertook DEEE dismantling, sorting and processing in China are former peasants, and that the first places that specialized in these types of activities are rural towns and villages. When carried out manually, DEEE dismantling, sorting and processing qualifies as “dirty, dangerous and demeaning” (3D)¹³⁰ work, as it puts workers in constant contact with waste and exposes them to toxic chemicals harmful for health. 3D is typically performed by marginalized people or people with a low social status. This applies to local inhabitants in rural recycling hubs, who at first carried out manual work themselves, and also to the workers they later hired and to whom they delegated this manual work (Murphy 2002 & 2010, Pun 2016).

As we have seen in the introduction, contemporary China is marked by a profound and persistent rural-urban divide. This is reflected, for instance, in prevalent representations of cities and the urban population — in particular the growing Chinese middle-class — as drivers of modernization and of the countryside and the rural population — in sum, peasants — as perfect examples of backwardness (Lai 2016, Rocca 2017, Yan 2008). Such representations affected the images of rural recycling hubs that circulated nationally. The assumption was that they were underdeveloped places engaged mostly in primitive, backyard recycling and populated by unsophisticated people. Below, we shall see how this played out in relation to state policies aimed at transforming rural recycling hubs.

This chapter has two sections. The first one addresses the emergence of rural recycling hubs, in particular in Guangdong Province. It identifies the factors that allowed these places to grow and thrive. I note in particular that the people who engaged in dismantling, sorting and processing activities there conceived of DEEE as a type of “goods” (*huowu* 货物) rather than as a form of “waste” (*laji* 垃圾). They sought to extract as much value from these objects as possible, which had significant implications. If we look at electronics, for instance, component reuse was widely practiced and accounted for a large part of profits.

¹³⁰ The neologism “3D” originates from the Japanese expression “3K” (*kitanai, kiken, kitsui*), used in Japan to refer to jobs typically accessible to migrant workers and *burakumin*.

The second section of the chapter addresses rural recycling hubs' transformation and ultimate demise. Here, the emphasis lies on the relationship between recycling “workshops” (*xiao zuofang* 小作坊) and state authorities. I observe that official attempts at reforming Guangdong's DEEE recycling hubs began in the early 2000s but had little impact until the mid-2010s, when I conducted fieldwork. At the time, I argue, a combination of adverse factors dealt a heavy blow to DEEE recycling workshops and pretty much sealed the fate of rural recycling hubs.

In terms of empirical material, the first section draws in large part on other investigators' observations and interviews. This is because my research only began in 2013 and did not focus on the history of Guangdong's rural recycling hubs, so I personally have little first-hand data on this topic. The second section relies mostly on my own observations and interviews.

4.1 DEEE floods the countryside

The recent histories of places like Guiyu and Qingcheng District have much in common, so I treat them conjointly, switching from one case study to the other depending on data availability.

4.1.1 From growing crops to growing piles of scrap

The same set of factors drove the emergence of China's various rural recycling hubs. Here is how Adam Minter (2013) describes the origins of the scrap trade in Qingyuan, for instance:

“Homer [a Chinese recycler] tells me that Taiwanese scrap men brought the recycling business to Qingyuan in the mid-1980s. Laborers were plentiful and willing to work for low wages that — all things considered — exceeded the subsistence level living earned working in the fields. Better yet, Qingyuan was remote enough to avoid scrutiny from environmental authorities in Beijing and Guangzhou, yet still quite well connected — via rivers and railroads — to the ports where scrap was delivered. Those same links connected the scrap processors to the manufacturers [...]. Guangdong's government, eager for foreign investment and cheap raw materials, encouraged the trade. Pollution was an afterthought.” (Minter 2013:133)

In all cases, the emergence a rural recycling hub featured a population of farmers transitioning from agriculture to scrap recycling as a main livelihood. With regards to Guiyu, Lora-Wainwright (2016) writes that:

“[The town]’s development as a center for disassembly is due to its history and geography. Due to its lowland morphology, the area is prone to flooding, making agriculture an unreliable source of livelihood. The presence of convenient trade routes and a historical experience with trade allowed the development of waste recycling since the 1950s, and after economic reforms this became a vital source of development.” (Lora-Wainwright 2016:120)

Several of my interviewees also indicated that the high risks and low yields associated with land cultivation in Guiyu had led peasants to turn to recycling during the second half of the twentieth century¹³¹. After the reforms of the late 1970s, Guiyu’s inhabitants started to derive most of their income from recycling (Zhang 2009:982). At the beginning of the 1990s, DEEE dismantling became the main sector of economic activity (Zhou 2010)¹³². Here is how a local businessman recalls the origins of the trade:

“It probably started twenty years ago. The e-scrap processing was imported into Nanhai [a district of Foshan (Pearl River Delta)]. Some people from Guiyu were down there and brought it to Guiyu, and made money. Others saw him [sic] make money and joined the business. That’s how it grew.” (quoted in Minter 2013:195)

Local people embraced DEEE recycling because it allowed them to “build up a family fortune” (*fajia zhifu* 发家致富) (Sun Yat-sen 2003:11). The business boomed during a decade, turning Guiyu into China’s largest DEEE disassembly site (Zhang 2009:982) and creating the town’s global reputation. People flocked to Guiyu, settled and set themselves to work. In a few short years, fields were transformed into scrapyards, tracks into paved roads, and traditional villages into blocks of multi-storied warehouses. The incessant noise, smell and sight of matter being moved, thrown, broken, sorted, packed or burnt became part of everyday life, and so did business talk.

¹³¹ Flooding remains a problem today and even affected my research. Two days before what was supposed to be my first visit to Guiyu, in the summer of 2013, a dam broke and the whole southern district of Chaoyang was submerged. Some 180 houses collapsed, 96,000 people were evacuated and two of them died.

¹³² This publication summarizes, in English, the findings of the report on Guiyu authored by the Sun Yat-sen University (2003).

DEEE recycling in Guiyu grew at such a speed and to such an extent that the town's name soon became synonymous with the activity. According to one newspaper article¹³³, the local Party committee secretary estimated that this sector's output value reached eight hundred million RMB (8 亿元) in 2004 and accounted for ninety percent of the subdistrict's gross industrial output value — figures that the journalist describes as “extremely conservative”. At that time, the sector comprised three hundred large companies (*qiye* 企业) and more than five thousand entrepreneurs (*hu* 户). It employed 60,000 people, in other words more than a third of the total population of 150,000 long-term residents. And an estimated 20 million tons of equipment had been dismantled and processed in just thirteen years¹³⁴. As for Qingyuan, Jiao et al. (2012) estimated that, in 2012, the region hosted more than 1000 “illegal dismantling workshops” (*weigui chajie chang* 违规拆解场) that employed more than 10,000 people and processed close to one million tons of “foreign e-waste” (*dianzi yang laji* 电子洋垃圾) a year.

4.1.2 Black rivers, foul air and diseases

As discussed earlier, the advent of DEEE dismantling and processing in Guangdong's recycling hubs resulted in severe environmental degradation. The Chinese anthropologists that Greenpeace mandated to conduct research on Guiyu identified three main issues: water and ground pollution; air pollution; and land lying idle (Sun Yat-sen 2003:12-13). With regards to rivers and streams (fig. 4.1), they wrote that:

“Guiyu's rivers and streams, large and small, bore the brunt. [...] [They] became a pit in which to dump and pile waste. In the 1990s, old printed circuit boards that did not have any recycling value

¹³³ “Offering Amnesty and Enlistment’ to Guiyu” [“招安”贵屿镇], *CEOCIO Magazine* [经理世界网], September 5, 2005. URL: <http://www.ceocio.com.cn/e/action/ShowInfo.php?classid=184&id=123223> (accessed January 26, 2018).

¹³⁴ Minter 2013:202 mentions the same figures, but his source is the Guiyu Resource Recycling Association (*guiyu zaisheng ziyuan xiehui* 贵屿再生资源协会), which was founded in 2009, i.e. four years later. This suggests that these figures may have been used over and over, without any update.

any more, picture tubes of monitors that had been stripped of their plastic, metal and components, various bits of plastic, even strong acids remaining after metal extraction were jettisoned in large quantities in these rivers. The latter soon became sewage ponds highly polluted with heavy metals, which in turn contaminated the soil and ground water. At that time, [...] ground water in [most of] Guiyu became totally undrinkable and the local residents were confronted with the necessity to buy water. In 2001, after the revelation about e-waste recycling in Guiyu, the government started to manage rivers, strictly forbade throwing trash and wastewater indiscriminately, and even dredged rivers. But until now most of the rivers are still black-green, continue to give off a bad smell, and continue to contaminate the soil and ground water.” (*my translation*)

The anthropologists added that local residents were exposed to contamination even though they did not drink ground water anymore, because they still used it in daily life, e.g. for washing.



Figure 4.1: A stream in Guiyu in the early 2000s. Photo credit: Basel Action Network.

About air pollution, they noted that “the air quality in Guiyu is extremely bad” and that local residents frequently complained. The explanation, according to them, lies in Guiyu’s topography:

“The harmful gases and particles in suspension produced by the heating of printed circuit boards, the burning of waste, and the recycling and manufacturing of plastics that take place throughout

Guiyu are not scattered by natural air circulation, because Guiyu is located in a low-lying area surrounded by hills.” (my translation)

As a result of water and air pollution, doctors in the area reported that, colds excluded, they mostly had to treat people suffering from respiratory ailments and kidneys stones. Later reports by Greenpeace on pollution in Guiyu (Bridgen 2005, Walters & Santillo 2008) revealed the presence of high levels of toxic heavy metals (e.g. lead, cadmium, antimony) and organic pollutants (e.g. brominated, chlorinated and phosphorus-based flame retardants, phthalate esters and esters of long-chain organic acids) in the workplace environment and surrounding soils and water courses.

Finally, the Chinese anthropologists observed that, at the time of their visit in 2003, almost all of Guiyu's fields had been abandoned. There remained only a few patches of cultivated land¹³⁵. According to them, local residents had no interest in engaging in that type of activity anymore:

“Locals do not show any enthusiasm for the idea of agriculture resuming. One aspect is that a great number of wealthy locals refused to cultivate the land long ago. In Guiyu, there are some who, despite being extremely poor, categorically refuse to do it too, because they feel it would affect their ‘dignity and status’ [zizhong shenfen 自重身份]. Another aspect is that, except in Nanyang [a village located next to Guiyu], the local ground and water has been severely polluted. Locals would not eat their own produce and the only option would be to sell it somewhere else, to unaware outsiders.” (my translation)

At first, recycling supplanted agriculture by virtue of being economically more attractive, but later on agriculture turned into a shunned, last-resort livelihood. When I visited Guiyu in the mid-2010s, one of my informants told me that “outsiders” (*waidiren* 外地人) had taken over most of the farming. I stumbled on a few paddy fields as well as on strawberry and

¹³⁵ A few days into their investigation, the anthropologists noticed that rice seedlings had popped up on fields adjacent to roads. They were surprised by this sudden apparition, enquired about it and found out that it was linked with the arrival of a delegation of high-ranking officials who had come to Guiyu to carry out an investigation.

melon plantations and a few people I interviewed said they avoided eating locally grown food. Given the low levels of food traceability in China, however, reselling local produce was certainly easy. As a matter of fact, the menu in my favorite restaurant in Guangzhou promoted “seasonal greens” from Chaoshan (潮汕), the area to which Guiyu belongs, as coming from a “soil, air and water devoid of pollution” (fig. 4.2).



Figure 4.2: A menu in a restaurant in Guangzhou that presents Chaoshan as a region “devoid of air, soil and water pollution” (*wu wuran tudi/shuiyuan/kongqi* 无污染土地/水源/空气). Photo credit: the author.

DEEE recycling in Guangdong’s rural recycling hubs and the environmental degradation that resulted from it profoundly altered the local way of life. It introduced a new type of relation between the people and their land: whereas, in the past, they could live off it, gradually they had to learn to protect themselves from it in order not to be harmed. Many owners of recycling workshops, making the most of their newly acquired wealth, addressed

this issue by moving out of Guiyu and resettling in Shantou or Shenzhen. Some of them kept their professional activity in Guiyu and regularly traveled between their workshops and their home, where the rest of the family lived in a less contaminated environment.

However, even moving out of Guiyu did not solve the problem entirely. Indeed, natives of Guiyu, like other people from Chaoshan, count among China's most fervent practitioners of ancestor worship and that ties them to the land in very specific ways. Li Xubin, a young man from this area who had conducted a toxicology study in Guiyu for his master thesis, explained to me in an interview in 2013 that:

“[People in Guiyu] attach great importance to traditions and feel bound to the land on which their ancestors lived. For them, celebrations like Spring Festival and Tomb Sweeping Day are crucial moments when those who live abroad or far away come back to Guiyu to revere their ancestors and pay tribute to their parents and grandparents. This has an important consequence: Guiyu people are tied to their town and will come back to it regularly even though the ground there is extremely polluted. It is harder for them to leave their place of origin completely and settle elsewhere than it is for other Chinese.”

We need not take Mr. Li's conclusion about comparative attachment to the land at face value, but his emic perspective does suggest that people in Guiyu are linked to their native land in long-term ways.

Mr. Li also stressed that it was common for among young natives of Guiyu, and of Chaoshan more broadly, to leave the region to do business elsewhere in China or abroad (e.g. in Thailand) and return later, preferably with some wealth. In that scheme, one would ideally make a fortune away from home and subsequently invest it, or some of it, at home. But environmental degradation, Mr. Li advanced, made Guiyu less worthy of investment and therefore jeopardized this tradition.

Pollution affected everyone in Guiyu and yet few were willing to talk about it. Zhou (2010:31) notes that all attempts by the anthropologists from Sun Yat-sen University to collect local residents' views on pollution in Guiyu in 2003 failed. The issue may have been obvious, yet it was hardly acknowledged. Only when speaking about the young generation's future did interviewees mention pollution — most of them said they wanted their children to be spared. The rest of the time, they stuck to statements such as: "Everybody does it. There's no way around it. We need it to make a living." Similarly, the first thing Chen Bo, a young man who was born and spent most of his life in Guiyu but later worked as an accountant in

Guangzhou, told me when I interviewed him in 2013 was that I should avoid the topic of pollution altogether. He explained that it was very “sensitive” (*mingan* 敏感), even “taboo” (*jihui* 忌讳). He worried that I might get into trouble with the local population if I was to ask questions about pollution. His parents, who owned a plastic recycling workshop in Guiyu and to whom Chen Bo had mentioned my research, recommended that I rather ask people about the recent economic slowdown and its effect on business. Like Zhou, Chen Bo noted that locals portrayed pollution as something inescapable that goes with making a living from DEEE. “In Guiyu, everyone knows that the environment has been severely degraded and that it poses a serious health risk. But everyone, locals as well as outsiders, manages to make money through e-waste recycling. That’s why people accept the situation.”

4.1.3 Former peasants and cheap manual labor

The advent of DEEE recycling in rural areas in Guangdong Province, and in China more broadly, triggered far-reaching transformations in both nature and society. Another example of such changes is the massive influx of people coming from other parts of the country, which profoundly altered local demographics. Students in economics at the Sun Yat-sen University, who conducted research in Qingcheng in 2012 (Jiao et al. 2012), report for instance that out of 57,000 residents registered in Longtang in 2012, a staggering 55,000 were “outsiders” (*wailairenkou* 外来人口). Likewise, the anthropologist who studied in Guiyu almost a decade earlier estimated that the area hosted close to 100,000 migrant workers in 2003 (Zhou 2010), a figure far exceeding that for permanent residents. In both Qingyuan and Guiyu, most internal migrants — or “peasant workers” (*nongmingong* 农名工)¹³⁶ — came from the provinces of Sichuan, Hunan, Jiangxi, Anhui, Guizhou, Hubei or Henan. They had left the interior of the country, where employment opportunities were scarce and wages relatively low, to look for better opportunities in the south, thereby following what was the most common migration pattern in China at the time (Liang & Ma 2004).

¹³⁶ According to one of my informants, Guiyu people rather used the term *waishengzai* (外省仔).

Migrants from China's interior provided the cheap labor essential for DEEE dismantling and processing performed in places such as Guiyu and Qingyuan, namely with very little industrial equipment. Since these people were, for the most part, former peasants, they had only a low level of formal education and few skills outside of agriculture. That forced them to settle for unskilled manual labor while looking for employment in the economically prosperous zones of China. Having experienced life in the countryside, migrant workers were accustomed to harsh living and working conditions, which explains why many of them were willing to do the physically demanding work of DEEE recycling. Their decision to abandon farming and take up a job in recycling was motivated by a number of factors, among which public policies unfavorable to small-scale or subsistence farming, land-grabbing practices by local authorities in the countryside, a need for better access to the cash economy, and a desire to provide one's family with decent living conditions. This is well conveyed by the story of Mr. Deng, a former peasant who moved from Sichuan to Qingyuan at the end of the 2000s and whom I interviewed in 2015. Here is an excerpt from my field notes:

“In the corner of a large scrapyard, I observed big bags filled with plastic parts and five or six people moving around, carrying stuff. One man was perched on a ladder next to a small, old shredder and feeding it. I asked him a question, but he could barely hear me due to the noise. He said: ‘Let’s drink tea’ and pointed in the direction of a tiny house. We walked in, sat in an almost bare room, and introduced ourselves. His name is Deng, he is forty-seven years old and originally from Sichuan. He lives on the scrapyard (in the tiny house) with his family, including his daughter and his granddaughter, whom I met as well, as they were in the same room, the former nursing the latter. A mere six years ago [i.e. in 2009], Deng was still working as a farmer, cultivating the land. He left Sichuan because he wanted to earn more money and first found a job in a nylon¹³⁷ factory somewhere in Guangdong. After working there for six months, he decided that he had learned enough about this material to launch his own recycling business in Longtang. He started out with a capital of only 10’000 RMB — he laughed after mentioning this figure, which

¹³⁷ As a rule, DEEE does not contain nylon. However, Mr. Deng’s story is still relevant, as it is representative of the ways in which migrants became involved in recycling in general.

he visibly found ridiculously low. 'I did things gradually', he said. 'At first I didn't own any machine and I earned almost nothing.' But at some point, Mr. Deng was able to buy equipment and to hire workers. Today he employs five people, all of them relatives from Sichuan. He shares the large scrapyards with several other entrepreneurs (he rents a fifth of the surface). Basically, his business consists in buying scrap nylon, sorting and shredding it, and reselling it to others.

Today most of Mr. Deng's family lives with him in Longtang. He rarely has a reason to go back to Sichuan. This year, for instance, he and his family will stay in Longtang for the Spring Festival¹³⁸. Mr. Deng's family is originally from the municipality of Yibin (宜宾市), which he describes as a 'mountainous area'. 'In my village, people have stopped cultivating the land, because agriculture is not easy', he explained. Subsistence farming may have been difficult in the past, but it became impossible after Mr. Deng left his village, for the local government decided to use the land for fruit tree plantations. Mr. Deng does not have a local *hukou* [legal residency]. He and his family have settled in Longtang for good. Officially, however, they still belong to Sichuan¹³⁹.

During our conversation, Mr. Deng declared several times that he and his peers have a low level of "culture" and education [*mei wenhua* 没有文化 or *mei dushu* 没读书]. He himself left school after third grade. What he knows about the world, he has learned mostly from watching television, he said. He seemed proud of being self-taught, but also clearly said that a school diploma gives one more chances in life. At some point, I put forward that his granddaughter, unlike him, would certainly have a chance to finish high school, if not attend university, and she would certainly be grateful for that. This remark visibly hit the mark and Mr. Deng's eyes lit up. He replied that sending his granddaughter to university was indeed one of his plans for the family's future. He seemed to rejoice at, and find pride in, the idea that his efforts could one day allow her to enjoy a better or an easier life.

¹³⁸ This is a time of the year when most people in China travel back to their hometowns.

¹³⁹ For much of China's contemporary history, rural dwellers were not allowed to move their *hukou*. This has changed recently. However, as I discovered through interviews with migrant workers, some of them nowadays choose to keep their *hukou* in the countryside anyway, even if they have been away from home for years, because that gives them some security. In case they struggle in large cities, they have a place to return to. It also provides them with a small additional income, as they can rent out the portion of land they are entitled to for others to cultivate.

In a report entitled *The Labour, Human Health and Environmental Dimensions of E-waste Management in China* (ILO 2015), the International Labour Organization (ILO) recognizes the vital role played by DEEE recycling in providing employment opportunities to migrant workers:

“It is clear that as part of the waste management and recycling industry, e-waste management is a job-intensive business that provides employment and poverty alleviation opportunities by easing the employment pressure on surplus labour, especially for the rural migrant and urban unemployed workers. [...] In the informal sector, the e-waste treatment industry is a main source of income for the local community and migrant workers [...] The informal sector provides temporary employment, particularly for the migrant workers.” (ILO 2015:9)

At the same time, the report stresses the many risks involved in DEEE processing and dismantling, particularly given the lack of protection for workers and the low awareness of health impacts. It is hard to understand why places like Qingyuan and Guiyu attracted migrant workers, despite these risks, if one does not realize that they also offered these people relatively convenient working conditions. Chen Bo, the plastic recyclers' son, described these working conditions in the following way during an interview in 2013:

“A normal working day lasts from around 8am to around 5pm. Workers are employed and paid on a daily basis. There are no [written] contracts. They are free to leave whenever they want. If something happens in their village and they need to go back immediately, they can. [...] On average, migrant workers stay in Guiyu for a few years. Some of them bring their families. [...] A migrant worker can earn more by working one month in Guiyu than one year in his native village, even more than [s]he would earn if [s]he worked in Guangzhou.”

I had trouble assessing how much people working for family business or as self-employed workers in the DEEE recycling sector earned, and getting an idea of how this compared to the wages paid by large licensed companies. The numbers mentioned by my informants varied greatly: from as little as 1700 to as much as 8000 RMB a month. However, I do know that there were many other advantages: wages were paid regularly and in cash; employment relationships were personal and flexible; and there was little to no discrimination at recruitment, so people of all ages, genders and origins qualified for the job. This contrasted with the working conditions typically found in large manufacturing factories in Guangdong or elsewhere in China, where working days were generally longer and often included compulsory overtime; only workers who met specific criteria (e.g. young or female) had a chance to be recruited; and wages were paid once a month — that is, when employers did

not withhold them for several months in an effort to dissuade their employees from leaving, as they often did (Pun 2016). Thus, to many a peasant wishing to switch to industrial labor, DEEE dismantling and processing appeared as not altogether a bad option — notwithstanding the toil and health risks involved — if not the only one.

While doing fieldwork in Qingyuan in 2015, I met a group of migrant workers in their fifties who were cracking DEEE open using a chisel and a mallet (fig. 4.3). They did not seem to particularly enjoy their job, yet when I asked them to compare their working conditions with those of people working in factories they replied that it was no comparison. First, they felt “freer” (*geng ziyou yidian* 更自由一点)¹⁴⁰. Like them, their boss came from Guizhou Province, a predominantly rural province and one of China’s poorest; she therefore had some understanding and sympathy for their situation, and let them go back to their village at short notice, if needed. Second, they earned more than factory wages, which rarely amounted to more than 2500 RMB in the region at the time. Third, they did not have access to factory jobs anyway. One woman commented that: “In factories, they only hire young people. We’re too old.” Finally, while I was observing them, it dawned on me that, all things considered, their way of life had not changed all that radically from that in their native villages — or, at least, the change seemed less significant than it would have been had they joined a large factory. They sat in a circle, in the open, among piles of stuff that needed sorting and processing; they attended to these tasks quickly and efficiently, sparing no energy or attention, but also found time to chat with each other and could express themselves in their own dialect. The setting, the tools, the working rhythm, the materiality, the social exchanges... a lot of these things must have felt familiar to people like them, who had always been members of small, closely knit communities and who had spent their lives outdoors, cultivating rice and vegetables.

¹⁴⁰ Most of the migrant workers I interviewed who either were self-employed or worked for small business entities mentioned “freedom” (*ziyou* 自由) as one of their job’s distinctive advantages.



Figure 4.3: Manual dismantling in Qingyuan. Photo credit: Rémi Quesnel.

It seems reasonable to assume that at least part of the migrant workers working in DEEE recycling had chosen this sector over others to which they had access as well, such as mining, construction or manufacturing. And yet this idea is unconventional, to say the least. Most accounts of DEEE recycling emphasize the worst aspects of the job and present it as something one only turns to as a last resort. Typically, workers are portrayed as engaging in highly harmful activities, such as “roasting” PCBs (see below). Different takes on this topic are rare and likely to trigger strong reactions, particularly from people involved in the protection of workers. In 2015, I participated in a webinar jointly organized by the Secretariat of the Basel Convention and the ILO. The latter had just released a report (ILO 2014) entitled *Tackling Informality in E-waste Management: The Potential of Cooperative Enterprises* and was publicizing the findings. To introduce the report, the ILO representative gave a presentation on the problems posed by DEEE recycling and the risks involved for workers. In his presentation, he sought to raise awareness about the occupational hazards arising from this type of work, but his approach and analysis struck me as excessively negative. I believed the situation to be more complex and therefore intervened during the Q&A session. First, I noted that the “e-waste” workers I had interviewed in Guangdong Province in the mid-2010s complained about their jobs but also

had a few positive things to say about them. Then, I argued that, before we dwell on these people's plight and attributed it to "e-waste", we should ask what alternatives they have: is it necessarily preferable to stay in the countryside despite poor prospects or to take a job in another economic sector where risks abound? Finally, I advanced that we should put DEEE recycling back in the broader context of a country that has been, and is still, industrializing and urbanizing thanks to, but also at the expense of, its rural population. But my comments fell on deaf ears: the ILO representative defended his approach of "informal e-waste management" as a singular issue that needed to be crusaded against.

Such a position betrays a lack of understanding of the realities that migrant workers are confronted with in China. As Zhang et al. (2012:10865) argue, quite rightly I believe, eliminating "primitive e-waste recycling" would not in and of itself guarantee better working and living conditions for these people, because state authorities are fundamentally unconcerned about their well-being:

"the government has not implemented any stimulants for creating reasonable and safe jobs for the unskilled and under-privileged if primitive e-waste recycling is eliminated. Although it is unethical or unjust to expose powerless workers to toxicants unknowingly, it is equally unethical or unjust to deny them the opportunity to earn a decent salary for better living standards."

4.1.4 Techniques and material flows

The way it was practiced in places like Qingyuan and Guiyu, DEEE dismantling and processing relied mostly on low technology processes, commonly decried as "backward" (*luohou* 落后). As stated above, manual labor played a critical role, not least because it was cheap and plentiful in China at the time. In general, processes required few, if any, industrial machines, and only basic equipment and tools. But they required that workers actively use their bodies.

Some of the methods, e.g. sifting, raking and sun drying, were borrowed from agriculture. Others, like heating PCBs over a stove in order to melt soldering and release surface-mounted components — a process sometimes referred to as "roasting boards" (*shaoban* 烧板) or "fry the skin, extract the bones" (*jianpi chaigu* 煎皮拆骨) — were more or less invented. Others still were readily available to anyone with a lot of guts and few scruples: aqua regia and sulphuric acid leaching were basic, well known hydrometallurgical processes for the extraction of copper, gold or silver. Methods also evolved. In the early days, recyclers burned

electrical cables to separate them from their plastic sheaths and access the copper wires. But later, all of them abandoned this practice in favor of cutting cables lengthwise and stripping them, which allowed the sheaths to be recovered as well.

It should be stressed that centering the business model for recycling on the utilization of human labor makes business sense and is not necessarily a default option. Indeed, with a little training and experience, humans are capable of carrying out the various tasks involved in recycling in particularly effective ways. Minter claims that “developing-world recyclers, using hand labor, are able to harvest more recyclable material from a device than a shredder using magnets and eddy currents” (Minter 2013:260). Workers may not be as fast as machines, but they are more accurate — which makes a big difference in a sector where economic value depends largely on fractions’ degree of purity and components’ defect rate. To give just one example, I learned through interviews, that, after a few years on the job, professional plastic sorters manage to sort anywhere from twenty (average worker) to fifty (outstanding worker) different types of plastics. It takes them a few seconds at most using only their eyes, hands, nose, ears and a lighter, to find out whether a piece of plastic (e.g. the casing of a computer) is made of one or the other type of plastic (e.g. ABS, PP or PC). And they make very few mistakes, I was told. No machine, however high tech, achieves that level of performance — at least not yet.

DEEE dismantling and processing involved highly specialized activities. Guiyu attracted mostly consumer electronics and plastics, Qingyuan mostly copper-rich products such as cables and motors. One kind of scrap featured predominantly in each of the villages that made up Guiyu, e.g. PCBs in Beilin Village (北林村). Similarly, each of the town’s numerous workshops concentrated on a few materials, components or devices, to the exclusion of all others (Zhou 2010). One of the workshops I visited in Longtang contained only compressors from refrigerators and air conditioners; another one only electrical motors from washing machines. Many workshop owners bought exclusively electrical cables or cases made of a particular type of plastic (e.g. ABS). One could also specialize in “mixed goods” (*zahuo* 杂货) (fig. 4.4), but that was a perilous choice, made mostly by newcomers.



Figure 4.4: A heap of unsorted “mixed goods” containing, among others, a tape recorder and a vinyl player. Photo credit: Rémi Quesnel.

As we have seen, rural recycling hubs at first sourced all their goods from abroad. With time, however, domestic channels become more plentiful and started to account for a significant part of their input. Minter quotes a Chinese recycler saying that “China now generates more than half of all the electronic scrap that turns up in Guiyu, and the percentage is growing — fast.” (Minter 2013:191).

4.1.5 The varying fortunes of those who “make a fortune”

Quite a few people in rural recycling hubs managed to become rich thanks to DEEE dismantling and processing. As we have seen, media accounts of rural recycling hubs lay

great emphasis on local residents become rich fast. One Chinese article, for instance, describes the earnings of bosses in Taizhou¹⁴¹:

“Despite this being a dirty industry, one can earn money. [...] Scrapyard bosses buy foreign waste, sort it and dismantle it, and then sell it to local smelters. Their profit margins are very high’, a certain Mr. Liu told the reporter at the entrance of a scrapyard. He described these owners of companies dismantling foreign waste [by saying that]: ‘Each family is worth [at least] several tens of millions [几千万, i.e. several million USD]. Many are even worth more than one hundred million.’ While in Tujing, an unremarkable village, the reporter saw, next to each other, a workshop specialized in the repair and maintenance of Porsche 4S [luxury cars] and a dismantling workshop containing piles of hardware that was giving off a putrid smell of metal.” (my translation)

These are impressive figures and striking contrasts, especially if we bear in mind that locals had only recently slipped out of their peasant shoes.

But not everyone benefited equally from the trade and transformation of DEEE. Wealth distribution differed across employment categories — self-employed people made more money than employees, as is generally the case — and from one hub to another. It was particularly unequal in Guiyu, where locals blocked access to entrepreneurship in DEEE recycling and made sure most profit accrued to them. Some native families, especially large and established ones, made large fortunes. By contrast, outsiders had to content themselves with basic salaries. Some of them became self-employed as drivers of three-wheeled motorbikes (*sanlunche* 三轮车 a type of vehicle used to transport DEEE within rural recycling hubs) or owners of restaurants, but that did not give them access to wealth. In Qingcheng District, the situation was different. Migrants enjoyed a wider range of opportunities and therefore better access to profits as well, as the above story about Mr.

¹⁴¹ “Confronted with Energy Saving and Emission Reduction [Requirements] as well as Close-downs, the Rich People from Taizhou Are Now Going Through “Pauper”’s Times” [渡过节能减排关——富起来的台州人过着“穷人”的日子], *Zhejiang Business Web* [浙商网], September 14, 2011. URL: <http://biz.zjol.com.cn/05biz/system/2011/09/14/017841352.shtml> (accessed January 26, 2018).

Deng, the nylon recycler from Sichuan, shows. Jiao et al. (2012), who compared Qingyuan to Guiyu, found that social and economic mobility existed in former, not in the latter. The authors describe relationships in Guiyu as “vertical and partitioned” (*zongxiang fenge* 纵向分割) and in Qingyuan as “horizontal and contrastive” (*hengxiang duibi* 横向对比). In the former type of relationship, the role of “head” (*zhuti* 主体) of a dismantling/processing workshop is exclusively assumed by locals, who do not engage in manual labor, and outsiders can only work as employee (*dagongzhe* 打工者). In the latter, both locals and outsiders can be found engaging in manual labor and outsiders can become bosses but only outsiders work as employees. This may be linked to another difference Jiao et al. highlight, namely clans (*zongzu* 宗族), which were omnipresent and powerful in Guiyu but not in Qingyuan.

When examined in detail, the narrative on former peasants’ sudden and overwhelming affluence only holds true with respects to certain periods in the history of DEEE dismantling and processing. A long-term perspective reveals that the fortunes of Chinese recyclers varied greatly from the late 1990s to the mid-2010s. This is well illustrated by the following insider’s account of the history of Qingcheng District’s scrap recycling sector¹⁴²:

“According to an interview with someone who has been in the business for more than twenty year, [...] ‘problematic’ plants started to appear around the end of the 1970s. In the 1980s and 1990s the sector slowly became prosperous. Around 1995-1996, people from Zhejiang made great fortunes here. That’s when great numbers of outsiders settled down in Longtang and got involved. Before that there were only locals. It grew to the point where [outsiders] now constitute a majority. Slowly, locals left the market. A few years back, especially around 2000, it was very easy to get rich doing this job. After all, controls were not very strong. That led, now and then, to situations where people sought profit above all and paid no attention to the environment. This was evident in the use of burning and acid baths, and in the reckless discharge of waste gases and liquids. Then the level of governmental control increased progressively. These acts of polluting the

¹⁴² I quote this account at length because it reflects the general evolution of rural recycling hubs in Guangdong Province, perhaps even in China as a whole.

environment slowly decreased. After 2005, the dismantling sector started to saturate. Whether or not one made money depended on [one's] skills. It depended to a large degree on what dismantlers call 'the power of the eye' [*yanli* 眼力], that is, the capacity to evaluate and distinguish goods on the basis of their value. The three years from 2006 to 2008 are considered by all dismantlers as lucky years. Stories of people getting rich came out one after the other and that attracted outsiders to Longtang, who brought in people from their hometowns. It was an endless stream. The financial crisis in 2008 acted as a watershed: the unusual price fluctuations for copper and other metals made certain households happy, others worried — it was cheap to buy, but selling meant losing hard earned capital. Some of those who lost money during that time have had to revert to their old occupation. This hasn't changed: people who get involved in this sector take huge risks. Starting in September 2011, dismantlers have experienced their most difficult year. One could see 'for rent' signboards everywhere and half of the scrapyards were empty. People who had goods were [holding them and] waiting for prices to come back up, whereas those who didn't all reported that they struggled to find some — supply channels were rigorously restricted. Despite this, the scale of the dismantling sector has not decreased." (Jiao et al. 2012:12, *my translation*)

Looking at economic development with hindsight and from an outside perspective, one can see a linear, steady or inexorable process. But business in China's rural recycling hubs in the late twentieth and early twenty-first century certainly did not feel that way for the people involved. There were highs and lows, and uncertainty throughout. Going into business in recycling meant benefitting from unique opportunities but also taking great risks. Some entrepreneurs made a fortune, but others lost all their money. At the time of my fieldwork, i.e. in the mid-2010s, business activity in rural recycling hubs in Guangdong had picked up somewhat compared to 2011, but it remained well below the levels characteristic of the pre-2008 era.

4.2 The transformation, decline and fall of recycling hubs

For a good decade, i.e. from the early 2000s to the mid-2010s, business took place more or less unhindered in Guangdong's rural recycling hubs. At times, the central or local governments affected an intention to trigger radical changes. But on the whole, state authorities' interventions remained limited. So-called "informal" (*fei zhenggui* 非正规) DEEE recycling therefore went on largely unabated.

4.2.1 A long period of leniency

Local officials in rural recycling hubs tended to turn a blind eye to the negative repercussions of DEEE recycling, at least until the mid-2010s. In some place, citizens complained openly, but that did not change much. A post published on an online forum in 2011¹⁴³ that addressed pollution caused by scrap recycling activities in a “village” belonging to the district of Nanhai (Foshan) elicited many irritated comments from local residents. Some of them wrote that they had repeatedly alerted local authorities, but to no avail. Others even claimed that the latter did not hesitate to silence dissenting voices in order to protect business interests.

An important reason for local officials’ not intervening is that they benefited from activity in this sector. For one thing, the key role DEEE recycling played as a driver of economic growth in rural recycling hubs made it more likely that they would get a promotion. This is due to the fact that, up until recently, performance metrics for Party cadres in China were based on economic and financial figures, such as gross domestic product (GDP), and did not take the environment into consideration¹⁴⁴. Second, officials could easily exact a price for their non-intervention and it seems that many of them did. The owner of a small cable dismantling workshop in Nanhai told me that “big bosses” in that area regularly bribed officials to make sure that they would be alerted on time in the event of a “surprise” visit by local government authorities. He talked about “collusion between officials and businesspeople” (*guanshang goujie* 官商勾结). Third, a large proportion of local officials administered regions that they originally came from, and participated in an intricate network of local “relationships” (*guanxi* 关系) with strong allegiances to other natives. This situation imposed obligations but also entitled them to rewards. It certainly impelled them to protect the interests of

¹⁴³ The website of this forum is not accessible anymore.

¹⁴⁴ This has changed recently. See “Chinese Cadres Told Going Green Rivals GDP to Rise in Party”, *Bloomberg News*, March 13, 2014. URL: <https://www.bloomberg.com/news/articles/2014-03-12/chinese-cadres-told-going-green-rivals-gdp-to-get-ahead-in-party> (accessed January 26, 2018).

powerful locals, even when that meant taking actions contrary to the public good or to the Party line. Guiyu is a case in point: the anthropologists from Sun Yat-sen University predicted in the early 2000s that it would be difficult to put an end to pollution there because of clan interests in the DEEE dismantling and processing business (Zhou 2010; see also Lora-Wainwright 2017:141).

4.2.2 Grand statements that failed to materialize

With regard to Guiyu, the central government actually did step in early on and took measures supposed to revolutionize the small town. In the wake of the pollution scandal (see chap. 2) that caused this rural recycling hub's infamy, officials in Beijing made grand plans to transform it into a fully regulated competence center for DEEE dismantling and processing. As Minter writes,

“in 2005 [officials from the NDRC], in concert with six additional high-level Chinese government agencies, announced that Guiyu would receive significant funding to upgrade its facilities in line with China's new emphasis on sustainable development. According to the government's announcement, officials would ‘accelerate the construction of Guiyu into a national demonstration base for recycling.’” (Minter 2013:191)

Specifically, the central government included Guiyu in a “first batch of circular economy national pilot project units for the collection and recycling of old home appliances” [*quanguo di yi pi feijiu jiadian huishou liyong xunhuan jingji shidian danwei* 全国第一批废旧家电回收利用循环经济试点单位] in October 2005. Prior to that, the town had already been officially declared a “demonstration engineering project for the dismantling and treatment of electronic information products” [*feijiu dianzi xinxi chanpin chaijie chuli shifan gongcheng* 废旧电子信息产品拆解处理示范工程] by the then Ministry of Information and Industry (MII) in November 2004, and a “demonstration industrial park for industrialization of the comprehensive utilization of old electrical equipment” [*feijiu dianqi zonghe liyong*

chanyehua shifan yuanqu 废旧电器综合利用产业化示范园区] by the then State Environmental Protection Agency (SEPA) in September 2005.

Such concerted measures suggest that officials in Beijing initially thought it would be possible to upgrade Guiyu and turn it into an exemplary recycling base (fig. 4.5). As a Chinese journalist summarized the situation¹⁴⁵:

“According to the plan, Guiyu is going to continue to optimize the industrial chain that has spontaneously formed over many years, to reduce pollution, and to build a type of resource recycling on whose industrial features it shall be possible to draw experience. [...] Guiyu’s electronics dismantling industry will leave the grey economy [*gaobie huise jingji* 告别灰色经济] and progressively join the ‘regular army’ [*zhuanxiang zhengguijun* 转向“正规军”].” (*my translation*)

Back in the mid-2000s, the central government had the intention to subject Guiyu to top-down management and planned economic development — in other words, to formalize it. Plans were even made to raise this rural recycling hub’s processing capacity considerably.

¹⁴⁵ *Ibid.* “Offering Amnesty and Enlistment’ to Guiyu”

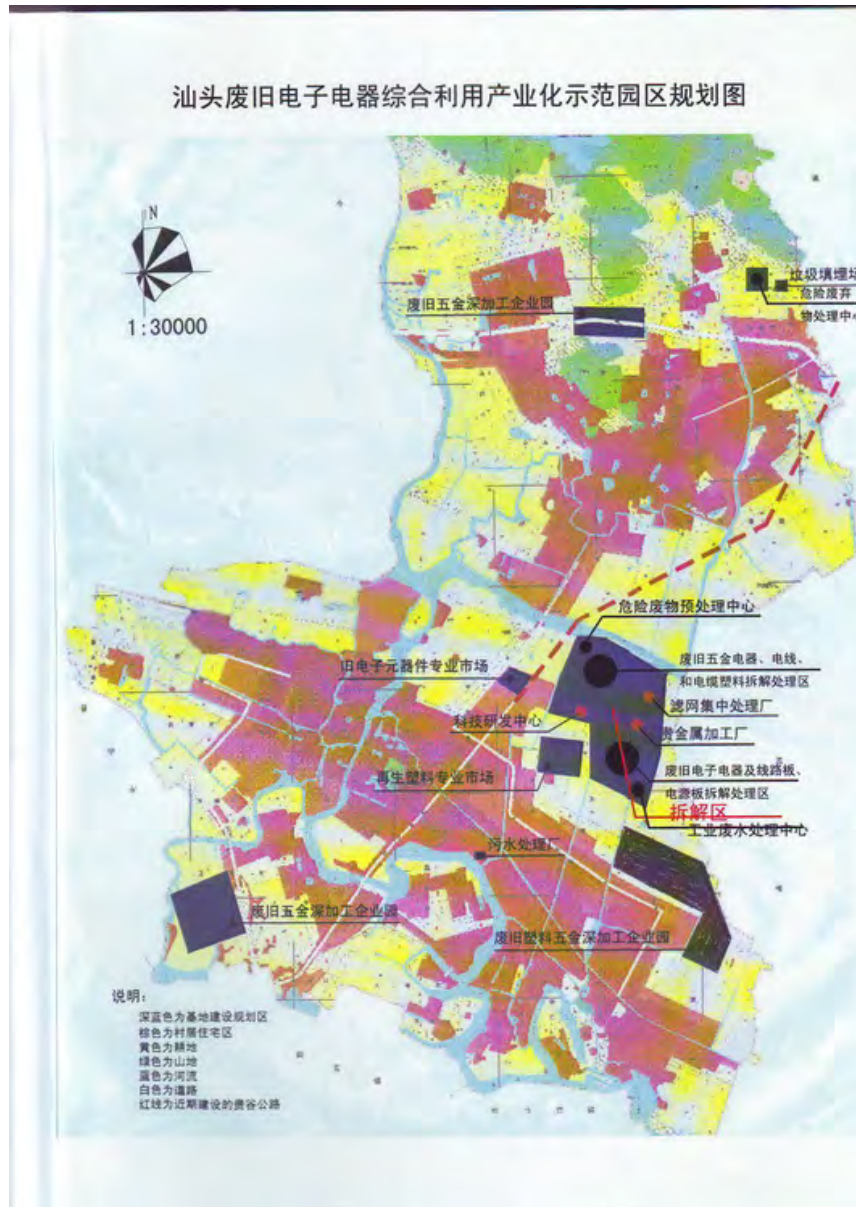


Figure 4.5: A map of Guiyu with the planned location of the industrial park in the mid-2000s (dark grey). Source: Taolv365.com.

From the outset, however, there were signs that things might not turn out as planned. The town's Party Secretary, Huang Luanwen (黄銮文), declared to journalists that he looked forward to this development plan, but also expressed concern about the budget necessary to realize it, namely two billions RMB (20 亿元, equivalent to around 240 million USD). Where would this money come from? Would Beijing foot the bill? It was unlikely that the recycling bosses in Guiyu would willingly pay out of their own pockets to fund a project of such magnitude, which had been imposed on them and was not in their direct economic interest.

Guiyu never really transformed the way the central government had grandiloquently announced it would. The town's industrial park, for instance, remained a vast stretch of wasteland for the better part of the decade following its creation by fiat. Guiyu arguably remained China's largest hub for DEEE dismantling and processing between the mid-2000s and the mid-2010s, but the town did not mutate according to Beijing's wishes. How are we to account for this failed transformation? It seems likely that local bosses resisted the central government's plans. Guiyu abounded in powerful and well-positioned people who benefited from the trade and transformation of DEEE, and for whom implementing the planned changes was tantamount to killing the hen that laid the golden egg (see chap. 2). The local bosses interviewed by Lora-Wainwright (2016) in 2013 expressed skepticism about industrial parks. One of them said he believed parks could be a solution in a country like Japan, but not in China. When I visited Guiyu's industrial park in 2016, I met a dismantler who had recently and unwillingly joined the park and who held the park's pretense to be environmentally superior up to ridicule. "It's good that you've come", he told me, "because you'll be able to report to the whole world on how environmentally friendly [*huanbao* 环保] we've all become since we moved here. It was worth it, wasn't it? Look at how environmentally friendly this all is!" Actually, his activities, and their impact, had barely changed — but he was paying a higher rent.

Another possible explanation is that the central government's plans mainly served the purpose of proving its capacity to intervene and to make order. Perhaps those plans were never meant to be fleshed out and thoroughly implemented, which would explain why they were shelved not long after having been adopted. Most likely, several factors came into play simultaneously. But whatever the correct explanation, the fact is that Guiyu continued to exist in much the same form for over a decade, despite the pollution scandals and the grand formalization plans. As Minter summarizes the situation in the early 2010s: "more than a decade [after the release of *Exporting Harm*] Guiyu not only persists, it thrives openly, mostly unmolested by local and national Chinese governments" (Minter 2013:190).

4.2.3 Controls and clean-ups

The observation that, for most of their recent history, rural recycling hubs did not have to worry about business being jeopardized by state intervention should not be understood as meaning that local governments did not intervene at all. They did, but by adopting

measures that aimed at incremental, if not cosmetic, changes. In Guiyu, for instance, they committed themselves early on to pollution alleviation by requiring bosses to give up certain recycling methods. The town and village governments signed a “document regarding the responsibility to protect the environment” (*huanjing baohu zeren shu* 环境保护责任书), in which they banned burning, melting, leaching and similar “backward and simple processing techniques” (*luohou jianyi gongxu* 落后简易工序)¹⁴⁶. I do not know how strictly they enforced this ban, or how successful they were in doing so. However, I had the impression that those techniques had vanished from Guiyu by the time I visited the town in the mid-2010s, although this may be due to some of the technical evolutions described above. Other meaningful, albeit small, improvements were made in the field of occupational health and safety. For instance, it became compulsory for workshops that heated PCBs (in order to recover components) to be equipped with exhaust fans and air ducts (fig. 4.6), in order to prevent workers from inhaling toxic fumes.

¹⁴⁶ Ibid. “Offering Amnesty and Enlistment’ to Guiyu”



Figure 4.6: Exhaust fans and air ducts in Guiyu in the mid-2010s. Photo credit: the author.

Occasionally, local governments applied basic environmental remediation techniques (e.g. dredging (fig. 4.7) or excavation) to clean up polluted sites. Such measures made it possible to reduce the level of contamination in one place — generally a densely inhabited area or one that received much attention — but they led to pollution being moved away, not remedied. In at least one case, as we have seen in chapter 2, local authorities went so far as to bury waste in the ground in order to make pollution invisible.



Figure 4.7: River dredging in Guiyu in the mid-2010s. Photo credit: the author.

Finally, some measures were exclusively cosmetic. In all the rural recycling hubs I visited, I heard stories of how recycling activities were put on hold, materials gathered and put away, and surroundings tidied up in preparation for official visits by high-ranking officials. The aim was to defuse control by superiors, which could potentially have dire consequences for everyone drawing revenue from the recycling business. Though only temporary, these changes may have contributed to rural recycling hubs' long-lived prosperity — even if controllers did not really believe what they saw.

4.2.4 What the eye does not see...

At the time of my fieldwork, two types of statements were commonly made regarding DEEE dismantling and processing in rural recycling hubs. A great number of people, especially those whom I will refer to as “institutional experts” (e.g. researchers in environmental sciences, professional environmentalists, government officials involved in waste management or environmental protection), stressed that pollution levels had gone down since the early days and even compared favorably with those that could be observed at the end of the 2000s. More often than not, however, these statements were accompanied by others, namely that polluting activities were still going on, albeit only in remote areas or at night.

I can hardly count the number of times I have heard or read these statements. Chen Bo, the son of recyclers, told me in an interview in 2014 that Guiyu's environment had improved considerably in recent years: "I've spent most of my life there and I remember times when pollution was much worse". But, he added, the most polluting activities were now hidden and therefore invisible. "One might get the impression that they've disappeared, but they haven't", he said¹⁴⁷. Similarly, Wu Xiaogang, a professor in geography who had been to Guiyu several times and had authored a report on the town for the municipality of Shantou's government, said that during his last visit he noticed that pollution was less serious than in 2007-2008. "I felt that it had improved a lot", he said. However, Prof. Wu also mentioned that some workshops hid themselves: "Those that process e-waste by burning it [*fenshao* 焚烧] or plunging it in acid baths [*suanxi* 酸洗] operate only at night and outside of town, in the mountains located around Guiyu." According to him, the EPB had trouble dealing with these clandestine workshops, because it did not have the personnel necessary to conduct night patrols. Last but not least, Lai Yun, a former Greenpeace China officer, declared in an interview with a Chinese journalist in 2011 that:

"In fact, measures have been taken in recent years to remediate the problem [*jingguo zhengzhi* 经过整治]. The situation here [in Guiyu] has improved a lot. Sometimes dismantling workshops only dare operate in remote places located in the wilderness [*pianpi de huangjiao yewai* 偏僻的荒郊野外]. But one cannot treat the huge trauma caused by environmental pollution overnight."¹⁴⁸

The same statements applied to other places as well. Referring to the situation in Qingyuan, Zhou Xuan, a researcher at one of the MEP's research institutes, told me in 2015 that open

¹⁴⁷ I tended to trust Chen Bo as a source of knowledge on Guiyu because he worked for the academic institute I was affiliated with in China and had never been involved personally in DEEE recycling but had acquired a good knowledge of it through his family and friends.

¹⁴⁸ "Visiting Guiyu, the Place that Concentrates the World's E-waste: Numerous Children Suffer from Lead Poisoning" [探访全球电子垃圾集中地贵屿:多数儿童患铅中毒], *Phoenix Web (Science and Technology)* [凤凰网科技], September 15, 2011. URL: http://tech.ifeng.com/it/detail_2011_09/15/9210800_0.shtml (accessed January 26, 2018).

burning had become much rarer since 2013 as a result of government controls and crackdown (see below). “With fines going up to 50,000 RMB, who still dares to burn e-waste?”, he asked rhetorically. However, when asked whether he believed that such practices could actually still be taking place in more remote areas, he replied that he did. One of his colleagues specified that Qingyuan’s hilly landscape made it easy for people to dispose of, or burn, waste without attracting attention.

There is a great deal of ambiguity here. Are we witnessing a decrease in pollution or a shift of pollution? Had polluting activities gradually disappeared or simply fallen off the radar? A mix of both is certainly what best reflects reality, but in what proportions? It is hard to say. There are good reasons to believe that burning was not as common in the early 2010s as it was in the early 2000s, for recycling techniques had improved in the meantime. For instance, it became possible and profitable to recycle cable insulation, which made burning cables less attractive economically speaking. But what about hydrometallurgical processes such as basic acid leaching, for which there exists no low cost alternatives? Are such harmful processing techniques still being used on a substantial scale in China? During my fieldwork, I heard rumors of clandestine workshops located in Guangdong that specialized in the dirtiest processing techniques and were supposedly guarded day and night by armed men and watchdogs. Needless to say, I did not push the investigation so far as to try to verify these rumors. The question therefore remains open.

What matters here is not so much the validity of these statements but rather the idea they convey. Claiming that the environment had improved in Guiyu (and elsewhere) and that severe pollution had become a marginal phenomenon, observable only in those temporal and spatial symbolic others — night and the mountains — seemed like a standard thing to do in the mid-2010s. Fundamentally, it meant that China had gone through difficult times and still faced numerous problems, but that challenges were now being addressed, efforts made, and that first results were already visible. Such claims went beyond the scope of DEEE recycling; they reflected an optimistic and confident take on the country’s modernization in general, and one proper to display, especially in front of a foreigner.

4.2.5 Full-blown crackdowns

While leniency towards so-called “informal” DEEE processing and dismantling in rural recycling hubs remained the rule up until the mid-2010s, things changed in the period

during which I conducted fieldwork. State authorities adopted an altogether different stance towards small, independent workshops. In several hubs, local governments orchestrated crackdowns that forced virtually all workshops to close. This happened in Longtang (Qingcheng District) and in Guiyu in 2015. Combined with the gradual but marked deterioration of the business conditions that could be observed at the time, this move got the better of small workshops — at least temporarily, maybe for good.

I was able to investigate the crackdown in Longtang quite thoroughly, having become aware of it when it was launched. In January 2015, Mr. Yu, the leader of the Qingyuan homeowner movement, mentioned an announcement by the Qingyuan Municipal Government according to which Qingyuan's "e-waste" would soon be solved via what Mr. Yu called a "strong program" (*lidu hen da de fang'an* 力度很大的方案). I later found a printed version of a text issued by the Qingcheng District Government¹⁴⁹ (fig. 4.8) that informed citizens that the government would start "cracking down" (*daji* 打击) on illegal activities on January 1, 2015, with the aim to "suppress" (*qudi* 取缔) them and "do away with them completely" (*quanmian dujue* 全面杜绝) before September 30, 2015. It further stated that the local Public Security Bureau (公安局) would bring charges against those who resisted clean-up or closure, and that these offenders would be punished according to the Environmental Protection Law. Finally, the notice warned that the judiciary might charge those suspected of being involved in such illegal acts, and that stern disciplinary measure would be taken against people who offered them "protection" (*baohu san* 保护伞). The message was clear and meant, in plain language: stop fooling around. The district government had taken matters in its own hands and showed determination to eliminate little players and root out corruption from the bureaucracy's lower levels.

¹⁴⁹ "Notice Regarding the Ban on Dismantling Electronic Waste Material Outside of Industrial Parks in Qingcheng District" [清城区关于取缔电子废弃物园外非法拆解行为的通知], *Qingcheng District People's Government* [清城区人民政府], January 2015.



Figure 4.8: The official announcement of a crackdown on “illegal” DEEE dismantling in Qingyuan. Photo credit: the author.

Shortly after the notice was released, I secured an interview with someone who worked for Longtang's Environment Control Unit (龙塘镇环境监察中队), a certain Mr. Wang. When I asked him to describe the situation in Longtang with respect to recycling operations and pollution, he emphatically replied that: “This problem has been solved already”. Mr. Wang considered pollution caused by DEEE dismantling and processing to be an old story, because the government had given small workshops an ultimatum to leave Longtang. He was confident that things would go according to plan. Local bosses might not be happy about the plan, he acknowledged, but they would be forced to comply. “It’s non-negotiable” (*mei shenme ke tanpan de* 没什么可谈判的), he commented.

Mr. Wang stressed that the decision to shut down the so-called “informal” sector had been taken by the Qingcheng District Government: “Orders came from above, we’re only implementing them”, he explained, adding that “it would be impossible without the financial and human resources we receive”. Among other things, he and his colleagues received money to devise and implement a propaganda campaign that involved covering signboards and walls with the waste-related slogans and threats examined in chapter 2 (fig. 4.9).



Figure 4.9: One among many banners and wall paintings that surfaced in Qingyuan in the mid-2010s reminding residents that burning DEEE and polluting the environment is illegal. Photo credit: the author.

Following my interview with Mr. Wang, I met with a young environmental engineer named Mr. Ma, who had been sent to the Qingcheng District EPB (Qingyuan) by the provincial EPD (Guangzhou) to provide technical advice that would help the EPB deal with pollution caused by recycling activities in Longtang and Shijiao. Mr. Ma told me that the plan was to curb pollution by moving all of the area’s “individual enterprises” (*sanhu* 散户) to one of Shijiao’s four industrial parks. It did not represent anything new, according to him, for other measures had been adopted previously. This time, though, the government could have trouble convincing local bosses to comply, he said. In Longtang, nearly all scrapyards were “unlicensed” (*wupai wuzheng* 无牌无证) and few of them fulfilled the requirements to move into an industrial park. A lot of bosses would have to upgrade their facilities and/or buy new machines and equipment if they wanted to continue working in scrap recycling, which could require considerable sums of money. Not everyone was able to invest such sums, acknowledged Mr. Ma. I asked him if the government would provide financial assistance to

the workshops that were challenged by the transition. Mr. Ma replied “yes”, but all the scrapyard bosses I later interviewed, in Qingyuan and elsewhere, denied that local governments offered them anything — or cared about their survival, for that matter. They had to deal with the new situation on their own and, for many of them, there would be no choice but to abandon their scrapyard. Mr. Ma stressed that scrap recycling played a crucial role for the region’s economic well-being, even though small workshops, as a rule, did not pay taxes. It provided employment as well as revenues from the land, on which many locals depended. The sector’s sudden closure therefore risked dealing a blow to the population and causing social unrest.

Yet, in the end, the sector did close down in Longtang. When I went back in 2016, Mr. Yu took me for a ride in his car and we saw a great many workshops that were either empty, and looked like they had been abandoned (fig. 4.10), or idle. His educated guess was that seventy percent of owners of small dismantling workshops had “vanished” (*qingzou le* 清走了) — I would put the figure nearer to ninety percent. A few of them had indeed moved to Shijiao, but most had just gone without a trace. According to Mr. Yu, “a relatively intense punishment” (*zhengzhi de lidu haishi bijiao da de* 整治的力度还是比较大的) had taken place, which saw twenty-two people being arrested and sentenced from January 2015 to January 2016, among other measures. The pressure build-up on local authorities had eventually produced results, he said, and he mentioned recent media reports as well as an “unannounced visit” (*anfang* 暗访) by the Guangdong Province’s Discipline Inspection Commission (纪委)¹⁵⁰ to investigate local governments’ handling of the “e-waste” issue, which had led to a report to the central government. It seems plausible that, this time, the orders came from the top of the Chinese bureaucracy.

¹⁵⁰ The entity’s full name is 纪律检查委员会. It is affiliated with the Chinese Communist Party and in charge of fighting corruption.



Figure 4.10: An empty scrapyard in Qingyuan that has been abandoned in 2015. Photo credit: the author.

Other rural recycling hubs I visited between 2014 and 2016 had also clearly gone through a crackdown phase, the traces of which were still visible. In Qilin (麒麟镇), for instance, a subdistrict located next to Guiyu, empty scrapyards and propaganda material (fig. 4.11, 4.12 and 4.13) abounded in 2015. In Longmen Village (龙门村), which belongs to Nanjing District (南径镇) and is not far from Guiyu either, locals told me that recycling activities had stopped since August 2014. In Guiyu itself, the regional government dealt an almost lethal blow to “informal” dismantling and processing workshops when it declared that they should all move into the town’s industrial park by the end of 2015. Prominent environmentalists Jim Puckett and Lai Yun visited the town at that time and wrote: “Last week, Puckett and Lai Yun witnessed the recycling streets of Guiyu as ‘a ghost-town’ with all operations shuttered and only a few abandoned piles of e-waste left behind in some yards and waysides”¹⁵¹. When

¹⁵¹ “Infamous Chinese e-Waste Town Finally Closes Doors to Import”, *Basel Action Network*, December 17, 2015.

URL:

<https://static1.squarespace.com/static/558fic27e4b0927589e0edad/t/567263fbee0327c81fa92fcb9/1450337275314/Infamous+Chinese+e-Waste+Town+Finally+Closes+Doors+to+Imports.pdf> (accessed January 26, 2018).

I went there myself, in January 2016, it had become difficult to find recyclers that were still operating, whether within or outside the industrial park.



Figure 4.11: Closed workshops in downtown Qilin. Photo credit: the author.



Figure 4.12: A propaganda banner authored by the local government in Qilin that reads “thoroughly remedy e-waste pollution, build a green homeland”. Photo credit: the author.



Figure 4.13: A signboard authored by the local government in Qilin that reads “All acts such as e-waste dismantling, which destroy the environment, will be punished severely”. Photo credit: the author.

4.2.6 Maintaining the status quo to contain damage?

The timing of these crackdowns raises the question, why so late? In the case of Guiyu, especially, one could reasonably have expected that “pressure from above” would build up quicker and produce effects sooner, given that the pollution scandal had broken in the early 2000s already. Why did it take so long for radical action to be taken? Beyond the entrenchment of local interests, another interesting explanation is that the central government wished to keep so-called informal DEEE dismantling and processing concentrated. Quoting an Asian-American scrap metal processor on Guiyu, Minter writes that: “Domestic electronic scrap is getting bigger [...] And the central government wants it to go to one place. They want a designated zone. They don’t want this kind of polluting business popping up all over China. They want it in one place” (Minter 2013:191). Crackdowns risk dispersing recycling activities instead of putting an end to them because

so-called informal dismantling and processing workshops operate in highly flexible ways and can be extremely mobile. While describing the workshops located in Longtang, Mr. Ma, the dispatched EPD employee, said: "If forced to close down somewhere, they have no trouble reappearing elsewhere. Their operational costs are very low and most of them are from another province. For them, leaving Longtang is not a problem." To encapsulate this, he used the expression *da youji* (打游击), which can be translated as "to settle and operate from anywhere", but literally means "to fight as a guerilla". Most institutional experts I talked to used this expression, which carries a connotation of antagonism, even conflict. It is revealing of the fact that they saw themselves and the so-called informal recyclers as being on opposite sides.

Cracking down on small workshops is a risky strategy likely to produce unexpected consequences. The events that unfolded in 2011 in Wen'an (文安), a rural recycling hub located in Hebei Province (northern China) illustrate this perfectly. The town had grown to become China's plastic recycling capital. It bore many similarities to Guiyu: most local residents were involved in the scrap recycling business; a large proportion of goods were imported from abroad; the environment was in a dire state; and officials showed virtually no interest in health and safety issues (Minter 2013:150-157). In the wake of a reshuffling of the town government, the new Party secretary took the decision to close all small recycling workshops. As a result, plastics started to accumulate everywhere, and recycling activities moved out of town, to unknown areas. Minter describes Wen'an in 2009 as one of the most severely polluted places he ever visited. But he also stresses that the environmental catastrophe remained localized. After the crackdown, pollution not only persisted, it spread and became uncontrollable. The lesson to be drawn from Wen'an is that crackdowns are unlikely to bring any improvement if they are not accompanied by well thought-out replacement measures (Goldstein 2017).

Furthermore, efforts to curb pollution through crackdowns necessarily have a limited geographical scope. This is a major drawback if what matters is the regional or national scale. Many of my interviewees who wished that "informal" workshops would soon disappear for good only cared about the local scale. Local officials, in particular, seemed perfectly content with the idea that, by cracking down on workshops located in their jurisdictions, they might simply be passing the buck to colleagues in other jurisdictions. Moreover, elsewhere was

often synonymous with more remote areas, which, as several of the people I talked to in Guangdong pointed out, offered additional “room for pollution” (*wuran kongjian* 污染空间).

During my fieldwork, I heard rumors that dismantling and processing workshops had opened in Guizhou Province and in Hainan Province, that some bosses from Guiyu had relocated to South-East Asia; and that the town was losing pace because of the emergence of these new rural recycling hubs. This might well have been the case, but I think it unlikely that any of these new hubs, provided they exist, could become comparable in size to Guiyu or Qingcheng. For one thing, such hubs are years in the making: know-how has to be acquired, networks have to be built, and solutions for transportation of goods on a large scale must be found. It is also unlikely that large hubs would have gone unnoticed in the mid-2010s, at a time when the level of awareness about “e-waste” far exceeded that of a decade earlier.

4.2.7 Enclose and control

State authorities’ alleged aim in orchestrating crackdowns — and to some extent controls — was to force small workshops to relocate into industrial parks (*gong/chanye yuanqu* 工/产业园区). Officially, bosses in rural recycling hubs were given a choice between two alternatives: moving into an industrial park or closing their operations. State authorities promoted industrial parks as the perfect solution to the problems posed by DEEE dismantling and processing. Parks, they stressed, made it possible to concentrate, contain and control workshops, which brought numerous benefits. First, parks allegedly reduced pollution to a minimum, because they were equipped with all the necessary infrastructure and equipment to capture emissions and neutralize them. Second, parks put an end to rogue development, as they were managed by a company that monitored and supervised recycling operations and had to report to the government. Third, parks made flows of goods and money traceable and therefore also quantifiable. Fourth, workshops that operated in parks were forced to comply with existing laws and regulations and could be made accountable for their actions. State authorities in China referred to the strategy to move workshops to industrial parks as “enclosed management” (*quanqu guanli* 圈区管理). It was formulated in the mid-2000s and subsequently implemented throughout the country. According to Shinkuma & Huong (2009:30), the strategy of enclosed management replaced that of mandatory removal: the

Chinese government changed its policy from banning improper recycling to encouraging proper recycling when it realized that crackdowns were not being effective.

Roughly speaking, industrial parks consist in circumscribed areas equipped with concrete walls and surfaces, asphalted roads and streets, a remote surveillance system, a sewage network, and, in some case, a water treatment facility. They are run by a company that provides services in exchange for fees paid by the recyclers in the form of monthly rents. In Qingyuan, in the mid-2010s, industrial parks came in all shapes and sizes: the biggest ones could accommodate several hundred workshops and a few large companies, such as smelters, the smallest ones only several tens of workshops. Large industrial parks tended to be linked with state authorities at the provincial or national levels, small ones only at the district or subdistrict levels, if at all. In Qingyuan, for instance, the Huaqing Circular Economy Park (广东清远华清循环经济园) belongs to the China Recycling Development Co., Ltd. (中国再生资源开发有限公司), a company subordinate to the All China Federation of Supply and Marketing Co-operatives (ACFSMC) (also known as China Co-op Group, 中国供销合作社), which is itself placed under the leadership of the Chinese central government.

In theory, industrial parks appeared to be a panacea for all the ills that had befallen rural recycling hubs. As a journalist noted, they remediated the problems posed by small and medium enterprises involved in scrap processing in terms of scale (too “small”, *xiao* 小), distribution (too “scattered”, *san* 散) and operations (too “disorderly”, *luan* 乱), because they covered all stages of the process (*quan guocheng genzong* 全过程跟踪) in a closed circuit (*fengbishi guanli* 封闭式管理) and in a more controlled environment (*qianghua huanjing yuesu* 强化环境约束)¹⁵². Industrial parks were routinely compared to clusters of independent workshops located elsewhere and considered as a better solution for organizing recycling

¹⁵² See, e.g., “‘Enclosed Management’: Encircling and Suppressing ‘Foreign Wastes’ and Shouldering Heavy Responsibilities over the Long Period Ahead” [“圈区管理” 围剿 “洋垃圾” 任重道远], *Economic Information* [经济参考报], March 11, 2015. URL: http://dz.jjckb.cn/www/pages/webpage2009/html/2015-03/11/content_2938.htm (accessed May 14, 2017).

activities. For instance, in their report on Qingyuan, Jiao et al. (2012) go so far as to portray Longtang's industrial parks and family workshops as opposites, like "light and shadow" (*guang yu ying* 光与影). Such statements made it seem like there were only differences, no similarities, between the two types of business. And it is true that, on the surface, at least, industrial parks, especially large ones, looked tidier, more organized, better equipped, better managed, monitored and controlled.

On closer inspection, however, certain aspects proved just as problematic inside parks as they were outside. Working conditions, for instance, were much the same everywhere: workers engaged in risky, dirty and grueling manual labor, mostly unprotected. Basel Action Network noted this explicitly with regard to Guiyu¹⁵³. The classic slogan "safety first" (*anquan diyi* 安全第一) could be seen in many places inside industrial parks, but that did not reflect a genuine concern for workplace safety or occupational health. Furthermore, parks were supposed to neutralize pollution, but they rarely delivered on that promise¹⁵⁴. Large parks were equipped with water treatment facilities (fig. 4.14), but it was unclear what these facilities were supposed to filter out, how effective they were, and to what extent they were being used. Senior environmentalist Wang Aidong told me that "sometimes these parks don't function properly": some managers pocket the money made available by governments for conducting pollution measurements and upgrading pollution control equipment and infrastructure. In the case I know best, that of Huaqing Circular Economy Park, evidence suggests that the park released water that had been only partially treated, if at all. A mud sample collected beneath a drain by a friend of mine working for a Chinese environmental NGO revealed the presence of five heavy metals in concentrations exceeding healthy levels

¹⁵³ *Ibid.* "Infamous Chinese e-Waste Town Finally Closes Doors to Import"

¹⁵⁴ Anecdotally, I remember riding in a bus along a canal on the fringes of Tianjin Ziya Circular Economy Industry Park (天津子牙循环经济产业区), one of China's flagship industrial parks, in November 2014 and watching the water change color every two hundred meters or so: brown, red, yellow, black... "Informal" workshops were entirely absent from this park, but pollution was not.

by factors ranging from four to one hundred. Small bits of plastic also abounded in the stream that carried effluents away from the park. Interviews conducted with people who lived next door suggested that the park polluted on a large scale, just not in visible ways. They complained of smelters operating at night and releasing smelly fumes. One man even suspected that the park pumped wastewater back into the ground. He said that his family had stopped using well water for anything apart from washing clothes and cleaning surfaces. Thus, at the very least, one can claim that industrial parks located in rural recycling hubs did not tick all the boxes for effective environmental protection.



Figure 4.14: The water treatment facility in Huaqing's industrial park. Photo credit: the author.

The plan to “scale up” in industrial terms also met with limited success. A decade after its adoption, the strategy to create industrial parks in China's rural recycling hubs had had only mixed results. Among other problems, a great number of small workshops kept on operating

outside and around parks, and larger companies inside parks found it hard to procure goods¹⁵⁵. How can this be explained? First, while many workshop owners resigned themselves to relocating to an industrial park, few of them showed any eagerness to do so. Industrial parks' features in terms of design, scale, location, organization, operating rules, and so on, were not tailored to their needs and capabilities, which made them impractical and therefore unattractive. Some owners wanted nothing to do with industrial parks. In some case, the reluctance to move into a park may have stemmed from an intention to continue engaging freely in dirty or illegal activities — which parks made impossible, since they exposed workshops to close monitoring. But, more generally, bosses' lack of enthusiasm for industrial parks stemmed from the costly changes these places made necessary and for which they did not offer much in return.

For a start, the transition involved an increase in operational costs (Tong et al. 2015:35). As we have seen above, operations often needed to be upscaled and equipment upgraded in order to satisfy park requirements, and not everyone could afford to make the necessary investments. In addition, once in a park, workshop owners had to pay rent and taxes. One owner in Longtang calculated that his costs would rise by fifty percent if he were to join a park (nevertheless, he accepted to do so). Another one complained that park managers, who in some cases were tasked with collecting taxes and transferring them to the government, pocketed part of the money. As long as they remained outside the park, workshop owners could in general minimize rent and avoid taxes because they usually owned the buildings in which they worked, and kept the true scale of their activities and revenues unknown to local governments, who, as a result, had trouble taxing them.

Beyond the cost issue, workshop owners did not like the fact that industrial parks forced them to reorganize operations in ways they were both foreign and disadvantageous. Park regulations focused exclusively on materials recovery, which in effect banned product

¹⁵⁵ *Ibid.* “‘Enclosed Management’: Encircling and Suppressing ‘Foreign Wastes’ and Shouldering Heavy Responsibilities over the Long Period Ahead”.

refurbishment and component reuse (Tong et al. 2015:35). In general, parks were also badly designed for artisanal DEEE recycling. One workshop owner who had moved to a park recently complained that he was forced to rent three floors but could only use one, the ground floor: “How am I to move stuff upstairs? They didn’t build a lift! Do you know how much it would cost me to have my workers carry those heavy bags to the third floor and back down again? I’m not even sure they’d be willing to do it!”

Furthermore, parks created a boundary between the working space and the living space that did not exist in traditional rural life. As former peasants, bosses in recycling hubs were accustomed to the interpenetration of work and family. It formed part of the mode of production and way of life that they (or their parents) had experienced while still being engaged in agriculture, and they had integrated it to a large extent into their business model for recycling. In Guiyu, for instance, dismantling and sorting activities took place inside bosses’ houses. A typical building consisted of a home (higher floors) and a workshop (lower floors). Private and professional life therefore occurred at the same time and in the same space — that is, from the perspective of the owner and his family. This spatial organization had many advantages. It allowed bosses to adapt workers’ shifts to material flows and always be present on site to supervise and monitor operations; enabled families to engage simultaneously in professional work and care work for children and the elderly; and provided plenty of opportunities to train teenagers or young adults, and teach them the tricks of the trade early on. Of course, it had drawbacks too. Notably, it exposed non-working family members to health hazards. Industrial parks, on the other hand, did not lend themselves to the interpenetration of work and life. They were dedicated exclusively to industrial work, located outside residential areas, and not fit for living purposes. In sum, parks questioned the business model, spatial and temporal organization and social relationships on which rural recycling hubs relied.

As a result, many of the industrial parks I visited in the mid-2010s had low occupancy rates. An extreme example is that of Guiyu’s Circular Economy Industrial Park (贵屿循环经济产业园区). In August 2013, Chen Bo informed me that a park had existed in Guiyu for a number of years, but not taken off yet. He claimed that plots of land had been allocated to recyclers but that the first workshop was yet to move out of town. In October of that same year, the park was “formally established and inaugurated” (*zhengshi jiepai chengli* 正式揭牌成立) with

great fanfare, but when I visited it for the first time in 2014, it still looked like a vast stretch of wasteland (fig. 4.15).



Figure 4.15: Guiyu's industrial park in 2014: a vast stretch of wasteland. Photo credit: the author.

Construction only began later and was still underway during my second visit in May 2015. By the time I came back a third time, in January 2016, most buildings had been completed and were being equipped. The park had reached an impressive size: it spread over a large surface, consisted in several areas that each contained five to twenty buildings, some of them up to a hundred meters long and twenty meters high. Judging from the infrastructure, it was clear that hundreds of millions had been invested in the project (fig. 4.16). And yet, back then the park was all but empty. To be fair, my visit took place less than two weeks before Chinese New Year, which is a time of very low professional activity in China. However, I could not see any signs that the park would fill up after the holiday. On the contrary, local bosses told me that they were not making any profit since they had joined the park and that they seriously considered “switching to another line of business” (*zhuanhang* 转行). In sum, the park had been ten years in the making but threatened to turn into a white elephant.



Figure 4.16: A portion of Guiyu's industrial park, seen from a distance. Photo credit: the author.

How are we to explain industrial parks' failure to attract small recycling workshops when they were supposed, and to some extent designed, to accommodate them? An obvious factor is rent and taxes that workshop owners could avoid paying if they operated outside of parks. Another one, which is perhaps less obvious but, in my view, also more fundamental, is the tension that exists between Chinese state authorities' top-down type of governance and the scrap industry's traditionally flexible and decentralized operating mode. As is often the case in China, the strategy to create industrial parks in rural recycling hubs was the brainchild of technocrats active at the top of the state hierarchy. The lower administrative levels had the responsibility to implement these plans and businesses were simply required to accept them and comply with them. The engineers and officials responsible for designing the parks cared little for "informal" workshops' operating mode and did not study them thoroughly. Neither did they consult with the people who already owned and operated such workshops. They therefore remained largely ignorant of these people's experiences and opinions. The solution they aimed at involved a radical transformation, not an incremental one, and it was imposed, not negotiated. In such circumstances, it is not surprising that a considerable proportion of "informal" recyclers did not embrace industrial parks and joined them only when forced to do so. Top-down governance always entails a risk that a sector's mode of organization, a population's experience, and citizens' opinions could be disregarded, even though they are firmly entrenched. The story of Guiyu's industrial park owes its absurdity to this more than anything else.

4.2.8 Tough times for rural recycling hubs

Rural recycling hubs' demise over the course of the mid-2010s cannot be attributed solely to controls and crackdowns by state authorities. True, the latter targeted DEEE dismantling and processing not only directly, but also indirectly by restricting imports of this type of goods into China (see chap. 3), thereby cutting into an important part of supply. But other factors had a negative impact as well. Falling materials prices and rising labor costs, in particular, considerably weakened DEEE traders, dismantlers and processors. That helped state authorities bring so-called "informal" DEEE recycling to an end — at least in certain areas.

In Longtang, for instance, business had been withering for some time before the 2015 crackdown. According to Mr. Wang from the subdistrict EPB: "A few years back, the area hosted more than 3000 recycling companies. Today, this figure has fallen to 587." He told me that the sector was losing momentum, though it still accounted for most industrial activity in the region. His colleague, Mr. Ma, the environmental engineer dispatched by the provincial EPD, attributed the closure of numerous workshops to "bad economic conditions" (*hangqing buhao* 行情不好) rather than to the government's crackdown. He claimed to have noticed a marked business slow-down during his one-year stay in Qingyuan, which he attributed to unfavorable conditions on global markets. That had led to shrinking profit margins in China's scrap recycling sector, and pushed a lot of entrepreneurs to question their involvement in this line of business, he explained. In Mr. Ma's narrative, the disappearance of small workshops sounded almost like an inexorable evolution; with their golden years behind them, "informal" recyclers would be driven out of the market, regardless of the measures taken (or not) by state authorities.

Prices of materials, in particular metals, started declining around 2011 and kept on sliding until the end of 2015. All materials were affected, though to varying degrees. Most significantly, the price of copper, the most sought-after material and a cash cow for many recyclers, experienced a drop of almost 50 per cent over the course of five years, from 2011 to 2016 (fig. 4.17). This put everyone who relied on the economic value of the materials found in DEEE under considerable pressure. The materials traders, dismantlers, sorters and processors I talked to regularly complained about this drop, and many of them acknowledged that, if prices did not reach a bottom soon, they might go out of business.



Figure 4.17: The evolution of copper prices in China from May 2012 to May 2017. Source: www.kitco.com.

The rising cost of labor posed another major problem, since cheap labor was part and parcel of rural recycling hubs' business model. Migration patterns kept on changing and from the late 2000s onwards migrant workers from the interior of China showed less willingness to move to the coastal cities. Development had caught up in the central and western parts of the country, which meant that more jobs were available closer to migrant workers' hometowns (Liang, Li & Ma 2014). Rural recycling hubs had to compete for unskilled labor with a lot more places than before.

Finally, the appalling quality of the environment after several decades of polluting activity pushed many families to leave rural recycling hubs and settle elsewhere, e.g. in Shantou or Shenzhen. DEEE dismantling and processing was a boon for people willing to work hard and take risks, and keen to access greater material well-being, but it was far from being an ideal profession. Once they had accumulated wealth, families had more choices. They could opt for other lines of business that did not require living in a highly polluted and not fully urbanized area. They could also covet jobs outside of business that require long studies, in law, medicine or government, which they hitherto did not have access to. In the 2010s an increasing number of parents in rural recycling hubs were sending their children to university so they would later enjoy a more stable income and a higher social status.

4.3 Conclusion

In this chapter, I have shown how recycling hubs came into being in some of Guangdong Province's rural areas some thirty years ago, how they endured for a long time, and how they recently declined. These hubs' careers reveal the entanglement of business and state interests at the local level and the hands-off approach that higher administrative authorities adopted. Things changed in the mid-2010s, when the latter intervened more decidedly, and local governments were forced to dissociate themselves from small, independent DEEE dismantling and processing workshops. Crackdowns took place at a time when rural recycling hubs had already been weakened by years of unfavorable market conditions and therefore put a lot of small workshops out of business. Industrial parks were created and expected to radically change rural recycling hubs. Because they did not really accommodate artisanal recycling, however, these parks proved to be an impractical solution and did not meet with success. Industrial parks made operations less convenient and more expensive for local bosses, and did not bring considerable improvements in terms of pollution control or working conditions. Local bosses were reluctant to join parks; many of them preferred to switch to another professional activity instead.

Several insights emerge from my account of rural recycling hubs. First, places like Guiyu and Qingyuan both benefited and suffered greatly from DEEE recycling. For them, economic development turned out to be a mixed blessing, to put it mildly. And that could be said of nearly all the rural areas in China that have transitioned from agricultural to industrial work. These places have many common characteristics, among which labor exploitation, absence of occupational health and safety measures, severe pollution, and collusion between local officials and businesspeople. One town located a few miles away from Guiyu, for instance, looked very much like its neighbor. Gurao (谷饶镇) has been dubbed China's "underwear capital", as it contributes a considerable portion of China's total national production of bras, panties and lingerie. The town is populated by large numbers of migrant workers and hosts dozens of factories, some of which are involved in textile dyeing, an activity known to be

extremely polluting. Greenpeace drew attention to the severe environmental degradation affecting Gurao and its inhabitants in 2010¹⁵⁶, but little had changed when I visited the town six years later¹⁵⁷. In early 2016, I took a picture of a black river in Gurao that looked very much like the ones from Guiyu reproduced in this chapter. Even if DEEE pollution has greatly decreased in Guiyu, as many people claim, the population of that area is not out of trouble at all. This is because other, more fundamental factors are at play, including a global division of labor that gives China the role of “world factory” and a national development model, in which a sustained economic growth is absolutely central.

The comparison between Guiyu and Gurao allows us to not only reveal the existence of a more general pattern but also to question the discourse that blames pollution on e-waste and the so-called informal sector. Pollution in Gurao has to do with textile waste and not with so-called e-waste. The fact that Gurao did not rise to public infamy as Guiyu did, or only to a much lesser extent, points to the exemplary character of e-waste, which stands for pollution in more powerful ways than textile waste does. Similarly, factories in Gurao are the source of serious pollution, but they can hardly be described as informal. Many of them employ hundreds of workers and are housed in buildings so big that they can be seen miles away. The fact that informal workshops in Guiyu appeared as more problematic than formal factories in Gurao indicates that informality itself was part of the problem.

This brings us to the second key insight, namely that so-called formal infrastructures such as industrial parks, which appeared as a panacea in theory, had many shortcomings in practice. In particular, industrial parks were ill adapted to the realities of recycling in rural hubs and

¹⁵⁶ “The Dirty Secret Behind Jeans and Bras”, Greenpeace East Asia, December 1, 2010. URL: <http://www.greenpeace.org/eastasia/news/stories/toxics/2010/textile-pollution-xintang-gurao/> (accessed January 26, 2018).

¹⁵⁷ See “Bleak Times in Bra Town”, *The Economist*, Apr 16, 2016. URL: <https://www.economist.com/news/china/21697004-one-product-towns-fuelled-chinas-export-boom-many-are-now-trouble-bleak-times-bra-town> (accessed January 26, 2018).

therefore did not enable a sector upgrade as they were supposed to. Not only that, but they also failed to deliver on their promises. For instance, although labelled a “circular economy” park, Guiyu’s industrial park involved virtually no industrial symbiosis, as predicted under industrial ecology models: inputs came from outside the region and outputs left for outside the region too; companies located in the park were all engaged in basically the same type of activities (i.e. recycling and not, say, manufacturing), so they all had the same needs and could offer the same assets; as a result, apart from dismantlers selling fractions to processors, there were no opportunities for exchanges of materials within the park — not to speak of exchanges of water or energy. More generally, the “circular economy” parks I studied in Guangdong Province featured quite a different take on industrial ecology than, say, the Kalundborg Eco-Industrial Park, in Denmark, which is often cited as a model of the genre. Whereas Kalundborg came into being thanks to spontaneous initiatives, autonomous organization, localized synergies, and so on, Chinese “circular economy” parks specialized in recycling were all created by fiat, managed from above and designed to foster clustering, not diversification and exchange. This sheds a new light on the Chinese central government’s policy of promoting a circular economy. China is frequently held up as an example of a country that takes action to tackle the wastefulness and inefficiency of its economy (Mathews & Tan 2016). In particular, experts stress that the concept of circular economy features in many important policy documents and that several large circular economy parks have been created. But a view from the ground, in Guangdong Province, indicates that smaller parks were circular only in name and that they often remained largely empty, thereby compounding wastefulness and inefficiency, rather than solving it.

5 A NEW SYSTEM IS THE ANSWER

For many years, DEEE dismantling and processing in China remained the exclusive domain of small businesses gathered into large networks. These businesses were based in rural recycling hubs and operated in a mostly artisanal and market-led mode. Starting in the early 2000s, however, another type of entity became involved in this type of activity, namely large companies. The latter differed from the former in that they used industrial technology, relied on state intervention, and sited their facilities at the periphery of major cities. Experts and officials viewed large companies as a preferable alternative to the existing, “informal” (*fei zhenggui* 非正规) subsector and therefore promoted them. They progressively created a framework for the regulation of DEEE recycling that favored them, thereby enabling the emergence and growth of a new subsector. This chapter deals with the central and provincial governments’ intervention in a this sector of economic activity. It traces the establishment of a new, state-led “formal system” (*zhenggui zhidu* 正规制度) intended to transform DEEE recycling. In what follows, I analyze the policies and regulations that have been developed to that end, and describe the entities and practices they gave rise to.

In this chapter, the focus is on domestically generated DEEE — China’s own problem, so to say. The issue of imports has been dealt with previously. Once again, the rationale for making a distinction between DEEE according to its geographical origin is that the “formal system” itself makes such a distinction (Tong et al. 2015). This is apparent in, among other things, the administrative structure of government agencies: in Guangdong Province, for instance, the EPB’s Center for Waste Management (广东省固体废物管理中心) is split

between two teams that each deal with only one category of DEEE (domestic or foreign). Different rules apply depending on where DEEE comes from. Most importantly, the country's "formal system" applies exclusively to EEE that has been discarded within the Chinese territory, and large dismantling and processing companies can only receive state subsidies for recycling DEEE that has been generated domestically.

Two sections make up this chapter. The first one recounts the experimentation process that led to the progressive constitution of China's formal system of "e-waste management and treatment" (*dianzi feiqiwu guanli yu chuli* 电子废弃物管理与处理). It also describes licensed DEEE dismantling plants, their activities and their business model. The second section elaborates on the driving forces behind "formalization" (*zhengguihua* 正规化), traces the influences that shaped this project, and identifies some of the system's key features and their implications. It offers an alternative reading of state action that goes beyond environmental protection, the rationale that was systematically mentioned.

A lot of the empirical material used in this chapter comes from specialized conferences I attended, on-site visits to factories I took part in and interviews I conducted with Chinese experts and officials. The term "expert" comes up a lot in the following pages. It has a broad definition and can be interpreted in a variety of ways, so it is worth specifying what type of people I have in mind when using it. The question of who qualifies as expert has generated considerable debate in the social sciences. There seems to be two extreme views. One, usually espoused by natural scientists, consists in trying to establish a true measure of expertise and to hierarchize knowledge and skills. The other, more typical of STS scholars, consists in attributing the competence of expert to everyone. These two extremes, I believe, are equally normative and therefore unhelpful. Stehr & Grundman (2011) offer a more useful, functional definition, emphasizing what experts do, namely recommend a course of action to others based on technical information (see also Grundman 2017). According to Stehr & Grundman, experts perform several key functions: they mediate between knowledge production and application; they reduce complexity and create trust and legitimation; and they define and interpret situations. Experts also operate within a certain type of social relationship: they interact with clients, to whom they are accountable. Stehr & Grundman's definition narrows down the scope of the term expert and helps clarify which categories of people it can be applied to. In the context of DEEE recycling in China, typical experts

include: academic and corporate researchers, scholars and scientists, journalists, NGO staff, doctors and state officials. As a rule, entrepreneurs, workers, and citizens, on the other hand, do not qualify as experts — which does not mean that they are less knowledgeable or skilled, or that their knowledge and skills are less valuable, but simply that they are rarely called upon to guide the action of others through providing knowledge and skills of a technical nature.

A key reason why I decided to study experts is that they are figures of authority who participate in the naming and framing of social problems (Best 2016), and have the power to legitimize certain solutions and delegitimize others. Through my interactions with Chinese experts, I felt that few of them adopted a critical stance towards state policies and regulations. Quite the opposite, many of my interlocutors seemed to be glossing over inconvenient truths, and blowing achievements and successes out of proportion. This made it difficult for me to get a sense of the relevance, efficiency and impact of these policies and regulations. It also forced me to systematically take experts' statements with a healthy dose of skepticism. In hindsight, it seems to me that I encountered something very similar to what scholars in international relations calls an “epistemic community” (Haas 1992). Without going into too much detail — I do not intend to use the term exactly as these scholars do anyway — such a community can be defined as “a network of professionals with recognized expertise and authoritative claims to policy-relevant knowledge in a particular issue area [who] share a set of norms that motivate their common action, a set of beliefs about central problems in their area of expertise, shared criteria for evaluating knowledge, and a common policy enterprise” (Clunan 2016:[no pagination]). In my research, the experts I interacted with all supported the project of formalization and had similar views on what it entails. There was a consensus among them about the causes and effects of this project. That is why I regard them here as a community.

5.1 Setting up a new subsector

In its efforts to transform DEEE recycling in the 2000s and 2010s, the Chinese central government made use of a strategy often referred to as “trial and error” (see Heilmann 2008). This strategy, which informed China’s economic reforms in the late twentieth century and stimulated rapid economic growth¹⁵⁸, consists in applying potential solutions at a limited spatial or temporal scale, or with a restricted material or technical scope, and testing them first. After assessment, certain elements might be abandoned, while others are kept and used to create new potential solutions at a larger scale and with a broader scope, that are themselves tested and assessed, and so on — the basic idea being to start small and grow big.

State authorities experimented with various solutions at the same time. At the beginning, the central government both issued laws and regulations at the national level, and launched pilot projects at the local level. This made the process of finding practical, effective solutions quicker, but also led to some confusion. In terms of legislation, in particular, the adoption of a great number of texts up until the early 2010s (Schulz & Steuer 2017:318) made it difficult for actors to understand legal requirements and adapt their behavior accordingly.

5.1.1 First attempts, first obstacles

As is often the case in China, the policy-making process regarding DEEE recycling involved first experiments conducted at the local level and only later policies of national scope (Heilman 2008). The first attempt at creating a new subsector made up of large companies dates back to the early 2000s (2003-2006) and consisted in an experimental program run at the provincial level. A first batch of pilot projects (*shidian* 试点) were launched in Beijing and Tianjin, followed by a second batch in Zhejiang Province and Qingdao. As Wang et al.

¹⁵⁸ “How China boomed by trial and error”, *Financial Times*, May 13, 2011 [from Tim Harford’s column *Undercover Economist*]. URL: <https://www.ft.com/content/ad97c282-7b6d-11e0-ae56-00144feabdco> (accessed January 26, 2018).

(2013:33) write: “The pilot project[s] aimed to explore the feasibility of approaches to collecting e-waste from different available channels, develop standards and regulations for e-waste management, and develop key technologies and equipment for e-waste recycling.” The legal framework for these projects stressed the importance of proper “treatment” (*chuli* 处理) but did not specify how they were to be realized. Provincial governments left the door open for experimentation with technologies and business models. The aim was precisely to observe how collection and treatment operations would evolve spontaneously at the local level so as to subsequently develop national standards (Yu et al. 2010, Wang et al. 2013:33).

One of pilot projects’ two main objectives, i.e. the construction of treatment facilities, proved successful, the other, i.e. the establishment of collection channels, less so. The experience revealed that the so-called “informal” subsector stood in the way of the establishment of a “formal” subsector (Hicks et al. 2005), because it captured most DEEE upstream. In Hangzhou, for instance, the pilot project failed to collect sufficient amounts of DEEE to feed the newly built plant. Out of the expected 800,000 units per year, only 200,000 were collected and processed within two years¹⁵⁹. Similarly, the Qingdao project never achieved the targeted 600,000 units. Haier, a large private company involved in the project, backed away when it realized that volumes would not be sufficient. The pilot project in Beijing collapsed after having encountered the same difficulty¹⁶⁰: it did not manage to source enough DEEE or “did not have enough to eat” (*chibubao* 吃不饱), as the Chinese expression goes¹⁶¹.

¹⁵⁹ “The Trouble with the ‘Environmental Protection of the Earth’ – Society Still Needs to Understand the Ideal of Environmental Protection” [“大地环保”的烦恼 环保事业有待社会理解], *Zhejiang Trade Net* [浙商网], 2005. URL: <http://biz.zjol.com.cn/05biz/system/2005/06/29/006146804.shtml> (accessed January 26, 2018).

¹⁶⁰ “Scavenger Kings’ Endure Hardships” [“破烂王”熬出头], *China Computer World* [计算机世界], June 1, 2010. URL: http://blog.sina.com.cn/s/blog_62ac24a70100itfj.html (accessed January 26, 2018).

¹⁶¹ See also, on Shanghai: “Why Are E-waste Processing Plants Going Hungry” [电子垃圾处理厂为何吃不饱], *People’s Daily* [人民日报], July 6, 2007. URL: http://paper.people.com.cn/rmrb/html/2007-07/06/content_13410359.htm (accessed January 26, 2018).

The main reason why these pilot projects, and similar ones, were all confronted with the issue of supply shortages is that they ignored, or at least did not make use of, small, unregistered businesses' pre-existing collection networks. Moreover, they offered little or no money in exchange for DEEE, whereas small independent collectors paid dearly to acquire it (Yu et al. 2010) (more on this in chap. 6). Wang et al. (2013:34) summarize the lessons drawn from those early pilot projects:

“the stream of e-waste coming to formal recycling facilities must be both consistent and sufficiently large. Merely constructing the treatment facilities without preparing a complete recycling and supply chain will lead to discontinuous operation and insufficient performance. [...] a proper financing scheme to cover the deficits incurred by formal recycling facilities is essential to run the system under an effective business model.”

To be successful, any further attempt at creating a “formal system” would require pumping additional money into it so as to make “formal” actors more competitive.

5.1.2 The central government steps in

At a second stage (2009-2011), the central government introduced another type of pilot program, this time at the national scale. Referred to as the “Home Appliance Old-for-New Rebate Program” (*jiadian yi jiu huan xin zhengce* 家电以旧换新政策 shortened as *yi jiu huan xin* 以旧换新 or “old for new” (OfN)), this take-back scheme was first introduced in nine areas (cities and provinces) and later expanded to the whole country. The main idea was to redirect material flows away from non-registered collectors by encouraging consumers to hand in their devices exclusively to registered ones. Owners were offered a 10 per cent rebate on the purchase of a new device on the condition that they sell another one (an old, used or defunct one) to an authorized collection and logistics company. As Wang et al. (2013:34) stress, the incentive for consumers lied in the “double financial benefit — the 10 per cent discount on a new home appliance and the cash payment from collectors”. The central government, through its Ministry of Commerce (MOFCOM), selected the companies involved in the OfN scheme (i.e. retailers, collectors and processors) and supported them with a subsidy that enabled them to offer better prices to consumers and therefore to compete with unregistered actors (Wang et al. 2013:36). Eighty percent of the funds came from the central level and twenty from the local level.

The OfN scheme provided much-needed support to licensed recycling companies and basically kick-started the new so-called “formal” subsector. As Wang et al. argue (2013:36), the OfN proved that “when provided with sufficient collection subsidies, the formal sector can collect large quantities of e-waste within a short period and stay competitive with the informal sector”. However, it also proved extremely expensive¹⁶² and therefore unsustainable over the long term. After the end of the program in December 2011, the “formal” subsector was again confronted with low volumes of DEEE (Wang et al. 2013:36) and had no choice but to rely on unregistered collectors. In the 2010s, licensed companies typically sourced between 85 and 100 per cent of their input through this channel (Steuer et al. 2015).

Interestingly, the OfN served another purpose beyond that of solving the problem of supply shortages. Designed in the wake of the global financial crisis, it was also meant to alleviate the effects of recession on China’s economy by boosting domestic consumption. The rationale was that stimulating consumer demand within the country could compensate for the weakening of demand on export markets (Wang et al. 2013:34). It is hard to assess whether this attempt was successful, but according to official figures, the OfN reported sales of home appliances in excess of 180 billion RMB (1800 亿元)¹⁶³ (fig. 5.1).

¹⁶² Wang et al. (2013:36) calculated that, for TV sets, the government had to pay a staggering total amount of USD 41-68 per item.

¹⁶³ “The ‘Old for New’ Program Drives Sales of Home Appliance to More Than 180 billion RMB” [家电以旧换新拉动全国家电消费突破 1800 亿元], *Ministry of Commerce* [商务部], May 11, 2011. URL: <http://jdylhx.mofcom.gov.cn/website/webNews!view.shtml?id=164659417> (accessed January 26, 2018).



Figure 5.1: Sales figures for five types of large appliances under the Old for New program. Source: Guangzhou Daily.

The central government actually sought to bolster sales of electronics and household appliances in the country on several fronts. In the mid-2010s, it also supported sales of these products in rural areas through another program, called “House Appliances Go to the

Countryside” (*jiadian xiaxiang zhengce* 家电下乡政策), that entitled citizens to a 13 per cent rebate on the purchase of new devices¹⁶⁴ (fig. 5.2).



Figure 5.2: Promotional material for the House Appliances Go to the Countryside program. Source: Nipic.com.

Most environmental scientists working in Mainland China hailed the OfN as a success (see, e.g., Zhou and Xu 2012:4714). Those working outside the country, by contrast, expressed reservations, especially regarding the supposed beneficial effect of the program for the environment. Chung & Zhang (2011) argue that it discourages consumers from minimizing DEEE generation; that it disincentivized producers from engaging in green design; that it shortened products' lifespan; and that it was not suited for certain categories of products

¹⁶⁴ See *China House Appliances go to the Countryside Network* [中国家电下乡网]. URL: <http://rural.cheaa.com> (accessed January 26, 2018).

(e.g. computers). In addition, they stress that the OfN was not well received by Chinese consumers due to the complicated procedure and the inefficient collection system.

5.1.3 Shifting the burden onto producers

In parallel to launching the OfN, the central government adopted a key text in 2009 (effective in 2011) that became the basis for the current regulation system, namely the *Regulation on the Administration of the Recovery and Disposal of Waste Electric and Electronic Products*¹⁶⁵ (hereafter Regulation). This text features two important principles: (1) “concentration of treatment” (*jizhong chuli* 集中处理) (art. 5): DEEE dismantling and processing is to take place in a limited number of large facilities located in specific places, and not in a great number of small ones scattered over vast areas; and (2) “multi-channel collection” (*duo qudao huishou* 多渠道回收) (art. 34): licensed dismantling and processing companies are allowed to source DEEE from anywhere and anyone.

Foreign experts tend to use the expression “China WEEE Directive” to refer to the Regulation, as it is deemed to play the same role in China as the EU WEEE Directive¹⁶⁶ in the European Union. Both text are inspired by the idea of “extended producer responsibility” (EPR or *shengchanzhe zeren yanshen* 生产者责任延伸), itself an application of the “polluter pays” principle in the field of waste management. EPR requires from producers that they shoulder responsibility for the entire life-cycle of their products and especially for take-back, recycling and final disposal.

¹⁶⁵ “Regulations for the Administration of the Recovery and Disposal of Waste Electric and Electronic Products” [废弃电器电子产品回收处理管理条例], *The State Council* [国务院], 2009. URL: www.gov.cn/jzwgk/2009-03/04/content_1250419.htm (accessed January 26, 2018).

¹⁶⁶ “Directive (2002/96/EC) on Waste Electrical and Electronic Equipment” [EU WEEE Directive], *European Union*, 2003. URL: <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32002L0096&from=EN> (accessed January 26, 2018). The Directive 2002/96/EC was recast and became the Directive 2012/19/EU on July 4, 2012. It entered into force on August 13, 2012 and became effective on February 14, 2014. URL: <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32012L0019&from=EN> (accessed January 26, 2018).

The Regulation provides for the establishment of an EPR system by instituting a financing mechanism for the redistribution recyclers' costs: producers¹⁶⁷ pay a tax to a national fund managed by the central government and this money is then reallocated to recyclers in the form of subsidies. The tax is calculated on the basis of the number of items producers put on the Chinese market and fees per item vary between 7 and 13 RMB according to the type of device. The subsidies too vary according to device type. They originally ranged between 35 and 80 RMB per item, and later between 35 and 130 RMB per item¹⁶⁸. In order to receive subsidies, dismantling and processing companies must comply with certain standards and procedures, in other words have the necessary "qualifications" (*zige* 资格), and obtain a license. Provincial EPBs are in charge of monitoring them and do so mainly through video camera surveillance (fig. 5.3) and audits. On-site controls are rare, in large part because of EPB's serious lack of human resources (see Kostka & Mol 2013): in Guangdong, China's most populated province, only eight people were employed to conduct such controls¹⁶⁹. If a company does not meet requirements, the EPD can put pressure on it by threatening to recommend that the MEP revoke its license. According to Mao Yida, an engineer at Guangdong Province's Waste Management Center (广东省固体废物管理中心), EPDs usually make sure that DEEE dismantling and processing companies (1) invest enough money in their facilities, (2) use "state-of-the-art" (*xianjin* 先进) technology, and (3) demonstrate considerable "soft power" (*ruanshili* 软实力) — a term that could be interpreted in this context as meaning good marketing and educational skills.

¹⁶⁷ The term "producer" refers here not only to manufacturers but to all companies putting new EEE on the Chinese market.

¹⁶⁸ "Standard Regarding the Treatment Fund and Subsidy for Waste Electrical and Electronic Products" [废弃电器电子产品处理基金补贴标准], *Ministry of Finance et al.* [财政部等], November 26, 2015. URL: http://szs.mof.gov.cn/bgtZaiXianFuWu_1_1_11/mlqd/201511/t20151126_1584250.html (accessed January 26, 2018).

¹⁶⁹ In Taiwan, by contrast, two officials are present in every plant on a daily basis to conduct checks, as I learned from the owner of a DEEE recycling plant located in that country.



Figure 5.3: The “surveillance center” at a licensed DEEE recycling plant. All such plants are required by law to have video cameras at various places on their premises. Photo credit: the author.

The Regulation is often portrayed as the Chinese equivalent to the EU WEEE Directive. However, there are significant differences between the two legal texts, some of which make the Regulation look like a watered-down form of EPR. First of all, the Regulation only has a limited material scope. For several years, it only applied to five categories of products, referred to as *siji yinao* (四机一脑, “four types of machines and one type of computer”): television sets, washing machines, air conditioners, refrigerators and personal computers. The central government extended this catalogue to a total of thirteen categories in 2014 by including, among other items, mobile phones, printers, photocopiers, tablets, and gas heaters, but this extension became effective only in March 2016¹⁷⁰. By contrast, the EU WEEE Directive covered virtually all types of electricity-powered consumer products from the

¹⁷⁰ [No title (announcement on the extension of the catalogue)], *National Reform and Development Commission* [发改委], February 9, 2015. URL: http://www.sdpc.gov.cn/zcfb/zcfbgg/201502/t20150213_664456.html (accessed January 26, 2018).

outset. As of 2016, certain product categories had not yet been listed in the Regulation's catalogue, although there was a strong case for recycling them. Fluorescent light tubes, for instance, abound in China and contain mercury, which is toxic and extremely harmful to the environment and human health, but they have low economic value. Chinese recycling companies would only recycle them if they received support through subsidies.

The Regulation also imposes few obligations on producers. For instance, a minimal collection threshold, as can be found in the EU¹⁷¹, does not exist in China. Not only that, producers are not required, or even encouraged, to organize collection and treatment independently (Tong and Yan 2013:200-4). Chinese policymakers initially discussed the possibility to force them to take back their own devices and organize the latter's "end of life" themselves, but eventually settled for the sole payment of a tax for recycling. The downside, with this solution, is that producers have an exclusively passive role (paying taxes) and virtually no control on how their money is spent or how DEEE is collected and recycled. As a result, they have little interest in doing anything to reduce their products' ecological footprint. In theory, the whole idea behind EPR was to push producers to improve the design of their products and make them more easily recyclable. In practice, however, none of the national EPR systems worldwide has achieved this objective. In that sense, the failure of the Chinese EPR system is the rule rather than the exception.

The Regulation grants producer a preferential right to set up their own recycling company, but the opaqueness, rigidity and bureaucratic weight of the regulatory system makes this option unattractive. Therefore, in the mid-2010s, few of them had taken advantage of it. In 2014, I interviewed Bridget Wu, who lobbied for the multi-national company HP on environmental issues in China. Ms. Wu complained bluntly about what she perceived as the official EPR system's lack of transparency.

¹⁷¹ Four kg per inhabitant per year in the first version of the EU WEEE Directive and 45% of the weight of electrical and electronic products entering the market in the recast.

“The levy is generated out of nowhere. We don’t get any invoice, so we can’t deduce value-added tax¹⁷². [...]. For us, Chinese value-added tax is a pure output. [...] We lose millions of US dollars [in recycling tax]. We have no control whatsoever on the process. If we refuse to pay this levy, we cannot get our products into China¹⁷³. [...] We pay, but we have no idea how the money is used. We don’t even know if it’s used to recycle our products or only those of other brands¹⁷⁴.”

Ms. Wu insisted that HP’s own take-back system was much more transparent. “We control not only the material flows, but also the cash flow. We can manage the whole process”, she said. She also argued that prices should fluctuate according to market conditions and not be fixed, as they were in the official EPR system. And she suggested that producers should be allowed to play a much greater role in deciding how the system works (see also Tong & Yan 2013:208). But most damningly, she made allegations that the central government collected tax mostly from multinational companies and not so much from domestic ones. She had calculated that the contributions paid by Dell, Apple and HP in 2013 amounted to the total sum the central government claimed to have received through the recycling tax. In other words, Ms. Wu assumed that multinational companies were footing the bill for the Chinese recycling system. While I have no way of verifying Ms. Wu allegations, I find it noteworthy that she criticized China’s EPR system the way she did, namely for being exaggeratedly top-down, opaque and even discriminatory towards foreign corporations. If anything, we can learn from Ms. Wu’s account that the Chinese state did not bother justifying its action and that it could hardly be made accountable for it.

China’s EPR system was still in its early stages when I conducted fieldwork in the mid-2010s. It was producing promising results, but also worrying ones. The financing mechanism,

¹⁷² At that time, electronic products sold in China were subject to a 17 per cent value-added tax.

¹⁷³ A good part of HP’s product, like those of its competitors, are actually produced in mainland China, albeit in factories located in special economic zones (SEZ). Legally speaking, they therefore have to be declared and “imported” into the country before they can be sold on the Chinese market.

¹⁷⁴ Actually, Ms. Wu and I both knew that licensed companies in China were recycling very few devices belonging to the categories of products sold by HP (e.g. printers, laptop computers).

which had become effective in 2012, provided subsidies to more than a hundred licensed recycling plants in 2015 and the total amount of DEEE “treated” by these companies was on the increase (from 40 million items in 2013 to 75 million in 2015). But licensed plants only used half of their processing capacity on average in 2015¹⁷⁵. And the fund ran a very large deficit¹⁷⁶ likely to grow with time¹⁷⁷.

For several engineers I interviewed the system was still too young in the mid-2010s to be evaluated properly. Mao Yida, at the Waste Management Center, acknowledged that the “formal system” had many shortcomings, but argued that “it’s only been in place for two years [as of April 2014], whereas the informal sector has accumulated decades of experience”. One first had to let it grow and gain in strength, he argued. Similarly, Björn Bronnenberg, a European researcher studying China’s recycling industry, sounded optimistic when we talked in October 2014:

“Little by little, things are falling into place. The system is evolving slowly, but surely. Such a system can’t become effective overnight. It takes time. The [China WEEE] Directive is only two years old. We must give Chinese authorities time to implement it. Twenty years ago, in Europe, WEEE recyclers were not much different from those found nowadays in China. They were using the same methods. But the situation has changed dramatically: the [European] sector is now much more advanced and diversified.”

¹⁷⁵ They processed only 75,000,000 items despite a total processing capacity of 150,000,000 items. Source: “Inefficient: E-waste Collection Urgently [Needs to Be] Reorganized, Consolidated and Upgraded” [效率低下——国内电子垃圾回收亟待整合升级], *21st Century Economic Report* [21 世纪经济报道], March 10, 2017. URL: http://epaper.21jingji.com/html/2017-03/10/content_57715.htm (accessed January 26, 2018).

¹⁷⁶ According to CHEARI, the fund received 2.7 billion and reallocated 5.4 billion RMB in 2015, so the deficit for that year alone amounted to 2.7 billion RMB. Source: “2015 White Paper on WEEE Recycling in China” [中国废弃电器电子产品回收处理及综合利用行业白皮书 2015], *China Electrical Appliances Research Institute (CHEARI)* [中国家用电器研究院], 2016. URL: <http://www.cheari.org/recyclingtech/白皮书 2015.pdf> (accessed January 26, 2018).

¹⁷⁷ Ibid. “Inefficient: E-waste Collection Urgently [Needs to Be] Reorganized, Consolidated and Upgraded”.

Mr. Bronnenberg too acknowledged some of the problem faced by Chinese state authorities and licensed recyclers. But for him, it was clear that China DEEE recycling industry would one day resemble Europe's.

5.1.4 State-sanctioned vertical integration

By adopting the pilot programs and regulation described above (local projects, OfN and the Regulation), the central government mainly aimed to support large recycling companies so that they would gain market share and eventually supplant small, unregistered ones. Shortly before I completed fieldwork, the government released a new “pilot program” (*shidian gongzuo fang'an* 试点工作方案)¹⁷⁸, this time with vertical integration in mind. A total of fifteen close collaborations between producers and recyclers were to be tested over a period of three years.

If we look at the list of companies taking part in this first batch of projects¹⁷⁹, a clear profile emerges. Among producers, one finds several of the largest Chinese brands specialized in the production of consumer electronics and household appliances¹⁸⁰ and among recyclers, many of these brands' own recycling branches as well as many of the companies that own flagship DEEE recycling plants, i.e. plants that are portrayed as models by local governments, research institutes, and other industrial actors, and that enjoy great support from state institutions. Less officially prominent recycling companies are not represented, and neither

¹⁷⁸ “Pilot Program on Extended Producer Responsibility for Electrical and Electronic Products” [电器电子产品生产者责任延伸试点工作方案], *Ministry of Industry and Information et al.* [工业和信息化部等], June 29, 2015. URL: www.miit.gov.cn/n1146295/n1652858/n1652930/.../3758373.doc (accessed January 26, 2018).

¹⁷⁹ “List of the Companies Taking Part in the First Batch of Pilot Projects on Extended Producer Responsibility in the Field of Electrical and Electronic Products” [电器电子产品生产者责任延伸首批试点名单], *Ministry of Industry and Informatization et al.* [工业和信息化部]. URL: <http://www.miit.gov.cn/n1146290/n4388791/c4667571/content.html> (accessed January 26, 2018).

¹⁸⁰ Changhong 四川长虹电器股份有限公司, Gree 珠海格力电器股份有限公司, Haixin 海信集团 and TCL TCL 空调器(中山)有限公司/TCL 王牌电器(惠州)有限公司, to name but a few.

are foreign-owned multinationals. What this list suggests is that, while striving to better achieve the aims of an EPR system, the central government also seeks to strengthen and consolidate major Chinese-owned groups by pushing them to integrate further (fig. 5.4¹⁸¹).



Figure 5.4: During a visit in a licensed DEEE dismantling plant in Wuhan, Xi Jinping declared that “waste is only natural resources in the wrong place”. Source: Xinhua Shidian [新华视点].

5.1.5 Big is beautiful

It should be clear by now that the regulatory system put in place by the central government is informed by the idea that DEEE recycling can only be improved if operations are upscaled and technology upgraded. This system was designed to promote large, capital-intensive and science-driven recycling plants possessing “state-of-the-art” technology (fig. 5.5). The companies owning such plants managed to enter the system and navigate it, but self-

¹⁸¹ Source: <http://politics.people.com.cn/n/2013/0722/c1024-22279250.html> (accessed January 26, 2018)

employed individuals, independent entrepreneurs and family businesses did not. Indeed, it was impossible for the latter to participate in the “formal system”, for it required investments that were beyond their means and skills (e.g. accounting) that they had never acquired. In the mid-2010s, this system still relied on such actors for the collection, accumulation and delivery of DEEE, but it did not acknowledge their key role and contribution explicitly. By leaving them out, it also deprived them of legitimacy, security and support.



Figure 5.5: One of the many buildings that make up a DEEE dismantling plant located in a Chinese mega-city. Photo credit: the author.

The exclusion of small business was most pronounced in the field of dismantling and processing. As a representative of the MEP’s Pollution Prevention Department (环保部污染防治司) explained to me: “We are cracking down on small workshops and using economic methods to promote their competitors. The more big recycling plants there are, the harder it will be for small workshops to survive.” She acknowledged that “crackdowns [we]re not particularly effective”, since workshops often reopened or relocated soon after having been closed down (see chap. 4), but added: “we believe that economic methods can achieve good results.” In other words, by distorting competition, the central government sought to get rid of them. Some independent recyclers I talked to claimed that, with some help or incentive

from state authorities, they would be willing to upgrade their facilities, better protect their workers, reduce their environmental impact, or transition into other sectors. But I am not aware of any program available to them, much less tailor-made for them. State authorities either ignored them, used them for their own benefit, or repressed them.

It should be noted that excluding small businesses runs counter to recommendations found in the literature on waste management in developing and emerging countries (see, e.g., Wilson et al. 2006, Benson et al. 2014). Several authors contend that the “informal” sector of recycling should be “integrated” into China’s “formal” DEEE recycling system (Chi et al. 2011, Wang et al. 2012, ILO China 2013; Yang et al. 2008:1596, Li et al. 2012). Its characteristics, size and role should be taken into consideration at the level of policy design, these authors argue, and failure to do so, they warn, can result in delayed and incomplete implementation. From a social welfare perspective, it is worth noting that a great number of people in China make a living by engaging with DEEE in more or less unregulated ways. The question of what professional activity these people could, would or should turn to if deprived of their current source of income is crucial — and yet barely touched upon¹⁸².

Why were self-employed individuals and small businesses never included in what would be a truly comprehensive regulatory system for DEEE recycling in China despite recommendations going in that direction? We can answer this question by looking at the representations of these actors held by the experts (e.g. scientific researchers, government officials and environmental activists) involved in framing the “e-waste” problem and designing solutions (see chap. 2). These people contributed, to varying degrees, in creating the “formal e-waste management system”, so their opinions and ideas matter. Experts tended, for instance, to consider self-employed individuals and small businesses as difficult to govern. During a conference on DEEE recycling in Shanghai, I met with two Chinese postdoctoral researchers in environmental sciences. They had heard me speak in favor of including “informal” collectors into the “formal” system during a panel and they agreed.

¹⁸² The report published by ILO China in 2013 (ILO 2013) is a notable exception.

They too saw “informal” collectors as effective, useful, and not endangering the environment, so there was a real case for acknowledging the important contribution made by these people at the official level and taking advantage of their skills. I therefore asked what, according to them, stood in the way of this being realized. Straight away, the two Chinese researchers came up with the answer that these people were “hard to manage” (*buhao guanli* 不好管理).

For me, this statement — which I heard many times — points to an incompatibility between small businesses and the Chinese state. The two are organized in fundamentally different ways and therefore constitute a challenge for each other. As an advanced bureaucracy, in the Weberian sense (Weber 2015 [1922]), the Chinese state tends to be characterized by hierarchical organization, written rules, formally trained and neutral officials, and so on, that is, things that cannot be found in the world of Chinese individual entrepreneurs and small businesses. The fact that the latter are referred to as “guerilla groups” (*youji dui* 游击队) reveals how small recycling businesses’ mobility and adaptability, among other characteristics, challenge experts and the formal system they promote. Such characteristics resist modern states’ reorganization of the societies they govern in ways that make them more legible to the apparatus of governance (Scott 1998). Mobility, in particular, makes it impossible to locate social actors on a spatial grid and therefore stands in the way of modern spatial planning. It is not only that experts and officials have trouble dealing with such characteristics, they also tend to declare themselves unable to do so from the outset. Robert Merton (1968 [1949]) named this attitude “trained incapacity” and viewed it as a dysfunctional aspect of bureaucracies. Since they believed in the bureaucratic ideal and held high modernist beliefs, Chinese experts and officials assumed that small business entities had to adapt to the state and not the other way around. They did not reflect on, and speak of, an incompatibility between two types of actors, but rather framed the problem as due to the incompetence of small businesses and self-employed individuals.

Experts also conflated small businesses’ unregistered status, unregulated activity, and ungovernable mode of operation with their occasional infringing of the law. In their discourse, “informal” became synonymous with “illegal” (*weifa* 违法 or *feifa* 非法). This is not proper to the field of “e-waste” — or even to that of waste, for that matter — but it played

out there as well, frequently and in obvious ways. With regard to plastic recycling in Wen'an, Goldstein (2017) observes for instance that

“The production of the informal as illegal is not merely a discursive act, for when the Chinese government treats informal sectors as illegal it profoundly shapes conditions and behaviors in those sectors. The informal/formal division is neither a natural outcome of market forces nor a foreordained byproduct of a transitional economy. Even less so is it an accurate representation dividing law-abiding actors from law-breaking ones [...]. Rather, the formal/informal division is a persistently reinforced and malleable policy tool, regularly reinvented and renewed to shore up privileged political, administrative, and business networks against a wide range of outsiders (who are often, not coincidentally, business competitors) by labeling them not just as vaguely inferior (uncivilized, un-modern), but as polluting criminals. So branded, informal enterprises can be shut down at any moment, their assets confiscated and destroyed without compensation, [...]”
(Goldstein 2017:27)

In the mid-2010s, a lot of people I talked to, and in particular experts, believed that “informal” actors were doomed. I personally doubted that small businesses would soon vanish from the DEEE recycling sector (see Schulz & Steuer 2017). For one thing, China’s economic growth relied on the private sector’s liveliness, to which small enterprises, including in the scrap recycling sector, contributed greatly by being innovative, flexible and efficient. Officials knew this and were careful to not throw a wrench in the works. More specifically, I believed that “informal” businesses still had good chances of survival in China’s DEEE recycling sector in the mid-2010s, because they were not (yet) really menaced by their competitors.

5.1.6 “Feeding on subsidies”

At the time of my research, all licensed DEEE dismantling and processing companies relied on state support. Partly or wholly state-owned ones, which accounted for almost of third of all companies¹⁸³, obviously had easy access to state funds. But some of the privately-owned

¹⁸³ According to CHEARI, the figures for 2013 are: 63% privately owned and/or privately run (*minying/siying* 民营 / 私营) companies, 22% state-owned (*guoyou* 国有) companies, 9% joint-ventures (*hezi* 合资) and 6%

companies, which were a majority, did as well. Many plants, regardless of ownerships, had been created with official blessings, so to say. But more importantly, all licensed companies ran chiefly on the subsidies paid to them by the state-managed recycling fund (Steuer et al. 2015) — a situation referred to in Chinese as “feeding on subsidies” (*chi butie* 吃补贴). Subsidies were part and parcel of their business model: without them, licensed companies would have gone bankrupt very quickly. In May 2015, I took part in an organized visit of Rainbow Environmental Protection Co. Ltd., a state-owned company that operated one of China’s flagship DEEE recycling plants in one of the country’s megacities. The plant consisted in several huge and relatively newly built facilities equipped with what looked like advanced technology. The official guide worked hard to convince visitors that every aspect of the plant was “consistent with international standards” (*fuhe guoji biao zhun* 符合国际标准). Yet I was struck by the emptiness and cleanliness of the place (fig. 5.6). In total, I counted only a handful of workers and a few dozen items of DEEE. Visibly, this plant was running well below its capacity — to the point where I became suspicious: had it resumed operations only because, and for the duration, of our visit?

foreign-owned (*waizi* 外资) companies. Source: “2013 White Paper on WEEE Recycling in China” [中国废弃电器电子产品回收处理及综合利用行业白皮书 2014], *China Electrical Appliances Research Institute (CHEARI)* [国家家用电器研究院], 2014.



Figure 5.6: Empty lines were a common sight in licensed DEEE recycling plant in the mid-2010s. Photo credit: the author.

After discussion with other visitors, all of them knowledgeable professionals, I realized that the most likely explanation had to do with the recycling fund's massive underfunding — itself a result of a tax miscalculation by the central government, according to Mr. Salcido, a global EPR expert. In the absence of sufficient revenue from the recycling tax, the fund had suspended payments to recyclers. This forced companies like Rainbow Environmental, which relied on subsidies as their main source of income, to stop purchasing DEEE and to freeze their dismantling lines. On the other hand, the availability of the subsidy incentivized licensed companies to attract the largest possible volumes of DEEE. It strengthened demand and acted as a pull factor, thereby maximizing DEEE generation, at least in theory.

There is an interesting parallel between licensed companies' reliance on the subsidy and workshops reluctance to pay tax (see chap. 4). One looks like the inverted image of the other and both seem crucial to the operating modes of those various entities. When deprived of subsidies, licensed companies are hardly able to function, let alone make a profit. Similarly, when workshops and family businesses are subject to paying taxes, they struggle to make ends meet.

Licensed companies' reliance on subsidies affected not only the number, but also the type, of products they purchased and processed. Up until the mid-2010s, at least, their "product mix" remained highly unbalanced. In 2013, for instance, ninety-four per cent in weight of the almost 40 million devices they collected were CRT television sets¹⁸⁴ (fig. 5.7). Up until 2016, licensed plants did not buy any "small WEEE", simply because this type of products did not belong to the catalogue of products and therefore subsidies were not available for them.



Figure 5.7: In the mid-2010s, CRT television sets accounted for the vast majority of DEEE sourced by licensed recycling companies. Photo credit: the author.

According to experts, licensed plants' unbalanced product mix was due to "informal" actors' ability to offer higher prices and appropriate valuable devices upstream: these actors were deemed to be more competitive because they disregarded environmental protection rules, which allowed them to cut costs. This was very much a routine explanation, at least one that

¹⁸⁴ For which they received 3.3 billion RMB (approx. 531 million USD) in subsidies. Source: *ibid.* "2013 White Paper on WEEE Recycling in China".

I heard over and over again, and, as I will show later, one that partly misses the point (see chap. 6). But we need not even look outside of the formal system for an explanation. The pricing decisions embodied in the subsidy incentivized licensed companies to concentrate on certain types of products and ignore others. Television sets, for instance, were worth 85 RMB per item in 2013, that is, more than twice as much as air conditioners or washing machines (35 RMB per item). In addition, they were less bulky, so more items could fit in a lorry. Managers of licensed plants therefore preferred buying this type of products to others — and so did their suppliers, for obvious reasons. In other words, the unbalanced product mix was partly due to the “formal” system itself and the people who created or took part in this system, were partly responsible for it. The central government sought to remedy this and to pressurize licensed plants to diversify their input by adapting subsidy prices and lowering the price of television sets in 2015.

Licensed plants relied mostly on subsidies, but not exclusively. A considerable part of their income also came through the sale of materials — or “fractions”, as recyclers call them. Officials in Beijing had planned it to be that way; they wanted licensed companies to have at least some exposition to market mechanisms. That proved to be a real challenge for licensed companies because, unlike subsidy prices, market prices fluctuated, and officials had not foreseen their downward trend in the 2010s. As Mr. Zhang, head of operations at Champion Environmental Science and Technology Co. Ltd., a DEEE dismantling company located in the Pearl River Delta, explained to me, his company received 85 RMB per item (in early 2015) for television sets through subsidies and earned around 40 RMB (for large models) through the sale of the materials these television sets are composed of. On the other hand, Champion Environmental had to pay 106 RMB to buy such devices on the market. The company was therefore making only 19 RMB per item. “That doesn’t even cover our costs”, commented Mr. Zhang. “We’re losing money with these devices.” He added that the decline in materials prices put their profitability at risk. “The price of iron is down to 1 RMB a kilo, from 2 RMB last year, so we currently don’t make any profit on all the iron we sell.”

In January 2016, I observed a phenomenon that well illustrates licensed recyclers’ two-pronged approach to conducting business. After having visited numerous licensed plants, but only in the context of organized tours — and having been denied access to an even greater number of plants — I decided to organize my own visits. I chose a plant located in

the Pearl River Delta and roamed around its facilities, trying to catch a glimpse of everyday, unstaged operations. The risk was well worth taking, for I saw something amazing: tens of thousands of washing machines piled up outside, in the open (fig. 5.8). Obviously, the plant had been stockpiling this type of device for weeks, if not months. It occurred to me that at that time: (1) iron and steel prices had reached their lowest levels in years¹⁸⁵ and (2) subsidy amounts had just been revised. The most plausible explanation, in my view, is therefore that plant managers were waiting for metal prices to rebound and, at the same time, hoping that the subsidy for washing machines would rise from its low level at 35 RMB. Only the cumulated effect of both factors made stockpiling an attractive option for them.

¹⁸⁵ See “Ferrous Scrap Metal Prices 2016”, *Let’s Recycle*, [no date]. URL: <http://www.letsrecycle.com/prices/metals/ferrous-metal-prices/ferrous-scrap-metal-prices-2016/> (accessed January 26, 2018).



Figure 5.8: Many licensed DEEE recycling plants kept impressive stocks. Photo credit: the author.

5.1.7 The "shredder ideology"

China's current regulatory system — much like those of other countries — is based exclusively on a conception of DEEE as a form of waste and a source of secondary raw materials. It treats objects as mere bundles of raw materials and promotes a single technique for “treating” them, namely destruction and extraction. The system as a whole remains oblivious to DEEE's potential for reuse. This is evidenced, for instance, by the conspicuous absence of regulations addressing reuse or refurbishment (Steuer 2016) (see chap. 6).

Certain instruments show that China's “formal” system does more than just ignore reuse. This is obvious if we look at subsidies, for instance. The Ministry of Finance (MoF), which is in charge of the DEEE recycling fund, calculates the money it owes to licensed recycling

companies on the basis of the number of items of DEEE that are dismantled, crushed and sorted by these companies. According to the Regulations, it can only allocate funds for devices that have been fully and irremediably destroyed. In theory, nothing prevents licensed companies from salvaging and reselling devices or components. But in practice, they would forgo the subsidy, something which no company is willing or able to do. As far as I know, none of the companies that have a license for “treating” DEEE engages in refurbishing or repair¹⁸⁶. On the contrary, all of them destroy every item that enters their premises, even those that are still in good condition and could be reused. As Rainbow Environmental’s official guide declared: “We don’t do second-hand. We process [*chuli*] all products, regardless of their condition: good or bad.” Inside the plant, I noticed a slogan that read: “the function does not exist any longer, but the value does” (*gongneng buzai, jiazhi youcun* 功能不再, 价值犹存). Since the subsidy did not value DEEE function, but only its material content, plant managers considered function worthless and therefore irrelevant. They did not check whether it could be maintained or restored; they assumed it had been lost already and for good.

A senior American researcher in environmental sciences I talked to during an organized plant tour in Beijing in 2013 dubbed this “the shredder ideology”. What he meant was that the whole system is premised on the idea that the realization of DEEE’s value necessarily involves its destruction, ignoring other methods, even “much more eco-efficient” ones. The “shredder ideology” is apparent in a dichotomic approach to DEEE as refuse/resources (fig. 5.9) and in the use of concepts such as “urban mining” (*chengshi kuangchan* 城市矿山) and “resource renewal” (*zaisheng ziyuan* 再生资源), and part and parcel of the disciplines called waste management and industrial ecology. It informs regulatory systems in all countries with high standards of living and mass consumption — or in those, like China, that aspire to have those features. In that sense, the “shredder ideology” was not proper to China, but crucial to its planned evolution.

¹⁸⁶ Some companies claim to do it, but fail to substantiate that claim.



Figure 5.9: A poster in a recycling plant that explains the process of recovering materials from DEEE. Photo credit: the author.

Widespread as it may be, this ideology is far from obvious. Its limitations become manifest as soon as we look closely at what DEEE actually is and at what happens to it on the ground — in this case, in China — and ask ourselves why. Mao Yida from the Waste Management Center acknowledged that, unlike “formal” recycling companies, which “transformed DEEE back into materials” (*huidui dao cailiao* 回归到材料), informal workshops salvaged, repaired, refurbished and reused devices and components on a large scale. He mentioned explicitly compressors (*yasuoji* 压缩机) and computer processors (*xinpian* 芯片).

Many of DEEE’s characteristics distinguish it from other types of objects and substances commonly qualified as waste or raw materials (Schulz & Steuer 2017:322-3). First, they are technologically complex products whose design and manufacture require considerable know-how, advanced equipment and intricate industrial networks. This affects their value throughout their lifecycle. Average prices of new devices may be dropping, but refrigerators, television sets and mobile phones still count among the most valuable objects found in households, at least in China.

Second, DEEE remains in use for a relatively long period of time compared to disposable crockery, leftover food or effluent — though it does become obsolete at an accelerating

pace. In this regard, it rather resembles garments, vehicles or furniture, i.e. consumer goods that, when discarded by their first owners, are arguably more often referred to as “second-hand” than “waste”.

Third, owners of EEE often dispose of it before it breaks and/or becomes unusable. Opportunities thus arise for direct resale and reuse, activities that take place on a large scale in China. Markets selling second-hand EEE abound and are powered by fast-paced economic growth, uneven wealth distribution and impressive demographics (see chap. 6). Many people make a living by collecting DEEE in rich urban centers and selling it to peripheral and poorer areas (Minter 2013:27, Schulz 2015).

Fourth, most types of DEEE, when defunct, can still be repaired, refurbished or repurposed, or even exploited as a stock of spare parts and components. In China, the presence of specialized repair shops in most neighborhoods as well as that of specialized refurbishment centers (Schulz 2016 & 2017) indicates that a vibrant sector continues to transform devices and components so as to extend their lifetime (see chap. 7).

Fifth, DEEE can be more or less hazardous, depending on the situation. The current state of science seems to indicate that DEEE has a strong harmful impact when it is cracked open, burnt, shredded, acid leached or dumped, but a weaker one as long as it remains intact, in use or stocked properly or even landfilled properly — science, however, evolves constantly and that it is notoriously difficult to assess waste’s harmfulness (Wynne 1987). At the very least, it seems reasonable to see a difference between DEEE and other types of waste labelled “hazardous”. Medical, chemical or nuclear waste, in particular, practically always represent an immediate danger. Direct contact with those wastes should be avoided at all times, regardless of the situation, for it is highly likely to cause severe harm to human health or the environment. The same cannot be said about DEEE. This is not to say that DEEE is harmless, of course, but simply that it is not as obvious a type of hazardous waste as others.

Sixth, approaching DEEE as a form of waste arguably makes less sense in China than in countries such as the USA or Switzerland, where large quantities of DEEE — even functioning or relatively new products — ends up in rubbish bins and later in landfills or incinerators. Like their international counterparts, Chinese experts assume that products that do not turn up at licensed dismantling plants have been landfilled and therefore talk of a massive “wasting” (*langfei* 浪费) of useful and valuable resources, but they have less good

reasons to be preoccupied, because the situation in China is somewhat different than in the countries it takes as models. In China, DEEE is, to a large extent, either reused or recycled, and only enters the final disposal stage as very old devices and appliances or worthless materials. There is a vibrant market for DEEE and Chinese people are aware of this. So, for instance, owners in China are used to selling their EEE, regardless of age or condition, and, in general, do not accept giving it away for free. By contrast, owners in rich, industrialized and consumerist countries often have no choice but to let go of their devices without any compensation — those who do not have to pay an extra fee can even count themselves lucky¹⁸⁷.

Finally, it must be stressed that promoting destruction contravenes the “waste hierarchy” (also known as the “3Rs” doctrine), a central principle in the field of waste management, according to which reduction, when feasible, should always be preferred to reuse, and, likewise, reuse to recycling¹⁸⁸. China’s “formal” system turns the waste hierarchy on its head by promoting consumption and recycling instead of reduction and reuse. It subscribes to the principle of modernization by scrapping: more waste need to be created and treated, not less. Claims that this system offers better solutions for protecting the environment should therefore be taken with a grain of salt.

5.1.8 Only apparently greener

As we have seen above (chap. 2), the so-called “formal” and “informal” sectors of DEEE recycling in China are often juxtaposed when it comes to judging environmental performance. Licensed dismantling plants are routinely portrayed as a greener alternative to unregistered, small recycling business, which gives them a competitive edge. The comparison is generally based on the observation that licensed plants possess pollution

¹⁸⁷ In most countries, municipal authorities take care of DEEE collection and removal, and charge for this service through tax. So owners of EEE actually pay a fee anyway, but few of them are aware of that.

¹⁸⁸ The term recycling is used here as a synonym for materials recovery and not in a general sense, as I use it.

control technology and are required by law to use it, which is not the case for workshops. Hence, the argument goes, big plants are cleaner and more efficient than small workshops.

Upon scrutiny, however, it appears that this comparison is flawed. First, it lays emphasis on dismantling and processing activities and ignores other forms of engagement with DEEE. Reuse, in particular, is not factored in, even though there is a consensus among environmental experts that reusing DEEE is preferable to crushing it and extracting materials out of it, because it prevents EEE from turning into waste in the first place (StEP 2009). If reuse were to be taken into account, the existence and role of a multitude of economic actors who engage in salvaging devices or components in China (see chap. 6 and 7) would come to light and licensed DEEE recycling companies' failure to do so would be exposed, thereby putting into question their alleged superior environmental performance. The fact that reuse is always left out of the equation, even though it takes place on a wide scale in China, betrays an exclusively backend or "end-of-pipe" (in engineering parlance) perspective, which considers waste as a given: it has already been generated and must now be dealt with. But this is far from obvious, as we have just seen.

Second, the comparison focuses exclusively on pollution arising directly from DEEE dismantling and processing, and ignores other forms or sources of pollution. Transport of goods, in particular, turns out to be a source of hidden pollution. Among DEEE collectors who do not sell goods to licensed plants, pre-disassembly and even pre-processing before shipment is standard practice (fig. 5.10). Collectors who work with licensed plants, by contrast, cannot practice pre-disassembly, because plants only buy untouched devices, the only ones for which they can receive subsidies. Untouched items take up a lot more room, so lorries can only carry a limited number of them (fig. 5.11). By the time untouched DEEE arrives at licensed plants' premises, it has a much larger carbon footprint than pre-disassembled DEEE. The difference is amplified by the fact that licensed companies often buy from aggregators located several hundreds of kilometers away. In other words, the comparison is never based on a holistic assessment such as an extended and comprehensive material flow analysis. That would reveal licensed plants' true nature as largely inefficient and resource- and energy-intensive operations — which comes at a cost for the environment as well.



Figure 5.10: In this workshop located in the outskirts of Beijing, washing machines are dismantled and metal parts are compressed. That way, they take up less space and trucks can carry more scrap to processors. Photo credit: the author.



Figure 5.11: A truck delivers washing machines and air conditioners to a licensed DEEE recycling plant in Beijing. Appliances sold to licensed plants cannot be compressed because of subsidy requirements. Photo credit: the author.

Third, I have noted on some occasions that licensed companies did not thoroughly dismantle DEEE (fig. 5.12). In a rural recycling hub located in Guangdong Province, for instance, a company called Great Prospects Environmental Protection Co. Ltd. disassembled devices and removed certain components, such as hard disks and PCBs, but did not dismantle these components further or sort the pieces. Rather, the company sold them to small workshops located next-door (within the same industrial park) that took care of the remaining steps. Great Prospects received subsidies for recycling DEEE, but did not produce marketable fractions for certain categories of components. Its plants reputedly had superior pollution control capacity, but by outsourcing part of the process, the company also externalized part of the pollution risk and therefore washed its hands of the necessity to control it.



Figure 5.12: Plastic casings from television sets are being loaded on a truck in a licensed DEEE recycling plant. They will be shredded, melted and pelletized elsewhere. Photo credit: the author.

Fourthly, and perhaps most crucially, most companies that had a license for “treating” (*chuli* 处理) DEEE actually engaged exclusively in dismantling (*chaijie* 拆解) it and abstained from processing (*jiagong* 加工) the fractions thus obtained. In a talk given to international PhD students in November 2014, a representative of the MEP’s Solid Waste Management Centre (环境保护部固体废物管理中心) acknowledged that the “formal” sector was still characterized

by a “low level of resource utilization” and that few licensed companies did “deep processing” (*shen jiagong* 深加工) — by which he meant processing fractions, extracting materials, and refining them, so as to produce secondary raw materials fit for direct use in sectors such as manufacturing. In the mid-2010s, most licensed companies only prepared (i.e. pre-processed) fractions and then sold them to other companies. This deserves to be underlined because licensed DEEE “treatment” plants were routinely compared to unregistered workshop that, unlike them, did engage in processing, and because dismantling activities are less likely to cause serious pollution than processing ones. Thus, these plants were keeping away from the most risky and problematic part of the recycling process. Tong et al. (2015:37) suggest that companies located downstream, which specialized in such potentially highly polluting processes, were “subject to even more restrictive inspection and registering regimes because of the high environmental risk”. That may well be the case, but it doesn’t mean that these companies necessarily handled a large proportion of the problematic fractions.

Indeed, and this is the final point, I found it very hard to get a precise idea of the fate of fractions obtained from DEEE dismantling in licensed plant in China. Without doubt, valuable materials such as copper or certain types of plastics (e.g. ABS) were brought to a higher degree of purity, melted and transformed back into raw materials. But what about those that have little or no commercial value and are toxic? Throughout fieldwork I paid particular attention to two of them, namely leaded glass from CRT television sets and refrigerant gases from refrigerators and air conditioners. The amateur “life cycle analyses” that follow reveal that, with regards to such fractions, licensed DEEE dismantling companies in China faced the same hurdles as all other DEEE recycling businesses (see Lepawsky & Mather 2014) and that, like everyone else, they tried to get rid of these fractions as cheaply and quickly as possible. Only, in China, it is far from clear what happened next.

DEEE recyclers worldwide struggle with glass from CRT television sets (fig. 5.13) because it is heavy, worth little money and contains lead, a substance harmful to human health. It is rarely safe to dispose of leaded glass, but not profitable to recycle it either. As long as there were CRT manufacturers around, leaded glass could be sold to them, but CRT production has stopped for good due to the advent of flat panel technology. In the mid-2010s, few of the possible applications for leaded glass made business sense. The question of how companies

dealt with this material is therefore highly relevant and critical. In the USA, leaded glass had become a headache for recyclers and regulators alike¹⁸⁹, and the source of endless debates. Surprisingly, China showed no signs of being affected by such a conundrum. I enquired about the fate of this material a great number of times and most Chinese experts did not seem particularly concerned. Some of them claimed that CRT leaded glass was used in the production of other CRTs¹⁹⁰; other that it went into the production of other types of objects requiring leaded glass, such as crystal ware (fig. 5.14) or energy-saving (fluorescent) lamps; others yet that it served in the making of road cover¹⁹¹ or was deleaded and used as normal glass. When I asked them to whom licensed dismantling companies sold their CRT leaded glass, all experts mentioned one single name, “Renxin” (Tianjin Loyalty Glass Material Co., Ltd. or 天津仁新玻璃材料有限公司), but many of them acknowledged that Renxin did not have the capacity to “treat” all the CRT glass produced by DEEE dismantling companies in China.

¹⁸⁹ See “An Analysis of the Demand for CRT Glass Processing in the U.S.”, *Recycling Today*, August 2013. URL: <https://www.recyclingtoday.com/FileUploads/file/An%20Analysis%20of%20the%20Demand%20for%20CRT%20Glass%20Processing%20in%20the%20U%20S.pdf> (accessed January 26, 2018).

¹⁹⁰ This may well have been the case up until the early 2010s — though even then experts did not agree, see Song et al. 2012 and Xu et al. 2012 — but it quite unlikely that this type of channel still existed in the mid-2010s (see Yu et al. 2016:892-3), as the closure of large, internationally renowned CRT manufacturing plants in India and Mexico in those years suggests.

¹⁹¹ In Europe, some companies specialize in integrating CRT leaded glass into asphalt. Others mix it with concrete to fabricate blocks that can be used in construction. Such methods are far from ideal solutions, as indicated by the fact that certain countries (e.g. Switzerland) prohibit them. They mitigate the risk of contamination by imprisoning leaded glass, but simultaneously worsen it by distributing it in space and embedding it in infrastructure that is subject to wear.



Figure 5.13: Broken CRT glass in an industrial “big bag”. As a rule, licensed DEEE recycling plants do not process this fraction on site. Photo credit: the author.



Figure 5.14: Decorative crystal objects said to be made using CRT glass and put on display in the museum of a licensed recycling plant. Photo credit: the author.

Tang Yongyi, a junior researcher based at one of China’s most prestigious universities, confirmed that, as of 2014, no other company than Renxin “smelted” (*yanlian* 烟炼) CRT

leaded glass in China (see also Song et al. 2012). He was a reliable source of information because he had conducted extensive research on CRT leaded glass' "life cycle" in China for his PhD under the supervision of a well-known and influential professor in environmental science. According to him, however, applications were too theoretical, too insignificant or too few to absorb the huge quantities of leaded glass arising from the mass disposal of old-style, obsolete CRT television sets in China. As a result, most of the funnel glass¹⁹² produced by China's DEEE dismantling plants ended up in landfills, not at Renxin's. This violated the law, which considered leaded glass as "hazardous waste" (*weifei* 危废 for *weixian feiwu* 危险废物) and prescribed special treatment procedures. Tang Yongyi stressed that lead in landfills threatened the environment because it could potentially leach into the soil and water. If we consider that a single CRT contains between 0.6 and 2.5 kg of lead, that licensed plants dismantled almost 40 million CRTs in 2013 and that most of the glass ended up in landfills, we can assume that millions of tons of lead were wasted in China in the mid-2010s by actors belonging to the "formal" system, with a significant risk for the environment.

CRTs contained other substances besides lead that were problematic as well. Dorothea Jones, another junior researcher at the same prestigious university, stressed that CRT panel glass, though not "hazardous waste" according to the law, was covered with toxic substances known as "phosphors" (i.e. zinc, cadmium and yttrium sulfides; copper or silver chloride; and sometimes even arsenic). For a long time, licensed plants in China were allowed to, and did, landfill these "phosphors" together with CRT panel and funnel glass. Starting in 2013, Chinese law required that they collect and store them for separate treatment. To what extent they were really doing it in the mid-2010s and how effectively remains an open question.

¹⁹² CRTs are composed of approximately two thirds "panel glass", which has an almost negligible lead content, and one third "funnel glass", which has a high lead content (more than 20%). Panel glass and funnel glass are joined by a small amount of "solder glass", which is mostly lead (75-90%).

Certain categories of home appliances contain gases that can have a detrimental effect on the environment. Refrigerators and air conditioners, in particular have cooling systems that function thanks to refrigerant gases¹⁹³ (*zhilengji* 制冷剂); refrigerators are also made of a large amount of insulating foam, which is produced using such gases as blowing agents. In order to dismantle gas-containing DEEE in a safe and environmentally friendly way, one must capture gases, otherwise they leak out, evaporate and harm the atmosphere¹⁹⁴. This requires using advanced, expensive and energy-intensive industrial equipment (fig. 5.15). Given the high costs associated with the process and the low economic value of the product, companies have little economic interest in capturing gases.



Figure 5.15: State-of-the-art refrigerator recycling equipment in a Swiss plant. NB: only a small part of the total set-up can be seen on this picture. Photo credit: the author.

¹⁹³ Hydrochlorofluorocarbons (HCFCs, e.g. R-22, aka “Freon”) and chlorofluorocarbons (CFCs) are strong ozone-depleting substances whose production has been phased out but that can still be found in old appliances. Hydrofluorocarbons (HFCs) have replaced HCFCs and CFCs but are still strong greenhouse gases. New gases, whose precise effects on the environment are not yet known, are now replacing HFCs.

¹⁹⁴ See “Fridge Recycling”, *Waste Management World*, September 1, 2007. URL: <https://waste-management-world.com/a/fridge-recycling> (accessed January 26, 2018).

During a specialized conference on DEEE recycling organized in Shanghai in May 2015, I met a German engineer, Bea Leitz, who worked for the Chinese branch of Pohl & Kuhn GmbH, a German equipment-maker. Ms. Leitz was in charge of selling German-made DEEE dismantling machines to Chinese plants. Her main tasks consisted in contacting plant managers, visiting their facilities and convincing them to upgrade their technology. She therefore travelled a lot and had seen dozens of licensed DEEE dismantling plants after only one year on the job. At lunch, Ms. Leitz told me and a few other conference participants that Chinese plant managers generally expressed little interest for Pohl & Kuhn's high-quality, high-tech and relatively expensive machines.

"That's because they need machines, but they don't really need to use them. A lot of machines really look like they're not being used. Take CFCs[-capturing] equipment, for instance, it's there, you can't miss it. But most of the time, it doesn't run. We don't mind, because our job is just to sell machines. What customers do or don't do with them is their problem. But, of course, it makes a huge difference in terms of environmental impact."

Ms. Leitz believed that licensed dismantlers in China did not collect refrigerant gases from cooling systems, even though they possessed the necessary equipment, but instead let them evaporate. Not only that, but she also believed that they shredded insulating foam together with the whole appliance (though after removing the compressor), thereby causing the release into the air of an even greater quantity of harmful gases.

"There's a real lack of awareness with regards to foam. My boss was shocked when I told him that most CFCs in China just vanish into the atmosphere, even though we have all the technology necessary to recover them — and he's been working in China for fifteen years, so he's heard other stories!"

Ms. Leitz explained that Chinese licensed companies took few risks by discharging refrigerant gases in order to cut costs, because: "CFCs evaporate in the air and don't leave any visible trace. The pollution they cause is hard to prove¹⁹⁵."

¹⁹⁵ CFCs are colourless, odourless, nonflammable, noncorrosive and nontoxic. They have a detrimental effect on the ozone layer, but humans can breathe them (in small quantities) and not be affected.

At another conference that took place a year earlier in Beijing, I heard Zhang Ping, an expert working for a research institute specializing in EEE and DEEE, present his research on gas leakage from refrigerators in China. He noted that leakage occurred at every stage in these appliances' "life cycle" (manufacturing, usage, repair, collection, dismantling, etc.), but mostly (90%) at the stage of recycling or "recovery" (*huishou* 回收). His colleague Jiang Chen added that: "For the moment, very few companies in China have facilities to recycle refrigerators and air conditioner in a really environmentally friendly way, but this is something we want to develop." In theory, licensed DEEE dismantling companies had to pay to get rid of refrigerant gases and companies authorized to "treat" hazardous waste incinerated those gases together with solid waste. In the mid-2010s, no company in China offered recycling services. The one most likely to do it, Clear Bay Chemical Co. Ltd., described itself as "China's only group specialized in refrigerant gases recycling", but its activities at the time consisted in extracting "fresh residual gases" (*xinxian de yuqi* 新鲜的余气) from bottles and tanks (fig. 5.16); the company did not buy or process old gases, such as those captured from DEEE. Clear Bay planned to do so in the near future, but the group had stringent requirements (pure, unmixed gases sold in very large quantities) that only the very largest DEEE dismantling companies would be able to fulfill.



Figure 5.16: In the mid-2010s, the self-declared leading recycler of refrigerant gases in China intended to recover those gases from DEEE, but had not yet begun to do so. Photo credit: the author.

5.1.9 Exploited workers everywhere

On the issue of working conditions, too, licensed DEEE dismantling plants were supposed to be superior to small, unregistered businesses, but in practice very much resembled them. As I have shown above (chap. 4), it had become standard practice in the mid-2010s to decry working conditions in China's "informal" DEEE dismantling and processing sector. Many people assumed that, by contrast, workers employed in licensed plants enjoyed better working conditions. But that was by far not the case: long hours, health risks, tiredness, contamination and low salary were familiar characteristics for all the workers employed in the DEEE dismantling and processing sector, regardless of the type of business entity. In its report on "e-waste management in China", the ILO stresses that:

"Occupational safety and health needs to be strengthened in the e-waste management industry as a whole [...] In formal enterprises where the occupational safety and health management systems are mal-functional, unsafe e-waste recycling practices have become a threat for human health and the environment [...] The labor regulations do not specify the inspection and compliance in the e-waste industry." (ILO 2015:iii, my emphasis)

Since most licensed companies refused to grant me access to their plants, it was difficult for me to talk to their employees, let alone interview their workers about working conditions.

However, in January 2016, I made plans to meet a worker in a special setting, outside of working hours and far away from plant premises. Mr. Chen, a young man employed by West Mountain Environmental Technology Co. Ltd., one of the licensed DEEE dismantling plants located in the Pearl River Delta, agreed to let me interview him¹⁹⁶. He started by declaring that working conditions at his plant were “very bad” (*hen elie* 很恶劣) and complained repeatedly about “dust” (*huichen* 灰尘). His job had a detrimental impact on health, especially on lungs. “Dust is everywhere: on the floor, on our clothes, in the air. We wear masks, but that doesn’t help, because dust gets through. Often, when I remove my mask after work, the areas around my mouth and nose are black.” Mr. Chen added that noise, and fumes/odors also bothered him and that, at the end of the day, his hands usually ached. “Every day, I come home from work really weary”, he said. “We all do.” According to him, injuries were frequent, despite the protective gear workers had to wear, and could be serious, e.g. when inflicted by broken CRT glass. Men (80% of staff) assumed heavier tasks, but women (20%) were more exposed to pollution. A portion of every worker’s income depended on the number of items he/she managed to dismantle during the month (0.2 RMB/item). That encouraged workers to do their job as fast as possible. Mr. Chen earned 4000 RMB/month on average because he was able to work fast (200-300 items/day) and to do heavy tasks (fig. 5.17). Others made only around 2000 RMB/month. Everyone worked eight hours a day, six days a week, and overtime, even night shifts, were not uncommon. The bad working conditions and the low pay caused a high employee turnover.

¹⁹⁶ Since Mr. Chen risked his job by talking to me, it seemed only just that he should also benefit from it. In exchange for a personal account, I offered him a small “compensation” (*xinkufei* 辛苦费), which he gladly accepted.



Figure 5.17: Still from a video shot by a factory worker in a licensed recycling plant in Qingyuan. Washing machines are dismantled manually, which requires grueling labor from the workers and exposes them to a high risk of injury. Photo credit: Mr. Chen.

As this account makes clear, working conditions in licensed plants were not particularly attractive and not much better than in unregistered workshops and other small DEEE recycling businesses. That is because, in the mid-2010s, the vast majority of DEEE dismantling businesses in China, whether licensed/registered/monitored or otherwise, (still) relied on cheap, manual labor. Licensed companies possessed a few industrial machines and automated lines, but they let humans do most of the job anyway (fig. 5.18). West Mountain's plant, for instance, which counted as middle-sized, had two hundred workers on the payroll and used only basic industrial machines. Its plastic pellet production line, for instance,

strongly resembled those used by small workshops. In that sense, operations in the so-called formal sector did not differ significantly from those in the informal sector.



Figure 5.18: The type of tools with which a considerable part of the incoming DEEE is dismantled in licensed recycling plants. Photo credit: the author.

In sum, in comparing licensed plants with small workshops, or more generally the “formal” with the “informal” sector, experts tended to overemphasize certain differences, downplay certain similarities, and keep certain aspects vague. This resulted in a distorted picture, biased in favor of the licensed companies and the “formal” system, that most people, in the absence of better knowledge, took for granted. One was thought to be green, or fair, the other was not.

5.2 The rationale behind formalization

In China, much like in other countries, pollution and its corollary, environmental protection, dominated discussions of “e-waste” (see chap. 2), to the point where it generally overshadowed other important issues (Schulz 2015, Schulz & Steuer 2017). However, we cannot fully understand the revolution that took place in DEEE recycling and that led to the double birth of a new sub-sector and a regulatory framework, if we approach it only from the angle of “decontamination” (*wuhaihua* 无害化). “Formalization” encompasses, but is not limited to, promoting respect for the environment. It is a broad project that requires

changes of various kinds, most of which actually have little to do with the environment. A good way to understand why the central government adopted the policies described above is to analyze the transformation of DEEE recycling experts called for (Schulz 2016).

5.2.1 Measuring China against models of modernity

In chapter 2, I have hinted at how academic researchers, scientists and engineers participated in the social construction of “e-waste” as a public problem. Here, I would like to stress that, from the moment when they were first called upon to solve China’s “e-waste” problem, Chinese experts consistently looked abroad for inspiration. They entered partnerships with foreign colleagues, called for technology transfers and borrowed key principles or methods from other countries. In the quest for solutions, Chinese scientists and academic researchers, in particular, turned their attention towards older industrial powers and drew inspiration from them. Their interest was exclusively oriented towards countries deemed more economically “developed” (*fada* 发达) or technologically “advanced” (*xianjin* 先进) than China¹⁹⁷. In conference papers and publications (see, e.g. Li et al. 2014, Qu 2016), they presented countries like the United States, Germany, Japan or Taiwan as models. Lessons could be learned from those countries, they argued, and more importantly, “best available technologies” could be obtained and policy models copied from them. The “transplantation” (Tong & Yan 2013) of the principle of extended producer responsibility (EPR, see above) from OECD countries into China, for instance, owes much to this phenomenon. Chinese experts clearly looked up to “developed countries” (*fada guojia* 发达国家). In October 2014, I interviewed Lin Meixiu, a researcher at one of China’s main technical universities who taught a course on “e-waste management and recycling”. She was trained in resource recycling (BA), environmental science (MA) and economics (PhD) and had spent a year studying waste recycling in Japan. During our interview, Ms. Lin repeatedly

¹⁹⁷ E.g. Switzerland, see “Specialist Skills in E-waste Recycling in Demand”, *Empa*, Jul 26, 2005. URL: <https://www.empa.ch/web/s604/schrottreycling> (accessed January 26, 2018).

compared the Chinese waste recycling system with the Japanese one, always stressing the superiority of the latter. Japan's rules on the management of "e-waste" were clear, detailed and exhaustive, she said. They made sense and were effective, unlike China's. Japanese authorities also excelled at sorting municipal solid waste and at teaching environmental education in schools, two areas where, she stressed, China had yet to implement programs.

By contrast, Chinese experts paid little attention to countries deemed less developed or advanced than their own, which, in their view, included not only "developing countries" (*fazhanzhong guojia* 发展中国家) but also other so-called "emerging markets". Tellingly, they used the term "abroad" (*guowai* 国外) as a synonym for "in developed countries" (*zai fada guojia* 在发达国家) and not in its more common acceptance — what happened outside of those countries was of little interest to them. It may have aroused curiosity, but it did not lead to close scrutiny. This should surprise, for some of the challenges posed by "e-waste" in China resembled more closely those found outside of the "developed" world. The similarities with other BRICS countries (i.e. Brazil, Russia, India and South Africa), in particular, were striking. Just to mention one issue: all BRICS countries had to deal with a preexisting and prominent "informal sector" (see e.g. Lawhon 2013, Laha 2014) — whereas "developed" countries were confronted with this phenomenon to a lesser extent. Many foreign scientists and researchers compared BRICS countries with one another and sought to tease out the similarities and differences (see, e.g., Sinha-Khettrival et al. 2006, Shinkuma & Managi 2010). One would therefore expect that their Chinese colleagues did the same and drew parallels with China. But that virtually never happened. For them, it was obvious that China was moving away from its status as "developing" or "emerging" country and that it would soon cease to face the types of problems typically faced by those countries. Thus, the only meaningful comparison was with "developed" countries.

5.2.2 Ineluctable progress?

The notion of progress lay at the root of their understanding of China's transition towards sound "e-waste" recycling. Participants in specialized conferences repeated certain sentences over and over, almost like a mantra: "There's still some way to go, but we're making rapid progress" or "We're not quite at the same stage as [say, Japan, Germany or the US], but soon we'll get there". They highlighted some of the challenges and obstacles faced by China, but also concluded that it was only a matter of time before the country fared as well as its

models. While attending those conferences, I had a strong sense of national destiny and collective optimism, as if China would ineluctably rise to become a leader in “e-waste management and treatment”. Certain representations (see, e.g., fig. 5.19), which portray China as being on an upward trajectory, convey that very well. They show that progress was both aimed at and taken for granted. And that applies to charts displaying China’s rapidly growing DEEE generation as well: Chinese experts rarely questioned the trend or called for ways to slow it down. Rather, they approached it as if it were a normal phenomenon, which one needed only to accept and deal with.

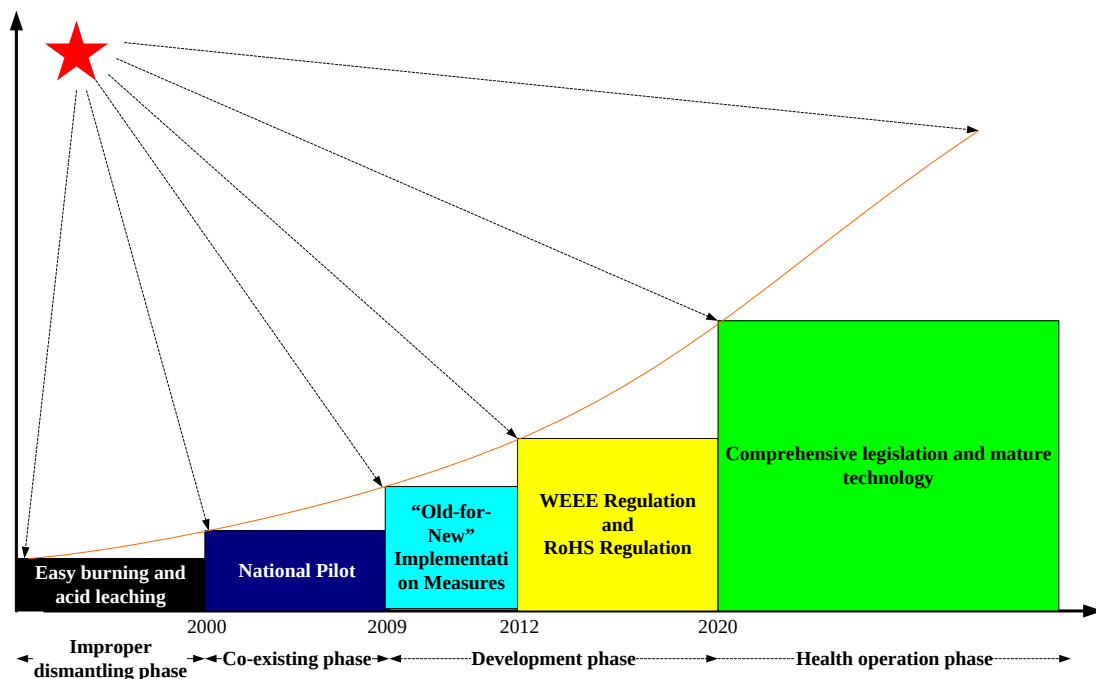


Figure 5.19: Progress in the evolution of Chinese e-waste management. Source: Zeng Xianlai et al. (2013).

However, there are good reasons to be skeptical about Chinese experts’ approach. Being fundamentally oriented towards the future rather than the present and what should be rather than what is, it blinded them to a series of important factors or led them to make shaky assumptions. First of all, they assumed that with time China’s “informal sector” would be replaced by a formal one, so they studied chiefly the latter and only rarely the former — tellingly, some of them seemed incapable of associating the “informal sector” with anything else than dirty DEEE processing in Guiyu. That had consequences on the way they calculated collection rates, for instance, namely using only figures reported by licensed recycling plants. But much DEEE flowed through other channels in China (see chap. 6), so they grossly underestimated the amount of DEEE that actually gets collected there. That, in

turn, affected comparisons with “developed countries”, which made it seem like China still had to catch up on that account, while it could well be that the country had always been far ahead of its models. Second, they assumed that uncollected DEEE necessarily went to landfills in China, like it often does in “developed countries”. Here again, however, that betrayed a lacking knowledge of what actually happened to DEEE on the ground in China. In Guangzhou, for instance, very little DEEE ended up in landfill, according to my interviews with local officials in charge of waste management. Thus, in that regard at least, China was quite unlike, say, the USA, Denmark or my home country, Switzerland. In sum, because they adopted a normative rather than an empirical perspective on DEEE collection and recycling in China, Chinese experts often had a distorted view of reality and arrived at teleological conclusions.

5.2.3 The instruction manual for “formalization”

But what exactly did Chinese experts see as the key components of the project of formalization? How did they detail it and what did they emphasize? First, experts saw a need to “systematize” (*zhiduhua* 制度化) DEEE recycling, that is, to organize it according to a set of principles or procedures and to turn it into a structured network. Actors referred to as “informal”, or as participating in the “informal sector”, are sometimes described as “unorganized”. Chinese experts typically used the words “disorderly” (*luan* 乱) and “scattered” (*san* 散) to refer to them. But that does not mean that these actors act in random or chaotic ways and they are not interconnected. It rather points to the fact that the rules they follow are not explicit and that the relations they have with each other exist only through their daily enactment. This typically bothers experts and officials, who wish to have a clear, overall view of complex situations. Here, they were left instead with a fuzzy and fragmented picture, or no picture at all.

Second, experts emphasized the need to “normalize” or “regularize” (*zhengguihua* 正规化) DEEE recycling. By that, they meant entrusting it to entities that belong to, or have close relationships with, the state. In Chinese, the term *zhenggui jun* (正规军) refers to the official army, i.e. the one that works for the state and not against or beside it, like volunteer militias, private armies and mercenaries often do. *Zhenggui* therefore expresses loyalty to the state and obedience to the law. Experts laid great emphasis on respect for official regulations,

authorizations and certifications (fig. 5.20). Compliance with state rules appeared as necessary — non-compliance disqualified almost automatically — and sometimes even as sufficient — compliance, once proven, obviated the need for further inquiry.



Figure 5.20: Some of a licensed DEEE recycling plant's credentials, authorizations and certifications, on display in the main entrance. Photo credit: the author.

Third, experts called for “standardization” (*guifanhua* 规范化 or *biaozhunhua* 标准化): DEEE recycling in China had to reach a certain level of quality or attainment and to compare with DEEE recycling elsewhere. They stressed that, despite recent progress, China still lagged behind “the rest of the world” (*guowai* 国外) — by which they always meant “developed countries” (*fada guojia* 发达国家) and never “developing countries” (*fazhanzhong guojia* 发展中国家) — and should strive to reach “international standards” (*guoji biao zhun* 国际标准).

They kept track of technical developments in countries like Japan or Germany and called for similar solutions to be implemented in China. In every area of interest for recycling (collection, dismantling, data management, regulation, etc.), techniques from abroad enjoyed positive connotations as tokens of progress. They had to be imitated, in order to prove — be it only symbolically — that China was catching up with older industrial powers.

Fourth, experts talked of “industrializing” (*chanyehua* 产业化) DEEE recycling. For them, entities and techniques or processes that did not qualify as industrial had no role to play in the new, “formal” system. In October 2014, in Beijing, I met Xie Peng, a Chinese environmental engineer who had been conducting research on, among other topics, component reuse in Guiyu. I wanted to know about his findings, but he told me straight away: “You know, this was only a small project, for which I had little money. You just don’t get much funding for this kind of research”. In extreme cases, experts denied that non-industrial entities even existed in China. Several foreign experts I interviewed reported having been told by their Chinese counterparts that “China ha[d] no informal sector”.

Fifth, experts advocated “scaling up” (*guimohua* 规模化) the sector, in other words increasing the volumes of treated DEEE as well as the size of companies. For them, the higher a plant’s “treatment capacity” (*chuli nengli* 处理能力), the better — even if, in practice, many plants operated well below their theoretical capacity. Experts touted very large dismantling plants as models because they assumed that such plants had a greater capacity to invest money in their facilities, to acquire advanced industrial machines, to deal with all categories of products, and so on. The “informal” sector, with its multitude of small business entities each dealing with small quantities of goods, served as a countermodel.

Last but not least, experts deemed it natural that the DEEE recycling sector would “informatize” (*xinxihua* 信息化) over time. They welcomed Premier Li Keqiang’s “Internet

Plus” (*hulian wang* + 互联网+) strategy¹⁹⁸, which aimed at promoting the introduction of the Internet and other digital information technologies into long-established industries. The national People’s Congress and Chinese People’s Political Consultative Conference even discussed the issue of informatization in direct connection with “e-waste” during their 2015 annual plenary sessions, calling for “the establishment of an informatized system including traceable information monitoring and involving the use of technologies such as Internet, electronic labels and big data, in order to raise the recycling sector’s level of professionalization and informatization”¹⁹⁹. In accordance with these government plans, experts recommended keeping track of every object, measuring every flow, converting any movement or change into information, and setting up a system for managing and exchanging digital data (fig. 5.21). Experts’ intention to make recycling more legible, more like a map that could be read using the techniques and tools developed by modern states, coupled with their conviction that scientific and technological advancements would help solve the problems at hand are strong evidence for the high modernist character of formalization.

¹⁹⁸ See “Internet Plus”, *The State Council*, [no date]. URL: <http://english.gov.cn/2016special/internetplus/> (accessed January 26, 2018).

¹⁹⁹ “Electronic Waste: Are You Aware of these Figures?” [废旧电子: 这些数据你都了解吗], *Buy Green* [淘绿网], August 11, 2015. URL: <http://www.taolv365.com/html/20150811/111449126679.html?a=1&scene=0> (accessed January 26, 2018).



Figure 5.21: A speaker addressing the floor during a forum on the importance of Internet in the circular economy and in the scrap recycling industry more particularly. Source: China Nonferrous Metals Industry Association Recycling Metal Branch.

5.2.4 By the state, like the state

It should be stressed that China's "formal system" for DEEE recycling is basically run by the Chinese state. It involves very few market mechanisms. For instance, the sums of money that are collected through the recycling tax and redistributed in the form of subsidies do not fluctuate according to offer and demand but are fixed by the central government and rarely adapted. Companies wishing to participate in the system need to: develop and maintain close ties with state authorities; adhere to state regulation; submit themselves to state monitoring and control; accept to live off state subsidies; and so on. Failure to do so will result in them being either illegitimate, unsuccessful or simply not allowed to exist or to continue operating. They enjoy little autonomy outside of the framework created and controlled by the state. For instance, although they are commercial enterprises, their operations only rely on market mechanism to a limited extent.

Since China's "formal e-waste management system" is fundamentally a state-run system, it is affected by several of the Chinese state's characteristics, including top-down governance and bureaucratic complexity (Someno & Miao 2016). Researcher Lin Meixiu from the well-known technical university expressed skepticism about China's "e-waste policies" when we

exchanged in 2014. According to her, those policies “d[id] not have obvious effects” (*zuoyong bu mingxian* 作用不明显) and were yet to “achieve results” (*qude xiaoguo* 取得效果). She even claimed that China still lacked a “formal system” (*guifan de tixi* 规范的体系).

Ms. Lin claimed that the Chinese state’s organizational structure and governance accounted for several of the problems encountered in China. First, she bemoaned Chinese law’s lack of clarity and precision. “The law does not define clearly the responsibilities of all the stakeholders, only of some of them”²⁰⁰. It did not say anything about consumers’ and retailers’ roles, for instance. Then she criticized the multi-ministry approach often adopted by the central government. In the case of DEEE recycling, no less than eight ministries were officially involved in the system (see Wang et al. 2013:40). According to her, this complex organization impacted negatively on efficiency: “It can take a while before the MoF and the MEP come to an agreement on something”²⁰¹ (see also Someno & Miao 2016). Finally, Ms. Lin attributed policies’ slow progress to the systematic failure to involve all relevant stakeholders: “In Japan, they have an excellent system for sorting household waste. In China, we’ve been talking about developing this for twenty years now, but there’s still a long way to go. [...] That’s because we don’t involve all the parties concerned.” In my experience, central government officials seemed uninterested in receiving advice or feedback from researchers or representatives of the recycling industry, and unconcerned about issues of transparency and accountability. Their attitude during specialized conferences is revealing. They formally accepted to take part in public event, so their names appeared on the program, but they

²⁰⁰ On Chinese regulation in the field of DEEE recycling, see , e.g., Yu et al. 2010:995, Chung & Zhang 2011, Zhou & Xu 2012:4714, and Chi et al. 2011.

²⁰¹ Writing in the late 2000s, Driscoll & Wu (2010) identified eleven administrative entities at the central level that “all ha[d] jurisdiction over various aspects of e-waste” and observed that “this le[d] to inefficient oversight, regulations so complex that it [wa]s hard to track and enforce violations, and governmental departments passing the buck as to who is going to address various e-waste concerns”. They recommended that “one of the first things that China needs to do is to centralize authority as to which ministry will control/enforce electronic waste” (p. 42-43).

later either canceled, sent an inferior to replace them, or left the conference venue right after the end of their presentation. By acting the way they did, they refused to engage in dialogue, let alone debate.

Ms. Lin's stance is unusual in that she thought that the type of organization, governance and instruments typical of the Chinese state jeopardized the formalization of "e-waste management and recycling". But many of my interviewees criticized them as well when they complained about slow and cumbersome administrative procedures, doubts arising from concurrent jurisdictions, inconsistent decisions, lacking coordination, and the difficulty to plan future action. Dave Huang, a Chinese businessman and owner of a company that bought, sold and processed scrap (including DEEE) on just about every continent (see chap. 3), observed only half-jokingly that: "What the MEP says [*zhiding* 制定] counts as law. What the Customs say also counts as law. And what the MoC says counts as law too!" Lack of coordination among state agencies led to legal complexity and uncertainty that were very off-putting for business people like him. When I asked him why his company, headquartered in Zhejiang Province, had not yet opened a DEEE dismantling plant in China, he replied that:

"There are only two situations in which it is worthwhile for a company like mine to invest in this sector: when a country has not yet adopted any regulation and when the system has been in place for several years and has stood the test of time. China currently presents an intermediate situation. Yes, there's already a subsidy and so on. But who knows how the system will evolve? What's the point of making large investments when a question mark is floating in the air? I'd rather wait for a more favorable environment."

As a self-taught scrap professional, a self-made millionaire, and a self-reliant entrepreneur, Dave Huang valued efficiency, reliability and predictability. In his eyes, Chinese policies on DEEE recycling offered none of that. He made clear that red tape and unpredictability, not environmental protection requirements, stopped him from investing in China. Giving the example of his plant in Pakistan, he said:

"There, we are free to do things the way we want, to work with the people we want to work with. It's not that we want to be free to pollute as much as possible — wherever we are, we always pay attention to our environmental impact — but we need to control enough parameters."

Listening to Dave Huang ranting about Chinese state authorities' way of handling the recycling sector, I had the impression that he actually wished to invest more in his country and resented the many hurdles involved, in particular red tape and the lack of transparency.

5.3 Conclusion

In this chapter, I have described the revolution that China's DEEE recycling sector has undergone from the early 2000s onwards: the adoption of a regulatory system has enabled the emergence of a subsector comprised of large companies. I have also demonstrated that the "formal e-waste recycling system" devised by the central government is centered on materials recovery and industrialization (Tong et al. 2015). It calls for DEEE to be wasted — in the sense of transformed into waste, hence "e-waste" — on an increasingly large scale (Schulz 2015). Unlike other ways of drawing value out of DEEE, material recovery is compatible with increased consumption and production rates. The more devices and appliances are bought, used, and discarded, the more business for recyclers. Conversely, the more devices and appliances are crushed and transformed back into their basic constituents, the more raw materials manufacturers have at their disposal to produce new stuff. Whereas repair and reuse are likely to impinge on sales of new EEE, harm manufacturers' interests, and slow down the growth of the national electronics industry, material recovery serves the interests of the manufacturing industry by making secondary raw materials available sooner and in larger quantities. The fact that China's formal system is based exclusively on industrial-scale material recovery is in line with producers' fundamental interests, i.e., to sell a maximum quantity of goods. That goes a long way in explaining why, even though they may not agree with some of the details, producers do not fundamentally oppose this system. If large recycling plants were to wrest DEEE entirely from the "informal" sector, reuse practices would vanish, or at least decrease drastically, and buying new EEE would become the only option left for consumers. In sum, the new system currently being promoted at the institutional level in China is compatible with higher production and consumption rates, on which China relies for the development of its EEE manufacturing industry as well as, more generally, economic growth.

In order to understand China's formal system, one must realize that, fundamentally, it is based on a normative or programmatic approach to development, not on an empirical or pragmatic one. This is evidenced by the fact that, for instance, "formal" and "informal"

actors are routinely compared based on representations of how things should be rather than how they are. Like the state “schemes” described by Scott (1998), which were supposed to improve the human condition but failed, China’s formal system is suffused with the ideology of high modernism. Like them, I would argue, thus far it has failed. It was supposed to reduce China’s ecological footprint but has not achieved this and is not even heading in that direction. Reflecting on the reasons that cause certain state schemes to fail, Scott writes:

“If I were asked to condense the reasons behind these failures into a single sentence, I would say that the progenitors of such plans regarded themselves as far smarter and farseeing than they really were and, at the same time, regarded their subjects as far more stupid and incompetent than *they* really were.” (p. 343)

“What is perhaps most striking about high-modernist schemes, despite their quite genuine egalitarian and often socialist impulses, is how little confidence they repose in the skills, intelligence, and experience of ordinary people.” (p. 346)

In my view, Scott’s conclusions can fruitfully be applied to the analysis of China’s project of formalizing DEEE recycling. Indeed, the people who advocated China’s formal system and worked on its design and implementation seemed unwilling to give any credit to the multitude of economic actors collectively referred to as the “informal sector”, or even registered small and micro enterprises. These experts, as I have referred to them in this chapter, ignored actors belonging to such categories: they showed little interest in their contribution to DEEE recycling, their understanding of DEEE’s materiality, and their methods for drawing value out of DEEE (in particular through reuse, see Schulz & Steuer 2017). Indeed, in some extreme cases, Chinese experts even refused to acknowledge the existence of an informal sector in China.

This rejection of informality and petty capitalism (see Smart & Smart 2006) might surprise. After all, actors commonly grouped into those categories were materially and discursively the engines of economic growth during the reform era. But, as Scott argues, high modernist schemes are impervious to many of the things that characterize these actors and their action, e.g. practical knowledge, informal processes and improvisation in the face of uncertainty. In order to be effective, these instances of large-scale social engineering require a legible society. Therefore, they cannot cope with phenomena that remain largely illegible, such as informality and small-scale, independent business activity. Ironically, Scott stresses, high

modernist state schemes rely on the very illegible phenomena that they are incapable of taking into account and integrating:

"the formal order encoded in social-engineering designs inevitably leaves out elements that are essential to their actual functioning. [...] all socially engineered systems of formal order are in fact subsystems of a larger system on which they are ultimately dependent, not to say parasitic. The subsystem relies on a variety of processes—frequently informal or antecedent—which alone it cannot create or maintain. (p. 351)

In the case of Chinese DEEE recycling, this is evident for instance in the fact that licensed companies sourced the vast majority of their supplies from independent rubbish collectors. Without the services provided by these so-called informal actors, they would have struggled to procure the stuff they needed.

The incapacity of high modernist schemes to take into account certain aspects of the reality they are supposed to improve is linked to another question, which is the relationship between “informality” and “illegality”. While studying Chinese experts’ discourse on DEEE recycling, I often observed that they used the two notions interchangeably, notably when they criticized “informal” actors for engaging in “illegal” activities. This conflation is not proper to the field of DEEE recycling nor, for that matter, to China. It abounds in discussions on informality in general. The relationship between “informality” and “illegality”, however, needs to be unpacked²⁰². First, practices that do not fit into the established legal framework risk being declared illegal even when, technically speaking, they do not constitute violations of the law. The same goes for actors who have no intention of violating the law, or no awareness that their action may constitute a violation of the law, but who operate in a legally grey area, where regulation is either lacking or unclear. That was very much the case for many DEEE recyclers in China. Second, there is a difference between the notions of illegality and illegitimacy. As Hart (1973) puts it: “The system of bourgeois values

²⁰² “Informality and Illegality: Unpacking the Relationship”, *WIEGO*, May 2015. URL: <http://www.wiego.org/sites/default/files/resources/files/WIEGO-Informality-and-Illegality.pdf> (accessed January 26, 2018).

enshrined in a nation's code of laws may not coincide with concepts of legitimacy prevalent in certain subcultures of that society” (p. 74). In other words, acts that, technically speaking, constitute a violation of the law, are not necessarily deemed morally reprehensible by all members of the population. In Guiyu, for instance, a lot of local inhabitants engaged in tax evasion and it did not expose them to opprobrium — perhaps because many of them simultaneously engaged in other forms of wealth redistribution, including support to members of their clan and donations for collective events or infrastructures (e.g. temples). Third, informality should not be seen as something that is external to state action. State authorities, in particular at the local level, always tolerate a certain level of informality (Lautier 2004:102-104). The language of illegality only kicks in when they stop doing so. Discourses that criminalize “informal” actors should therefore be analyzed critically. They often serve other purposes than simply enforcing the law and ensuring compliance. In the case of DEEE recycling in China, labeling informal actors as illegal certainly facilitated their eviction. It contributed to one of the key objectives of formalization, namely upgrading the recycling sector through dispossession.

However, it is not enough to observe that formalization failed. We should also ask what effects it did have (see Ferguson 1990). I would argue that the establishment of a formal system of DEEE recycling in China contributed to remedying what some scholars in China Studies have dubbed “fragmented authoritarianism”. According to Lieberthal & Lampton (1992):

“the fragmented authoritarianism model argues that authority below the very peak of the Chinese political system is fragmented and disjointed. The fragmentation is structurally based and has been enhanced by reform policies regarding procedures. The fragmentation, moreover, grew increasingly pronounced under the reform beginning in the late 1970s.” (p. 8)

“All of [the] changes [brought by bureaucratic reform in the 1970s and 1980s] combined to reduce the extent to which organs respond in disciplined fashion to instructions from higher levels.” (p. 9)

The establishment of a formal system clearly enabled the central government to play a much greater role in DEEE recycling in China. Not only that, but it generated numerous opportunities for Beijing to intervene in local affairs, monitor local governments, and reassert its authority on development at the local scale. On the other hand, the formal system can only contribute to the defragmentation of Chinese authoritarianism to a limited

extent, because of the way it is designed. Some of its features, in particular the involvement of several ministries and the complex distribution of tasks, stood in the way of making the “peak of the Chinese political system” even more powerful and in control.

6 FIGHTING FOR ACCESS

In order to be able to engage physically with objects, one must have them in one's possession. Logically speaking, this is obvious, but practically, it poses a wide range of challenges. How are these objects to be obtained and from whom? As we have seen, companies starting out on the Chinese DEEE recycling market were often confronted with supply issues. In the mid-2000s, several of China's first licensed recycling plants were forced to close because they could not buy the amount of DEEE they needed. A decade later, their successors often had to operate below capacity for much the same reason and despite the introduction of a financial mechanism intended to support them. What made securing DEEE challenging in China in the mid-2010s? Which businesses succeeded in this endeavor and which ones struggled, and why? Who tried to get a competitive edge over whom and how? Those are the kinds of questions addressed in this chapter.

In what follows, I identify the commercial entities that vied for access to DEEE within China and analyze their strategies. Particular attention is paid to where various actors positioned DEEE on the spectrum that ranges from “goods” (*huowu* 货物) to “garbage” (*laji* 垃圾), in other words from objects that have commercial value and may bring benefits to objects that are worthless and pose a threat — as seen from an emic perspective, that is. In early twenty-first century China, DEEE tended to have commercial value, if not as salvageable “products” (*chanpin* 产品), then at least as reusable “components” (*lingjian* 零件) or recyclable “materials” (*cailiao* 材料). A great number of business entities coveted these objects and competition was fierce, arguably even more so than for other types of recyclables (see Cavé

2015). In order to guarantee supply, businesses had to offer convenient services and/or high prices. Alternatively, however, they could avoid market mechanisms altogether and create other access pathways by emphasizing DEEE's status as "solid waste" (*guti feiwu* 固体废物) or "rubbish" (*laji* 垃圾) and the responsibility of individual consumers.

My focus, in this chapter, is on the collection of DEEE from households, offices (whether private or public) and small businesses (e.g. restaurants, shops). I track postconsumer waste from the moment when it leaves these places. Many things are likely to happen within households, offices and small businesses: old, obsolete, or simply unwanted EEE is often handed down to family members or friends, for instance, or stored in a closet or drawer. But this chapter does not cover those practices. In Guangzhou, like in many other large Chinese cities, self-employed workers and small-scale entrepreneurs (*xiao shangfan* 小商贩 or *getihu* 个体户) dominated the trade. Most of them were migrants with origins in the interior of China. As we have seen in chapter 1, these people had basically taken over the business of collecting and pre-processing recyclable waste in urban China in the early days of the reform era (Béja et al. 1999a & 1999b, Goldstein 2006 & forthcoming, see also Zhang 2002). They played a key role for waste management in large Chinese cities, yet they received very little recognition for their work. Quite the opposite in fact: as former peasants or simply people associated with the countryside, they were stigmatized, considered to be of "low quality" (*suzhi di* 素质低), and portrayed as an obstacle to modernization (Honig 1992, Lai 2016). Beside independent street peddlers, rubbish collectors and scrap aggregators, this chapter also pays attention to other categories of actors, e.g. retail stores, second-hand shops, subdistrict officials, reverse logistics companies and companies operating online collection platforms.

It would have been interesting to explore what happened to DEEE that originated from large businesses, organizations and corporations, and not only from small businesses, households, and isolated offices. State agencies and commercial companies employing several hundred or thousands of people represented another significant source of DEEE and I know that they usually had to follow rules on what to do with EEE that had become obsolete or stopped working. Many of them, for instance, entered agreements with either big manufacturing brands or licensed recycling companies, which cut out middlemen. At the Sun Yat-sen

University, the rule for computers stated that they had to be reused on campus first and, when they became too old, they could be donated to schools located in the countryside or to poor residents. But I have not been able to investigate this aspect in more detail.

This chapter is structured in two sections. The first one provides an explanation for the predominance of self-employed workers and small entrepreneurs in DEEE collection in Guangzhou. It describes these actors' business models and practices, and emphasizes how convenient their services were for local residents. I note that different types of DEEE entered different channels and experienced different fates. An old, cheap washing machine that did not discharge water effectively anymore, for instance, risked being dismantled on the spot soon once discarded, whereas a high-end smartphone with a broken screen had high chances of making it to a refurbishing center even if that required a long-distance shipment (see chap. 7). In the second section, I analyze several types of attempts at taking advantage of self-employed workers and small entrepreneurs' work or challenging their dominant position in DEEE collection. For instance, I note how certain companies sought to redirect DEEE flows to themselves by using digital technologies or the discourse of environmentalism.

6.1 First come, first serve

In twenty-first century China, self-employed people clearly dominated the collection of DEEE (Li et al. 2012, Chi et al. 2014, Steuer et al. 2017)²⁰³. The CHEARI estimates that these people collected more than 85% of all DEEE eligible for subsidies in 2015. As a journalist remarked, the predominance of the so-called informal sector implied that DEEE collection had to take place through “extremely dispersed supply channels” (*gonghuo qudao jidu fensan* 供货渠道极度分散), which stood in the way of efforts to “scale up” (*nanyi xingcheng guimo*

²⁰³ The same can be said about India (Laha 2013:315).

难以形成规模)²⁰⁴. Institutional experts deemed this problematic and called for reorganizing and consolidating (*zhenghe* 整合) DEEE collection so as to make it more “integrated” (*yiti* 一体).

The crux of the problem, according to them, was the “last mile (or kilometer)” (*zuihou yi gongli* 最后一公里), a term they borrowed from the fields of supply chain management and transportation planning²⁰⁵. Chinese experts readily acknowledged that self-employed people dominated the “last mile”, meaning that they stood closest to the source of DEEE, namely owners (or consumers), and therefore obtained access to these objects before anyone else did.

6.1.1 Masters of the “last mile”

Who exactly are those self-employed people and how did they manage to position themselves so efficiently? The vast majority of them are former inhabitants of the Chinese countryside who migrated to cities and started making a living by collecting recyclables from households, small businesses (shops, restaurants) and offices (Béja et al. 1999, Wu & Zhang 2016). In his account of the transformations of this sector of activity in Beijing during the second half of the twentieth-century, Joshua Goldstein (2006) explains that, during the postsocialist era, the amount of waste created in cities mushroomed and the prices for recyclables plummeted, prompting state authorities to just about abandon the collection of household scrap.

“The state's recycling net dissolved. In fifteen years the number of BRRC [*Beijingshi wuzi huishou gongsi* 北京市物资回收公司] collection points in central Beijing fell from more than two thousand to just six in 1998. For most of those years the BRRC was unconcerned; it was too busy joining in

²⁰⁴ “Low Efficiency: Upgrading Domestic E-waste Recycling is Urgent” [效率低下 国内电子垃圾回收亟待整合升级], *21st Century Economic News* [21 世纪经济报道], March 10, 2017. URL: http://epaper.21jingji.com/html/2017-03/10/content_57715.htm (accessed January 26, 2018).

²⁰⁵ The “last mile” describes the movement of goods, energy or people to a final, or from an initial, destination in the home, small office or business.

the speculative fever, shifting its funds into real estate and taxi companies. Its strategy was clear: recycling industrial metals was its only high-profit, low-labor sector. "Daily life wastes" (*shenghuo feipin*) were not worth the trouble, [...]" (Goldstein 2006:278)

The state's retreat created a window of opportunity for rural migrants, who seized it en masse and quickly became involved in this line of activity. Their willingness to work much harder than state employees and for less money was also a major asset, as Goldstein rightly notes (*ibid.* p. 278). During the postsocialist era, rural migrants basically took over the role that state-run collecting stations had assumed during Maoist times. And since "the flow of disposable recyclables was increasing as never before" (p. 279), many of them managed to make a decent living, or even to build wealth, and to reach a higher social status.

The evolution described by Goldstein with regards to Beijing is not unique to that city but reflects a national trend. In the early 2000s, state-run household rubbish collecting stations reopened in many Chinese cities where they had closed, but rural migrants kept the strong foothold they had gained. As late as the mid-2010s, the so-called "floating population" remained the main actor (see Steuer et al. 2017). Municipal authorities throughout China relied heavily on self-employed rural migrants for rubbish collection. In Guangzhou, the city management (广州市城市管理委员会 or 城管委) urged residents to "take what can be sold and go sell it" (*neng mai na qu mai* 能卖拿去卖) (fig. 6.1), which amounted to endorsing migrant workers, even if only tacitly, because only they bought back recyclables.



Figure 6.1: Instructions given to residents by state authorities at the neighborhood level in Guangzhou on how to deal with household rubbish. The first sentence reads “take what can be sold and go sell it”. Photo credit: the author.

6.1.2 An obvious choice for residents

As I lived in Yuexiu District (越秀区), in downtown Guangzhou, for a year and a half, I was able to observe household rubbish collection as it takes place in a major Chinese city and to take part in it on a daily basis. What struck me is how much more convenient the services offered by the “floating population” (*liudong renkou* 流动人口) were compared to those of the city management or of large retail stores selling home appliances and electronics. Just about everyone I talked to — officials included — recommended that I, as a resident, get rid of any scrap, including old or defunct EEE, by selling it to self-made “junk collectors” (*shou*

polan 收破烂 or *sau maai lou* 收买佬 in Cantonese)²⁰⁶. Trying out a few other options convinced me that this was indeed the obvious, or only reasonable, thing to do.

The first experiment I conducted consisted in testing the municipal government's official DEEE collection system. The city management claimed that it offered, among other services, free “home pick-up” (*shangmen huishou* 上门回收) for large items, including home appliances. I wanted to know which agency was in charge of DEEE collection, how the system worked, and whether it was effective. Getting information was quite difficult. It took a series of unproductive phone calls before I could speak to a well-informed and obliging civil servant. Chen Xiaolong, an employee at the city management's Rubbish Sorting Office (垃圾分类办公室) in Yuexiu District, explained to me that in all neighborhoods with around one thousand households (*hu* 户) or apartments (*ju* 居), or simply enough space, the local branch of the city management (城市管理行政执法局) built a “sanitation station” (*huanwei zhan* 环卫站) where residents could discard recyclables and special waste, including DEEE. Sanitation workers managed this station and called a specialized private company to come empty it when it became full. In less densely populated neighborhoods, or in those where space was scarce, residential committees (居委会) and sanitation workers posted signboards and notices telling residents to call a certain telephone number if they wanted to have DEEE or other wastes removed from their homes. Sanitation workers allegedly went to residents' homes and carried away any unwanted devices or appliances at no cost — Chen Xiaolong even claimed that workers were supposed to offer money in exchange for DEEE as they, in their turn, could sell it to specialized recycling companies and make a small profit. Residents were “encouraged, but not obliged” to go through the sanitation station to get rid of their scrap, Chen Xiaolong pointed out. They were free to choose another channel if they wanted to. He also hinted that residents tended to opt for “the best service” and rarely considered that to be the official one.

²⁰⁶ The term *shou polan* has a derogatory connotation in Chinese, but it is widely used, sometimes even by independent scrap and rubbish collectors themselves. Therefore, I treat it here as an emic term.

In the sanitation station located next to my home, a sign read “Household waste collection point. Please sort household waste. To arrange for the collection of large articles, call 83357854 [or] 83397570”. I tried to call both numbers, to no avail: no one ever picked up the phone. So I then tried to call the city management’s general hotline number (12319), which I had seen on various notices in my neighborhood. As absurd as it may seem given Guangzhou’s ranking as one the world’s largest cities, the hotline never produced anything else than an on-hold tune. I kept on dialing the number for weeks and tried from several handsets, but never heard a human voice²⁰⁷. All other official phone calls (e.g. to the municipal EPB and provincial EPD) led back to the city management, confirming that this agency was the only one in charge of collecting recyclables from residents and small businesses.

The manager of a sanitation station I interviewed later declared that his staff could, and did, pick up appliances from residents’ homes, but were “simply less often called than self-employed people [*getihu* 个体户]”. But it seems he was prone to euphemisms: later, two sanitation workers employed by the station next door told me that they were virtually never called (“less than once a year”) and that residents always addressed independent rubbish collectors. One of the workers pointed out that the city management’s collection system had not even been fully implemented yet. In other words, it most likely existed only on signboards and in official documents.

My second attempt at finding out what could potentially happen to DEEE generated in downtown Guangzhou involved taking part in a take-back scheme run by Gome Electrical Appliances Holding Limited (国美电器控股有限公司), one of China’s major retail chain stores for electronics and home appliances. The scheme, which officially lasted for three

²⁰⁷ The experience of not being able to contact anyone within the city administration of Guangzhou, officially one of the cities spearheading development in China, greatly annoyed the young Chinese person who assisted me in my research at the time.

days (May 29-31, 2015)²⁰⁸, bore the title “Old for New” (*yijiu huanxin* 以旧换新), in reference to the national, government-sponsored take-back program that had taken place in China between 2009 and 2011 (see chap. 5). Like the latter, Gome’s scheme offered a ten percent discount on the purchase of a new device provided an old one be handed in. Unlike the original Old for New, however, this one did not involve any form of government subsidy, monitoring or intervention. Gome had adopted it, and ran it, on its own. Weeks ahead of the launch, Gome started advertising the take-back scheme in all its shops and on billboards located throughout the city (fig. 6.2).

²⁰⁸ China’s major specialized retailers ran such schemes regularly. For instance, Suning (苏宁电器), Gome’s main competitor, offered a take-back scheme during the same period, albeit only for mobile phones.



Figure 6.2: An advertisement for Gome's take-back scheme. Photo credit: the author.

On the first day of the scheme, I visited two major Gome shops in downtown Guangzhou, and asked salespeople for instructions on how to proceed to benefit from the discount and have my DEEE collected at home. The more people I talked to, the more confused I became. After several hours spent enquiring about the scheme, I still could not ascertain whether: I could get the discount for a device of a certain type even though I wished to discard one of another type; I could arrange for my old device to be collected now or should have done it beforehand; all devices sold by Gome were eligible for the ten per cent discount (as claimed in the advertising materials) or only those not already discounted (as several salespersons told me); and so on. Every salesperson seemed to have his/her own interpretation of the scheme and of the associated procedure. In the end, one of them told me that the scheme

was non-binding anyway, meaning that one could get the discount on a new device without actually handing in an old one. Gome simply dispatched a licensed collector to a customer's home, he explained, who made an offer based on a list of fixed prices, but customers could refuse it.

“That’s how it works: first, I give customers the best available price, for instance the lowest price that can be found on the Internet. Then, I give them the additional ten per cent ‘Old for New’ discount. Later, a delivery man [*shifu* 师傅] drops by at their place and makes an offer to buy back their old device. If they’re happy with his offer, they can sell their device to him. But if not, they can also sell it to junk collectors [*shou polan* 收破烂]. We’re not opposed to that.”

The salesperson’s explanation convinced me that Gome’s take-back scheme had little to do with DEEE recycling. Rather, it amounted to an attempt by the company to attract more customers and increase sales volumes by slashing prices. The level of confusion among staff indicated that the scheme was not truly operational. At the very least, it posed a series of challenges for owners/consumers/customers. Its short duration, in particular, made serious planning necessary.

Nevertheless, I pushed the experiment further and arranged for an old flat panel display to be picked up from my home. A few days later, someone called me on the phone in the morning to announce that a pick-up service would be available the same day. I came home on an agreed time but had to wait an hour for someone to arrive. The “delivery man” offered me 20 RMB cash for my device and took it away. He guaranteed that it would “be handled as waste” (*dang laji* 当垃圾), like all the devices he collected. While talking with him, I realized how ineffective the whole scheme was. The man was employed by a company (possibly a Gome branch) based in Foshan, but he worked mostly in Guangzhou, so he had to drive in and out of that city every day; he criss-crossed Guangzhou on a daily basis alone and in a truck, so he had to go through the ordeal of finding a parking space (a rare thing in Guangzhou) every time he stopped; and he often had to carry large devices on his own, so he had to move around (in typically overpopulated streets) with a bulky and heavy cart. Given the costs linked to his working time, parking and fuel fees, and the low economic value of DEEE when it is used only as a source of materials, it was likely that his company lost rather than made money through sending him out every day — even if it benefited indirectly from the subsidy paid to licensed DEEE dismantling and processing companies.

In comparison with Gome and the city management, junk collectors seemed to personify efficiency and convenience. Rural migrants could be found just about everywhere; they were available all day, every day of the week, and even at short notice; and they bought back all kinds of scrap and bric-a-brac, including: paper, cardboard boxes, rusty metal door or window frames, plastic bottles, aluminum or steel cans, and, of course, DEEE. In an area of approximately one kilometer by half a kilometer centered around the subway station Peasant Movement Institute (*nongjiangsuo* 农讲所), I counted no less than twenty-three sites²⁰⁹ occupied by junk collectors as well as two aggregating stations (*feipin zhan* 废品站) operated by the same kind of people (fig. 6.3)²¹⁰. This means that residents needed only to walk out of their homes and a few meters on any street to meet with someone willing to rid them of any unwanted object. By way of comparison, in that same area, the city management employed a dozen people to run sanitation stations. All of them were migrants too. Like independent junk collectors, these sanitation workers performed waste work, but unlike them they wore a uniform, had a work contract and enjoyed a secure income. They were allowed to complement the basic salary they received from the state by selling the recyclables they managed to salvage. But their tasks and responsibilities (e.g. moving bins, making sure stations remain clean and uncluttered) rarely left them much time to invest in that activity.

²⁰⁹ By site, I mean a fixed and stable place (often just a patch of pavement), where at least one person works at least part-time.

²¹⁰ By aggregating station, I mean a neighborhood business employing anywhere from one to fifteen workers that specializes in buying back certain kinds of scrap and in shipping them to regional recycling hubs (e.g. Nanhai for the Pearl River Delta).

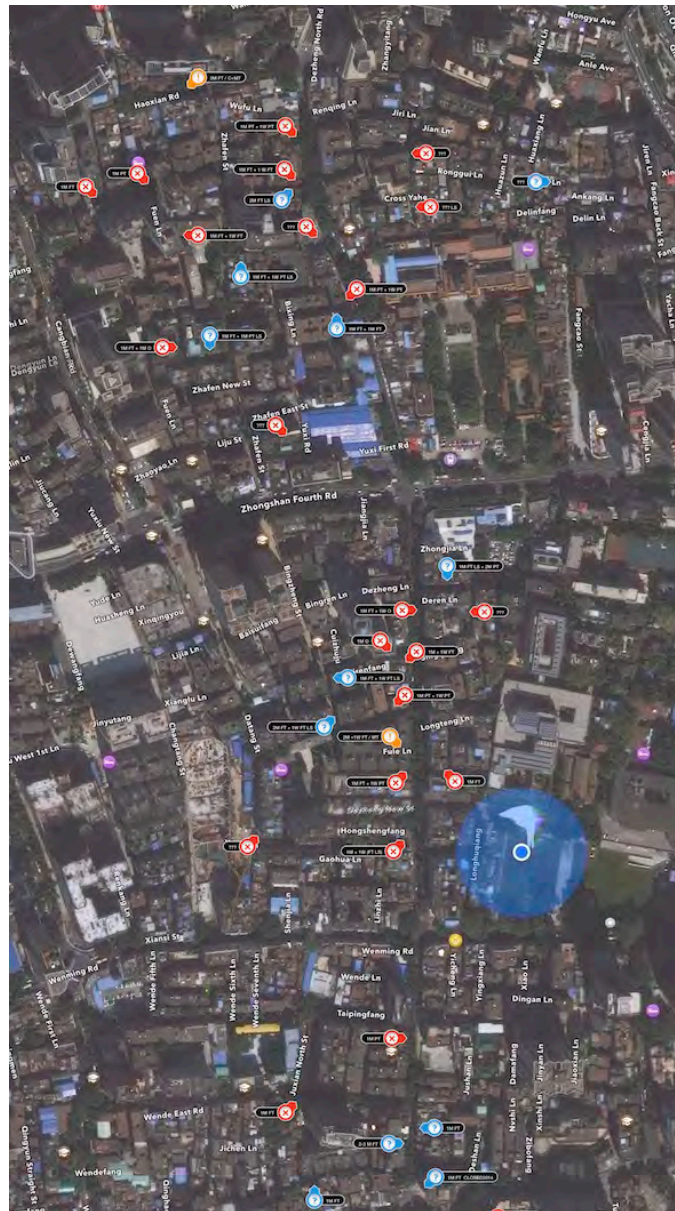


Figure 6.3: A map of the area around Peasant Movement Institute in Guangzhou. Red spots signal junk collectors, orange ones aggregating stations and green ones repair shops (see chap. 7). Source: Apple Maps, annotations by the author.

The high number of independent collectors in that area of Guangzhou may not have been representative of the city as a whole. It was partly due to the fact that this area was a densely populated and old residential and commercial neighborhood; neighborhoods built recently or spreading over a wider surface had a lower concentration of junk collectors. But no neighborhood was devoid of these people. The fact that they could always be found in proximity to households and small businesses made them the most convenient and often the only available collection service. Thus, everyone relied on them and they faced little true competition in accessing DEEE.

Proximity conferred advantages beyond scrap collection, for both residents and junk collectors themselves. For instance, junk collectors could easily be hired by residents to do all kinds of jobs. Some of them helped transport furniture or goods from one place to another. Others were called to fix a leaking tap or participate in renovation work. Junk collectors also made ideal conversation partners, because they could always be found at the same spot and were generally busy with their hands but not with their minds. Retirees, in particular, stopped regularly at junk collectors' sites to chat, whether or not they had something to sell. Many junk collectors took an active part in local public life; they knew hundreds of people personally and exchanged with them on a daily basis, which made them a good source of neighborhood news. Those junk collectors had generally been in the same neighborhood for years, which made them a permanent fixture in the local landscape. By engaging with them, residents could not only get rid of their scrap and make a little money, but also take the neighborhood's temperature, keep themselves up-to-date, or just pass the time. The fact that many residents interacted with junk collectors on a daily basis does not mean that they treated these people as equals or that they lost all sense of social stratification. But it shows that, in some cases — especially when junk collectors had familiar faces and were therefore deemed trustworthy — they were able to ignore widespread prejudice towards migrant workers and people with rural origins, and overcome their hostility, if they had ever felt any.

Beyond valuable and convenient proximity services, junk collectors also offered the best prices when buying back DEEE. A rough comparison between Gome's price list and the price ranges displayed by junk collectors on their sites²¹¹ (fig. 6.4) suggested that the latter were willing to pay up to four times more for certain products. Under such circumstances, companies that were not able to offer any money at all stood no chance of accessing goods.

²¹¹ Junk collectors were not bound by those indications and they usually tried to stick to the lower end of the price range. But still, owners could invoke them while bargaining to maximize the price of their device.



Figure 6.4: A lot of junk collectors in Guangzhou advertised their services through this type of poster. The prices mentioned here are all for DEEE, even though junk collector buy back other types of objects as well. Photo credit: the author.

6.1.3 Minimizing costs, maximizing profits

Chinese institutional experts explained junk collectors' capacity to offer high prices by pointing at the fact that they and the businesses they resold DEEE to did not comply with environmental protection regulation and hence managed to save costs. Strictly speaking, this was true, but it was also simplistic. The explanation left out a whole range of other factors, most of which actually played a more important role.

More generally, one could say that junk collectors were strikingly good at minimizing costs and maximizing profits. One would have struggled to find slicker business ventures than theirs: no capital (so no investment); no facility (so no rent); no stock (so no management costs); no employees (so no salaries); and, apart from a few basic tools and a small vehicle (typically a tricycle or a bicycle), no equipment (so no maintenance or replacement costs). Junk collectors produced just in time, i.e. what they bought from residents in the morning, or later during the day, they dismantled and sorted in the afternoon, and then sold to aggregating stations in the evening. When everything went according to plan, they reached

the end of the day with an empty site and a thicker wallet, and could start anew the next morning. That saved them the hassle of having to build, manage or reduce stocks, and to hedge against stock devaluation. Aggregating stations too transformed all or at least most of their input into output over a twenty-four-hour period. The man who bought back all metals in the neighborhood I lived in owned two trucks (fig. 6.5) and drove to Foshan every day, at dawn, to sell all of his goods. Not owning a warehouse forced him to get rid of everything on a daily basis, even if it meant selling at a loss, but it also allowed him to save considerable costs. Of course, someone down the line had to own a warehouse and to manage stocks. But that was only done in peripheral regions, by highly specialized aggregators that traded a handful of fractions at most.



Figure 6.5: The aggregating “station” for metals in my neighborhood in Guangzhou was fully mobile: it consisted of one, sometimes two, trucks that drove to Foshan every night. Photo credit: the author.

Junk collectors were also able to retain a great deal of value added in their hands by assuming several labor-intensive processes themselves. When it comes to large home appliances, for instance, they not only collected and transported devices, but also dismantled them. Dismantled devices (in other words fractions) could be sold at a higher total price than undismantled ones, which reflects the fact that dismantling requires labor. But labor is precisely what junk collectors are able to invest (unlike capital, for instance) and

what they do not need to pay for (since they do not employ anyone). Thus, junk collectors usually preferred to dismantle DEEE themselves, for it allowed them to achieve higher profit margins.

But, most importantly, junk collectors did not automatically treat DEEE as a source of materials. They systematically verified whether the devices and appliances they collected were still in working order. For instance, they took them to a nearby shop or restaurant and plugged them into a power socket²¹². When the devices and appliances turned out to be in working order, junk collectors sought to resell them as such. They did so because, as a rule of thumb, devices are worth more than their constituent materials if one manages to preserve or restore their functionality (Yang et al. 2008; Tong et al. 2015:36). Many junk collectors kept an old electrical ventilator or small portable electrical heater for a day or two in the hope that someone might be interested in buying it. As for large appliances, they typically offered them to businesses specialized in secondhand products, of which there are several types.

One of them is small secondhand shops. Such shops abounded in marginal areas of large Chinese cities. In Guangzhou, they could be found mostly in “urban villages” (*chengzhong cun* 城中村) (fig. 6.6), a type of neighborhood that forms part of the city but has the status of rural, not urban land. Urban villages are populated — overpopulated would be more appropriate — almost exclusively by low-skilled migrant workers and their families. These people tend to earn little and to move regularly. They therefore need cheap devices likely to last for at least the duration of their stay but not necessarily much longer. Secondhand devices and appliances are a good option because they are usually cheaper than new ones and can fulfil the purpose. Shops where large secondhand appliances such as television sets, washing machines and refrigerators can be procured often also sell secondhand furniture. I have not studied EEE consumption in urban villages in any detail, but I know that a

²¹² Owners usually gave them the permission to do so, because they knew them and occasionally benefited from their services in return.

proportion of the reusable appliances collected downtown, from “locals” (*bendiren* 本地人), in the mid-2010s ended up in outlying or segregated areas, where “outsiders” (*waidiren* 外地人) used them for an additional period of time. How big a proportion, it is hard for me to say.



Figure 6.6: A secondhand shop in an urban village in Guangzhou that sells both furniture and house appliances such as washing machines and television sets. Photo credit: the author.

Another type of business where secondhand EEE could be found are large, specialized secondhand markets catering to a more general public. Unlike the small secondhand shops located in marginal areas, which were still a relatively common feature in Chinese urban landscapes in the mid-2010s, those large markets, which had existed and thrived in city centers a few years earlier, were on the verge of extinction by the time I embarked on fieldwork. I visited several of them in both Guangzhou and Beijing and found them all very quiet, if not moribund (fig. 6.7). This certainly owes much to urbanites’ increasingly affluent lifestyles and the constantly falling prices of home appliances and consumer electronics.



Figure 6.7: An empty secondhand market for house appliances in downtown Beijing. Photo credit: the author.

A third type of business trading secondhand EEE are wholesale dealers specialized in one type of appliance or device. They represented another channel through which reusable DEEE (in particular household appliances) collected in rich centers moved to poor peripheral areas. Jiang Yingyue, the Beijing-based environmentalist specialized on waste regularly interviewed independent collectors in Beijing and told me in 2015 that she believed the reuse rate to be particularly high for air conditioners. According to her estimations, junk collectors dismantled only 10 per cent of those appliances. The remaining 90 per cent, they sold to specialized aggregators who acted as wholesale dealers (fig. 6.8). The latter tested the air conditioners, refurbished them and resold them, mostly to buyers from outside

Beijing²¹³. With regard to Guangzhou, I was not able to determine where large appliances collected downtown and sent to the outskirts later went to. I doubt that they traveled very far, though, as that would make little business sense.



Figure 6.8: An outdoor market for used air conditioners in the outskirts of Beijing. Photo credit: the author.

Chinese junk collectors had a clear preference for used DEEE over other kinds of scrap. When advertising their services, they always started by mentioning that they bought back television sets, refrigerators, washing machines, air conditioners, and so on. This is because they achieved better profit margins with these objects than with, say, old newspapers, empty plastic bottles or rusty window frames. And this, in turn, is due mostly to DEEE's high reuse potential. True, DEEE's material composition is also attractive, given the presence of copper

²¹³ Air conditioners' high reuse rate arguably explains why their price went from 35 RMB per item to 130 RMB when the subsidy was revised in 2016. Source: "Provisions on the Collection and Management of Funds for the Disposal of Waste Electrical and Electronic Products" [废弃电器电子产品处理基金征收使用管理办法], August 20, 2012. URL: <http://www.lawinfochina.com/display.aspx?lib=law&id=u895> (accessed January 26, 2018).

and aluminum, two of the most valuable materials found (in significant quantities) in municipal solid waste. But reuse (*zai shiyong* 再使用) offered the real bounty. A representative of the China Appliance Service and Maintenance Association (中国家用电器服务维修协会), acknowledged this explicitly during a conference that took place in Shanghai in 2015:

“According to our research, a lot of these unorganized and dispersed guerilla groups [*san luan de youjidui* 散乱的游击队] only collect electrical and electronic products because they are used [*jiude* 旧的]. [This person then explained the difference between ‘used’ (*jiu* 旧) and ‘useless’ (*fei* 废) in a few sentences.] Here in China, statistics show that we collect 103 million old products each year. Ten per cent must be discarded [*baofei* 报废], but ninety per cent can still be used. These ninety per cent, where do they go when they are collected by unorganized and dispersed guerilla groups? To third- or fourth-tier cities and city outskirts.”

The China Appliance Service & Maintenance Association reported to the central government (MoC) and the representative I met basically defended the interests of companies that collaborated closely with large manufacturers of EEE. Unsurprisingly, she strongly opposed direct reuse of DEEE by “informal” actors, which she described as causing nothing less than a “security disaster” (*anquan yihuan* 安全隐患).

6.1.4 Making the most of a refrigerator

One anecdote nicely illustrates all of the points made above, in particular junk collectors’ strategies for minimizing costs while maximizing revenues. Throughout my stay in Guangzhou, I conducted several experiments using my own EEE. One of them involved a small refrigerator that, although not particularly old, became hot quickly and made an annoying noise. I showed it to Mr. and Mrs. Cheng, a junk collector couple I had befriended, and asked them if they would be willing to buy it. Given the heat and noise, I expected that Mr. Cheng would decide to dismantle the refrigerator — and I secretly hoped he would, because I wanted to document the process. But after switching it on and listening to the noise, Mr. Cheng offered me 20 RMB and said he knew what was wrong and would repair the device later. That frustrated my plan and I offered to give him the refrigerator for free if he accepted to dismantle it on the spot. Jumping at an occasion to make a double profit, Mr. Cheng replied that he had just collected another refrigerator, a larger, older and defunct one, and that he would gladly dismantle that one for me if I gave him mine. We struck a

deal. Mr. Cheng went into his tiny home (which consisted of a five square meters room and a hall that doubled as a kitchen and bathroom) and magically extracted a large refrigerator out of it.

The device was almost twenty years old and contained a lot of metal (newer ones tended to contain more plastic). Mr. Cheng told me that he had bought it for 120 RMB and that he could make 150 RMB by selling the materials. I observed that a profit of 30 RMB (around 5 USD at the time) was not much, but he replied “that’s how it is” (*meiyou banfa* 没有办法). He took a pair of pliers and bent the tubes coming out of the compressor until they broke, thereby releasing refrigerant gases straight into the atmosphere. The compressor started making a hissing sound and Mr. Cheng took a step back (fig. 6.9). I asked him if those gases were toxic. “Yes”, he said, “but you don’t feel the effects right away.” He compared the effect of these gases to that of cigarette smoke: one could be exposed for years and only encounter health problems later in life. Mr. Cheng had learned about gases’ toxicity from a neighborhood resident, who advised him not to inhale them. Asked whether he thought they were polluting, Mr. Cheng just shrugged his shoulders. He knew for sure that they could not be salvaged, which was what mattered to him.



Figure 6.9: A junk collector in downtown Guangzhou removes a compressor from an old refrigerator. Photo credit: the author.

Mr. Cheng then removed the compressor from the rest of the refrigerator. He explained that specialized companies bought back these types of components and recycled them. The rest of the device, he attacked with a crowbar (fig. 6.10). After several minutes spent striking the refrigerator energetically, Mr. Cheng broke out in sweat. He was visibly using the entire strength in his body. The hardest part, it seemed to me, was to separate the refrigerator's inner box from its outer panels, because both were attached with insulating foam. The latter material was not worth anything, and it had to be scraped off every metal and plastic part in order to make them sellable; Mrs. Cheng said she would later throw the foam into the rubbish collection truck — so I assumed it would eventually end up in a landfill or an incinerator. Mr. Cheng was not aware that foam too, and not only refrigerant gases, could damage the atmosphere. He did not protect himself while extracting it from the refrigerator walls and neither did Mrs. Cheng when she shoved it into a bag. As far as they could tell,

this foam was harmless and could be manipulated freely. Nothing — no label on the refrigerator, in particular — specifically stated otherwise.



Figure 6.10: A junk collector in downtown Guangzhou breaks an old refrigerator apart using a crowbar. Photo credit: the author.

Mr. Cheng progressively created several piles of materials according to material type. He said that, in the evening, he would bring plastics (valuable transparent ones and less valuable opaque ones) to one aggregating station and metals to another, and that everything would be shipped to Foshan. I was struck by the amount of useless, potentially harmful foam the dismantling process had generated (fig. 6.11).



Figure 6.11: The dismantling of an old refrigerator generates a large amount of waste insulating foam. This material is not recovered and therefore ends up in landfills or incinerators. Photo credit: the author.

Mr. and Mrs. Cheng sold electrical wires as such, without stripping them, but some junk collectors went through the trouble of extracting copper wire from the protective sheath using a cutter (fig. 6.12). At a copper price of 15 RMB per kilogram, this was not profitable, because the activity was quite time-consuming and produced only small quantities of copper. But they still engaged in it in their spare time, just to keep busy or for “entertainment” (*wan yi wan* 玩一玩), as one of them put it.



Figure 6.12: A junk collector in downtown Guangzhou cuts an electrical cable open in order to remove the copper wire from the plastic and iron sheaths. Photo credit: the author.

People like Mr. Cheng relied exclusively on the economic value they could extract from materials and products to make a living; they did not receive subsidies, unlike licensed DEEE dismantling and processing companies. Yet, they managed to offer residents reasonably high prices for DEEE, which ensured that they secured this type of object before anyone else did (fig. 6.13). This can be attributed to their capacity to keep costs low, but not only. Their diversified strategy, which left room for reuse, also enabled them to squeeze the most value out of each device. Sometimes, however, junk collectors resold whole devices or appliances to aggregators that catered to licensed DEEE dismantling plants, in which case they benefited indirectly from the subsidy. Unfortunately, it remains unclear to me what prompted them to do so and when they decided that this was the most advantageous solution. In the neighborhood I studied, this practice was not common.



Figure 6.13: A cartoon published on the Chinese Internet that features a truck driver specialized in the “collection of used house appliances” (jiu jidian huishou 旧家电回收) driving past an “independent collector” (geti huishou 个体回收). The one, whose truck is empty, wonders why the other’s tricycle is full. Source: unknown, found as standalone image on Baidu.com.

6.1.5 Go where the action is

Junk collectors’ knowledge and skills were more or less limited to house appliances. They did buy back old hi-fi equipment, DVD players and the occasional desktop computer from residents and local businesses, but usually abstained from dismantling those devices themselves or even trying to test or repair them. Rather, they resold those devices straight to other collectors, who specialized in them. Those other collectors represented a category of its own: they were extremely mobile and prowled the city on two-wheeled vehicles (fig. 6.14), stopping by tens of places a day within a certain, pre-defined area. They could be summoned at any time and by anyone to buy back and take away a device, but the way they usually operated was by visiting the same sites every day, where they knew (immobile) junk collectors were waiting for them with cheap, middle-sized electronics. For smaller and more valuable electronics, e.g. high-end smartphones and recent game consoles, residents rarely turned to junk collectors or mobile collectors. Those categories of products had a high residual value even when defunct and required very specialized knowledge, which junk

collectors did not possess and neither did mobile collectors. Thus, small electronics flowed into another channel altogether.



Figure 6.14: A mobile collector specialized in electronics rides his bicycle in the streets of Guangzhou carrying an old CRT computer monitor. Photo credit: the author.

Several sites in downtown Guangzhou abounded with self-employed individuals willing to buy back small electronics. These people, which my Chinese informants sometimes referred to as “street peddlers” (*xiaofan* 小贩), gathered in places where electronics were sold in large quantities, for instance in Gangding (岗顶, in Tianhe District 天河区), the city’s main shopping site for computers. They sat outside specialized shopping malls, advertised their services using basic cardboard signs (fig. 6.15) and waited for owners to address them. On a busy day, there could be a hundred of them distributed over two or three blocks.

Closer to my home, street peddlers could also be found in Martyr's Park (烈士陵园), a bustling commercial district located next to one of the city's sightseeing highlights, where people always flocked in great numbers to take a stroll, eat out and/or do some shopping. The presence of a great many shops selling mobile phones and related accessories (one street alone harbored dozens of them and two floors in the shopping mall were entirely dedicated to this line of business) made Martyr's Park certainly the best place in Guangzhou to buy back such devices. Street peddlers positioned themselves at the heart of the action: in front of, or down the stairs from, the very shops where masses of consumers purchased new devices that made the ones they still possessed redundant.



Figure 6.15: A street peddler in a busy area of downtown Guangzhou waits for clients to address her and offer her mobile phones and other small electronics. Photo credit: the author.

Every time I managed to procure a used mobile phone or computer, I went to Gangding or Martyr's Park, offered it to street peddlers and tried to strike a conversation. From what I understood, street peddlers only made profit thanks to recent models and functional devices. They were willing to buy old or defunct ones for a modest price (a dumbphone was typically worth 5 RMB, in whatever condition) but showed very little interest in them. Tellingly, they advertised mostly for high-end smartphones. As soon as someone popped up with such a device, even a broken one, they became alert and displayed a much greater willingness to conduct a transaction. One day, I exchanged with a man who was very excited because one of his friends, further down the road, had bought an iPhone 6 with a shattered screen for half the price he could sell it for. "This guy made 1400 yuan in one day! Can you imagine? He doesn't even need to show up here for the next week!" Street peddlers in Martyr's Park told me that they resold most of their goods to specialized buyers located in Shenzhen, China's hub for smartphone refurbishing (see chap. 7). I do not know how lawful the activities of those street peddlers were, but I do know that they practically never harassed by the *chengguan* (城市管理行政执法局 or 城管), i.e. the law enforcement department within the city management. Indeed, I often saw street peddlers in Martyr's Park having a long chat with *chengguan* officers.

6.2 Contender strategies

At the time of my fieldwork, junk collectors, mobile electronics collectors and street peddlers specialized in small, valuables electronics had control over the last mile. But their dominant position in DEEE collection was not unchallenged. Some entities sought to appropriate it, others to put an end to it.

6.2.1 If you can't beat them, join them

Independent collectors' amazing efficiency and endurance attracted quite a few entrepreneurs, who thought that they could take advantage of preexisting networks to access DEEE more easily. In 2014, I met Ronny Steinmauer, CEO and founder of Last Mile Solutions Ltd. (LMS), a company that caters to "all the blue chips in the electronics industry" and helps them fulfill their EPR obligations throughout the world. LMS basically makes sure big brands' products are channeled into the right places, for commercial, legal and environmental purposes. The company considered entering the Chinese market and

had just launched a small pilot project in Beijing to test the feasibility of setting up a local company that would employ junk collectors and buy back the DEEE they collected.

Mr. Steinmauer was very critical of China's EPR system. He stressed that it was not in line with multinational companies' interests, since they had to foot the bill, but did not have any control whatsoever on material and financial flows (see chap. 5). His idea was to help multinational companies better harness the value that remained in their products at the postconsumer stage in China and to do so by starting at the level of collection.

"These independent collectors control the first mile²¹⁴ and it's the most critical part. That's why collectors are needed. That's why we want to include them in our program and that's also why governments tolerate them. [...] For the moment, state authorities are tolerant towards first mile collectors, but this is going to change. These people represent the best link in the chain to start with if you want to change the whole system. Diverting the materials right from the start is the only way to ensure that they will be treated appropriately. We want to own materials, in order to divert them to clean channels. You have to start from the collection point if you want to master the whole supply chain."

The way Mr. Steinmauer described his project to me made it sound like it was about exploiting Chinese junk collectors (their unique position, their workforce, their skills) rather than collaborating with them on equal or fair terms. He did not seem to care much for their well-being, not at all for their independence, and he declared himself ready to compete against them should he not manage to swallow them up.

"Their choice is a limited one. They have to understand that it's either they take what we give them today or they might lose everything tomorrow. [...] We can't offer higher prices for materials — actually we can only offer lower ones — but we can offer them small benefits, like free food, basic health coverage, a buy-back guarantee on the mid-term, and a basic monthly salary of some 1000 RMB. [...] As much as they don't like [the prospect of having to formalize], they won't be able to avoid it. [...] If there's no other choice, we'll do [collection] ourselves."

²¹⁴ The "first mile", here, is synonymous with the "last mile" mentioned above.

Though well-informed on the specificities of DEEE recycling in China, Mr. Steinmauer clearly had limited familiarity with this country. He had a poor understanding of junk collectors' motivations, for instance. This was China, not Chad, so free food and basic health coverage would hardly be an incentive for anyone; and depriving junk collectors of their autonomy, or "freedom" (*ziyou* 自由), as they called it, did not strike me as a particularly good idea, for that was one of the aspects they most cherished about their job. Not only that, but Mr. Steinmauer also failed to grasp the dynamics of informality in China. This led him to believe — wrongly, I think — that Chinese state authorities would greet his project in Beijing with open arms simply because it involved integrating "informal" actors into the formal economy. This might have happened in South America, where there was evidence of a relatively more open official stance towards informality²¹⁵. But this was China, not Chile. Finally, Mr. Steinmauer's conviction that LMS could rapidly and easily succeed where others had already tried and failed already betrayed a displaced self-assertiveness that did not bode well for the future of LMS's presence in China.

Nevertheless, it is telling that someone like Mr. Steinmauer, who ran operations on several continents and had a long experience in reverse logistics, looked enviously at Chinese junk collectors' position and aimed at entering the Chinese market through co-opting their methods and networks. For me, that goes a long way in proving how successful these people were.

6.2.2 Official endorsement in neighborhoods

Similarly, state authorities at the lowest administrative level (subdistrict office or *jiedao banshichu* 街道办事处) were tempted to integrate junk collectors into the state "sanitation" (*huanwei* 环卫) system so as to benefit from their manifestly higher performance in the field of "municipal solid waste" (MSW or *shenghuo laji* 生活垃圾) collection and sorting. In

²¹⁵ One of Mr. Steinmauer's employees was working full-time on the topic of informal sector integration in South America, so Mr. Steinmauer certainly knew more about it in that context.

Guangzhou, a first experiment took place in 2014 in Huanghuagang (黄花岗), one of Yuexiu's subdistricts, and several other subdistricts imitated it, triggering what could be described as a citywide trend. The method was more or less consistent across subdistricts: officials drafted several junk collector families, acknowledged their existence, adopted rules regarding their activity, and vouched for them. Junk collectors were issued a certificate (*zhengshu* 证书), equipped with a uniform (a vest), and housed into a specially built shed (fig. 6.16), so that they could easily be recognized by the local population as being officially endorsed. Unlike sanitation workers, however, they did not have a work contract or a salary.



Figure 6.16: These junk collectors in downtown Guangzhou operate from a shed built for them by a neighborhood government. Photo credit: the author.

Bringing junk collectors on board, so to say, had a clear benefit for subdistrict authorities: it allowed them to dramatically increase official MSW collection and sorting rates, which remained problematically low in China for years despite long-lasting efforts at establishing state-run systems throughout the country. In this sense, it was not only an innovative, but

also a desperate attempt. When I interviewed her in January 2016, Lin Fengmian had just handed in her PhD thesis in sociology, which concluded that policies promoting MSW sorting in Guangzhou had failed²¹⁶.

“Officially, they’re still being implemented and close to producing results. But, in fact, ten years have passed since they were adopted and we are still far from seeing a working system. Sorting [by state authorities] remains purely theoretical. If it weren’t for independent rubbish collectors, nothing would get sorted at the neighborhood [*xiaoqu* 小区] level.”

Back in the mid-2010s, separate bins for sorting municipal solid waste could be seen everywhere in China (fig. 6.17), but the content of those bins generally ended up in the same, single compartment truck, thereby making sorting a vain enterprise. This drove several of my Chinese friends, especially among the young generation, to despair and caused them much shame.

²¹⁶ Likewise, two nationally renowned environmental engineers noted in 2011 that “in recent years, a number of Chinese cities have begun carrying out household waste separation pilot projects. But none has truly succeeded [...]”. Source: Xie Jian & Du Huanzheng, “Time to Separate Treasure from Trash”, *China Daily*, May 31, 2011. URL: http://www.chinadaily.com.cn/cndy/2011-05/31/content_12608936.htm (accessed June 12, 2017).



Figure 6.17: Street rubbish bins in downtown Guangzhou. The green one is for recyclables and the yellow one for other wastes. Note the mix of environmentalism and nationalism in the slogans: “environmental protection” and “love our homeland”. Photo credit: the author.

Through her interviews, Lin Fengmian discovered that representatives of Guangzhou’s city management had always wanted to integrate junk collectors into sanitation services, but never managed to. Several practical obstacles stood in the way, among which the fact that junk collectors tended to operate on territories that spread across administrative boundaries. Evidently, the city management judged conflicting jurisdictions between subdistrict offices too great a barrier to be overcome. Junk collectors’ practice of adapting their level of activity to incoming material flows also sat uneasily with the rigid schedule that regulated administrative life.

Other issues, of a symbolic order, had to do with widespread representations of rural migrants. In China, these people were stigmatized in official discourse. As Goldstein points out:

"The urban administrative perception of migrants as being of 'low quality' (*suzhi di*), disorderly, criminal, and uncultured is propounded through both official and unofficial articulations and is a crucial discursive component of discriminatory regulatory and political mechanisms." (Goldstein 2006:286)

Migrants were portrayed as outsiders that posed a threat for the local population. Their presence was necessarily temporary and they could disappear overnight, without a trace. What is more, they were only partly integrated in the local social and economic fabric and their interests did not overlap with those of the local population. Junk collectors were often suspected of cheating residents through fiddling with weight measurements or offering prices below market levels, for instance. For all these reasons, state representatives felt that precautionary measures needed to be taken against rural migrants and that their aura of rulelessness, if not illegality, needed to be toned down prior to any collaboration. In Huanghuagang, for instance, the subdistrict office required junk collectors to register with the local police station, which verified their identity. Only those that had an empty criminal record were invited (or forced) to enroll. It also forced the latter to use calibrated scales. Ironically, all of the junk collectors I interviewed there who had started working for the subdistrict office had been active in the same area for years prior to that, so residents knew and trusted them already. But, visibly, that did not matter. The good thing about experiments with junk collectors, Chen Xiaolong argued, was that "once authorized, these people can participate in the collective defense (*lianfang* 联防) of the neighborhood" — which proved that rural migrants were not beyond redemption.

Experiments such as the one conducted in Huanghuagang were tricky because they built bridges between the "formal" and "informal" sectors while much was done to keep those sectors apart. That might explain why they only existed on a limited scale. State authorities at the lowest administrative level could endorse a few junk collectors, but those at the higher levels had to be more careful. When I asked Chen Xiaolong why the city management did not simply outsource the entire rubbish collection and sorting in Guangzhou to junk collectors, he replied that this would "have a bad impact on the city's image" (*hui yingxiang shirong* 会影响市容) and "hinder hygiene" (*fang'ai weisheng* 妨碍卫生). He also pointed out

that state authorities did not have the ability to deal with such actors (*bu fangbian guanli tamen* 不方便管理他们) (see chap. 5). Similarly, the representative from the China Appliance Service and Maintenance Center made clear that DEEE collection at the national level had to be entrusted to actors that complied with norms and standards, which excluded anyone “informal”:

“Companies don’t necessarily have to be big to belong to the formal sector [*zhenggui jun* 正规军], but they have to operate according to standards [*guifan de caozuo* 规范地操作]. That applies to collectors as well. Given the current situation, we have to introduce criteria and standardize the market comprehensively [*wanzheng de biao zhun he shi chang guifan* 完整地标准和市场规范]. If we let everyone do this work and don’t establish rules, that would create an insurrection [*zhibi ba zhege hangye zuoluan* 势必把这个行业作乱].” [...]

6.2.3 The future lies in digital technology

A lot of entities sought to bypass junk collectors and wrest DEEE away from them. Some of them tried to beat junk collectors at their own game. In Shanghai, for instance, the state-supported dismantling company Shanghai Xin Jinqiao Co. Ltd. (上海新金桥环保有限公司) set up a proximity service, dubbed AlaHB (*ala huanbao wang* 阿拉环保网)²¹⁷, in the form of automatic deposit machines (fig. 6.18) located in neighborhood throughout the city where residents could drop their small DEEE and receive “points” (*jifen* 积分) in exchange. However, this system hardly incentivized anyone. Points only allowed users to buy a limited range of products and mere plastic trinkets cost the equivalent of six or seven highly valuable small DEEE — so accumulating enough points to buy a reasonably useful product, like an electrical kettle or a hair dryer, seemed unrealistic. Not only that, but the procedure made AlaHB quite unappealing: one had to register online, get a card, locate a machine, navigate its interface, and so on. During a visit to Xin Jinqiao’s dismantling plant, the official final destination for all devices collected through AlaHB, I asked the guide how many devices the company managed to collect through AlaHB. The question visibly made her feel

²¹⁷ See <http://www.alahb.com> (accessed January 26, 2018).

uncomfortable and she replied that she did not know the exact figures but that the quantities were “acceptable” (*zhongliang shi keyi de* 重量是可以的). At the same time, she explained that the company offered only 2 RMB per kilo for small DEEE, which compares very badly with what residents could get from any junk collectors at the time (a defunct dumbphone weighing around a tenth of a kilo typically went for 5 RMB).



Figure 6.18: Deposit machines used by a licensed recycling company to collect small DEEE in neighborhoods in Shanghai. Here, a model is on display in the company’s museum. Photo credit: the author.

Most contenders counted on digital technology to get a competitive edge over junk collectors, but few of them did so successfully. Another attempt, and perhaps the most famous of all, fizzled out miserably. Starting in August 2014, Baidu (百度), the Chinese internet giant, developed an application dubbed “Baidu Recycle” (*baidu huishou zhan* 百度回

收站), which aimed at enabling licensed DEEE dismantling companies to source their goods directly from owners/consumers. The application allowed owners to upload pictures of a device they wanted to get rid of, get a quote and arrange a pick-up service at home. The project, which was launched in July 2015 with great pomp and unanimously celebrated, featured a direct collaboration with TCL Aobo (TCL 奥博 (天津) 环保发展有限公司), one of China's leading DEEE recycling companies, and benefited from international support through the United Nations Development Program (UNDP) (fig. 6.19).



Figure 6.19: UNO general secretary Ban Ki-moon and Baidu founder Robin Li present Baidu Recycle, an online platform for DEEE collection, during a press conference. Source: UNDP.

Everything suggests that Baidu Recycle's concrete impact is inversely related to its fame. To this day, I have found no indication that the project ever took off. Figures on the number of people who used the app or the number of devices collected through this channel are virtually nonexistent. Ironically enough, for an application intended to facilitate recycling through "big data" (*da shuju* 大数据), no statistic can be found on those numbers, even in the numerous press releases and media reports released in both Chinese and English since 2014. As of June 2017, Apple's App Store, one of the major platforms on which the app can be downloaded, did not display a single rating or comment, which suggests that very few people, if any, used it. All this would suffice to cast doubt on the project's performance. But

when I interviewed Cao Minghua, a person who had contributed to the project, in March 2015 I learned something that further discredits it: collection services would only be available through Baidu Recycle in a very few parts of the country: “For the moment, people can only use the app in Beijing and Tianjin. There’s been a strong interest from people in Guangdong as well, but the UNDP could only afford to support a single company, and that’s TCL, in Tianjin.”

Despite these highly unconvincing results, digital consumer-to-business (C2B) platforms were almost universally hailed as the next big thing in mid-2010s. Many people, including high-ranking officials, considered them to be the future of DEEE collection in China. At a specialized conference in Shanghai in 2015, Ye Changrui, a representative of the MoC, asserted that “digitalization” (*shuzihua* 数字化) was the way to go. He mentioned AlaHB explicitly, as well as a similar service (3R 超市) created and run by a well-known brand (Gree 格力美) in Wuhan, and declared his support for such initiatives. “We want to promote these new models”, he said, making clear that central government had the means to do so: since 2009, the MoF had invested almost 3,4 billion RMB (33,5 亿元) in supporting seventy-five cities in their effort to set up or expand their “resource” (*ziyuan* 资源) collection and treatment infrastructures²¹⁸.

C2B digital platforms’ popularity, despite their weak record when it comes to DEEE collection, can be partly explained by the fact that they promoted consumption of new devices. Many platforms, for instance, delivered points, not cash, and those points had to be spent on the purchase of new devices. What is more, all platforms potentially provided extremely useful data that could help manufacturers of electrical and electronic devices devise more effective marketing strategies. As Cao Minghua explained to me, Baidu Recycle’s application generated information on consumer behavior, especially with regard to

²¹⁸ See also Premier Li Keqiang’s “Internet +” policy, addressed above (chap. 4).

products' "rate of renewal" (*gengxin lǜ* 更新率, i.e. the speed at which consumers tended to replace old device with new ones).

"If the app shows that a customer renews his television set every three or four years, then this data can be used by producers to offer him a new model when the time is ripe. This is a great opportunity for producers. If they realize that they can benefit, they'll definitely climb on board."

More generally, C2B digital platforms formed part of a trend that marked China in the 2010s, whereby everyone involved in business sought to take advantage of the smartphone revolution. According to a report released by the state-backed China Internet Network Information Center (CNNIC), more than half of China's population was connected to the Internet in 2015 and more than ninety per cent of users accessed the Web via their smartphone²¹⁹. This high — and rapidly growing — "smartphone penetration rate" created a wealth of business opportunities and made it reasonable to envision the emergence of entirely new business models —after all, online sales in China exceeded those in the US in 2015 and were still growing at a staggering 33.3 per cent year-on-year²²⁰. A lot of Chinese took for granted that, in the future, all types of business transactions would be conducted using a smartphone. Obviously, this had more to do with fantasy than with reality. Experience in countries that had adopted online services early on revealed that they were no substitute and that they only made part of the equivalent offline services redundant, one of the reasons being that non-technology-savvy citizens, such as illiterate or elderly people, also had to be catered to. Nevertheless, many Chinese believed that digitalization would steamroller the country into a new era.

²¹⁹ "More Than Half of China's Population is Online — And Most Use Smartphones", *The Wall Street Journal*, January 26, 2016. URL: <https://blogs.wsj.com/chinarealtime/2016/01/26/more-than-half-of-chinas-population-is-online-and-most-use-smartphones/> (accessed January 26, 2018).

²²⁰ "China's E-Commerce Addiction Has Serious Market Potential", *Forbes*, July 16, 2016. URL: <https://www.forbes.com/sites/sarahsu/2016/07/16/chinas-growing-e-commerce-addiction/#67f146a32550> (accessed January 26, 2018).

6.2.4 Surfing the obsolescence wave

In fact, the only Chinese digital C2B platforms for DEEE collection that met with success were those that drew inspiration from another aspect of junk collectors' strategy, namely reuse. Like Baidu Recycle and AlaHB, these platforms relied on digital technology (either a webpage, a dedicated smartphone app or an integrated WeChat (*weixin* 微信) function, or a combination of those) to get closer to owners of DEEE. But, unlike them, they did not buy back devices at fixed prices themselves. Instead, they auctioned devices, which left the door open to other forms of engagement than materials extraction. Some of the companies that bought DEEE through those platforms repaired or refurbished them and then resold them as fully functional devices. Since products whose function has been preserved have a higher economic value, those companies were capable of offering higher prices, and therefore of securing the goods.

Several elements make it possible to assert with certainty that such platforms were dedicated to reuse. First, they required a considerable amount of information on devices. Buy Green (淘绿网)²²¹, for instance, asked owners a total of twelve questions, about their devices before issuing a reference price and most of them had to do with condition, appearance and functionality. Second, they quoted prices that exceeded by far what companies relying exclusively on dismantling and processing could offer. To take only one example, Love Recycling (爱回收网)²²², one of the pioneers in this field, registered sales of around 50 million RMB for around 100,000 devices in the first three years since its creation in 2011, which translates into an average of 500 RMB per device²²³.

²²¹ See www.taolv365.com/ (accessed January 26, 2018).

²²² See www.aihuishou.com/ (accessed January 26, 2018).

²²³ "Love Recycling: 'E-waste' Goes C2B" [爱回收: 让“电子破烂” C2B], *Finance East Money* [东方财富网], March 28, 2014. URL: <http://finance.eastmoney.com/news/1670,20140328372278187.html> (accessed January 26, 2018).

In the mid-2010s, numerous platforms like Love Recycling and Buy Green could be found on the Chinese Internet and all of them were powered by smartphone reuse. Some, like Buy Green or 360 Recycle Securely (360 安全回收), focused on smartphones exclusively; others, like Love Recycling, accepted all categories of electronics but relied on smartphones as their core business. Several factors accounted for smartphones being the most sought-after type of reusable DEEE: their still incomplete “penetration rate” in China; their rapid obsolescence (due to both changing fashion and incessant technological progress); and their function as markers of social status. The fact that they did not weigh much or take much space also made them very convenient to work with: online platforms could rely on preexisting shipping services such as those of courier companies, which were available everywhere, at least in Chinese cities.

6.2.5 Working on the source itself

As I have observed above, institutional experts in China considered collection to be the crux of the country’s “e-waste problem” (see, e.g., Qu et al. 2013 on the city of Dalian). They argued that DEEE would not have such a detrimental environmental impact if only it could be channeled straight into licensed dismantling and processing companies. In order to make the country’s “formal system of e-waste management” really successful, according to them, one needed to overcome these companies’ difficulties in accessing DEEE, which were largely due to junk collectors’ and street peddlers’ amazing capacity to reach DEEE at its source.

However, these people’s performance did not necessarily have to be matched. One way of circumventing the problem was to work on the source itself, namely owners. Institutional experts in China advocated triggering a change in mentalities. Practically all of them agreed on the idea that the country’s “e-waste problem” would not be solved without the population’s contribution. The level of “green awareness” (*huanbao yishi* 环保意识 or *shengtai zijue* 生态自觉) needed to be raised throughout society, and citizens — considered here above all in their role as “consumers” (*xiaofeizhe* 消费者) — needed to be taught to take the environmental threat posed by DEEE seriously and to act responsibly. Experts’ argument fitted well with the broader propaganda campaigns devised by state authorities at all administrative levels, which emphasized individual responsibility for protecting the environment (fig. 6.20). For instance, residents throughout China were exposed on a daily

basis to the message that sorting household rubbish was the morally right thing to do and a sign of “civilized behavior” (*jiang wenming* 讲文明) (fig. 6.21).



Figure 6.20: A poster in downtown Guangzhou that reads “Environmental protection and [energy/water] saving. It starts with me.” Photo credit: the author.



Figure 6.21: This poster in downtown Guangzhou reads: “Civilization starts with sorting. Let us blow a new civilizing wind of rubbish separation.” Photo credit: the author.

In the context of DEEE recycling, the call for more “green awareness” translated into an injunction for people to act in ways that fitted best with the principles, requirements and needs of China’s “formal system” (fig. 6.22). At stake, here, was the success of this system (Zhou & Xu 2012:4718). Owners had to be brought to: regard EEE suspiciously as soon as (but not before) it became obsolete and worry about its future impact (even after they did not possess it anymore); consider it as worthless and accept handing it in for free; and trust only certain actors, namely licensed companies, to the exclusion of all others. All this went against deeply rooted habits within the Chinese population. Aligning owners’ representations and practices to the interests of actors taking part in the “formal system” required nothing short of a revolution of minds.



Figure 6.22: A speaker advocates the establishment of a “formal recycling system” during a specialized conference in Beijing and ranks public environmental awareness as the main priority. Photo credit: the author.

Education efforts focused on the young generation, which, it was believed, could be influenced more easily and was accustomed to mass consumerism. Older generations, who had lived through previous eras, when China had barely begun to industrialize and urbanize, had experienced other ways of living and thinking, and clung to some of them. The elderly, in particular, tended to be more penny wise and to see economic value in even the smallest bits of scrap. This said, not all young people were willing to give up the revenues associated with DEEE (see Gu et al. 2016). Though he was young and certainly more environmentally aware than most of his fellow country people, Shi Dong, a PhD researcher studying mobile phone recycling I met in Shanghai, admitted in 2014 that he refused to give away his own devices for free.

6.2.6 Monsters under your bed

Pushing consumers to adopt the correct stance with regards to DEEE required changing the way they perceived these objects. From valuable products, DEEE had to be turned into hazardous waste. We have already seen that institutional experts routinely referred to DEEE as a form of “solid waste” or “rubbish” that could be transformed into resources. Those terms obscured DEEE’s commercial value as products that have a function. To insist on danger, actors supporting the “formal system” regularly invoked the dominant worldwide discourse on “e-waste” (see chap. 2), which provided plenty of arguments to buttress the claim that

DEEE caused harm at the dismantling and processing stage. Interestingly, I encountered claims that electrical and electronic devices posed a threat at the consumption stage as well, for their owners. Gome, for instance, advertised its Old for New take-back scheme using the argument that old devices are an “invisible threat” (*kan bu jian de weihai* 看不见的危害) (fig. 6.23).



Figure 6.23: An image used by one of the country’s main EEE retailers to promote its “Old for New” take-back scheme. It shows a poisonous-looking snake that hides in a ventilation hood. The accompanying text reads: “Obsolete house appliances: A danger that cannot be seen is even scarier.” Source: Gome.

The Guangdong Household Electrical Appliances Chamber of Commerce (GDEACC 广东省家电商会), a major trade and industry body that reports directly to the provincial government, backed Gome's scheme and observed in 2015²²⁴ that a lot of old appliances remained in people's homes, which represented a "hidden" (*yincang* 隐藏) threat. It recommended renewing all electrical equipment regularly and quoted national guidelines²²⁵ on acceptable lifetimes, namely:

- eight to ten years for all large appliances, after which: CRT television sets risked exploding and starting a fire; bacteria appeared in refrigerators that could cause cancer; bacteria accumulated in washing machines possibly causing skin infections; air conditioners developed foul odor, noise, high electricity consumption and bacteria; fat accumulated in ventilation hoods causing a risk of cancer;
- and one to three years for small devices, after which electricity consumption rose rapidly and various risks appeared, including a doubled amount of radiations from microwave ovens.

The GDEACC did not recommend cleaning devices, verifying their condition regularly, or repairing them in case they did not function properly. Instead it advocated automatically replacing them with new ones. "By renewing house appliances, one also renews one's way of thinking" (*huanxin jiadian, huanxin guannian* 换新家电, 换新观念), the organization put forward. Old for new take-back programs, it argued, triggered nothing less than a "renewal of the whole nation" (*quanmin huanxin* 全民换新).

²²⁴ "Gome Guangzhou to Launch 'Overaged Home Appliances' Old for New [take-back scheme]" [广州国美明日启动 "超龄家电" 以旧换新], *Hea.cn* [家电网]. URL: <http://news.heacn.com/2015/0528/226780.shtml> (accessed January 26, 2018).

²²⁵ See "Detailed Rules and Regulations for the Safe Use of Household Appliances" [家用电器安全使用年限细则], *Standardization Administration of the People's Republic of China* [国家标准化管理委员会]. URL: <https://wenku.baidu.com/view/a92d22f49e3143323968935b.html> (accessed January 26, 2018).

Such attempts at manipulating people's perceptions could hardly be justified in terms of a pursuit of the public good. Fundamentally, they did not aim at protecting the population against the negative repercussions of "e-waste", which are anything but obvious at the consumption stage. Rather, they were geared towards boosting sales, shortening periods of use, and massifying disposal.

6.2.7 Disregarding and discrediting the market leaders

In twenty-first century China, it was common knowledge that self-employed collectors and small collecting businesses bought back DEEE and offered very convenient services. These people's omnipresence, at least in cities, made it difficult to ignore them. Nevertheless, Chinese owners were sometimes portrayed as wondering whom to turn to when discarding electrical and electronic devices (fig. 6.24). In practice, few of them must have ever found themselves at a loss, but the illusion of a void created room for less obvious actors. During specialized conferences, when experts discussed scrap collection rates in China and compared them to those that in European, East Asian or North American countries, they generally mentioned figures that excluded "informal sector" collection, which gave the impression that China lagged behind those countries and that much remained to be done throughout China to improve the diversion of recyclables from landfills and incinerators — in fact, as environmentalists repeatedly told me, MSW in China was so "wet" (*shi* 湿), i.e. devoid of recyclables, that it did not burn well in incinerators.



Figure 6.24: A drawing published on the Internet that portrays a consumer wondering what to do with his electronic devices and house appliances (“Who can come and collect them?”). In the background, one can read the expressions “waste of resources” (*ziyuan langfei* 资源浪费) and “environmental pollution” (*huanjin wuran* 环境污染). Source: unknown, found as standalone image on Baidu.com.

Despite the “formal system” being officially based on “multi-channel collection”, state authorities explicitly encouraged consumers not to interact with independent collectors (fig. 6.25). These people, they claimed, posed a whole series of problems, notably in terms of security and morality (see above). They were also portrayed as lacking the “green awareness” so important for making China a truly “civilized” place. Joshua Goldstein notes that in the early 2000s rural migrants, who had progressively taken over the sector since the late 1970s, were “constantly criticized for being ‘driven purely by their desire for profit’ rather than by altruistic motives to conserve resources and promote sustainable development” (Goldstein 2006:287).

“Recent years have seen a dramatic increase in the government’s pro-environment preachings, but rather than harnessing this environmentalist rhetoric to boost the social profile of migrant gleaners, the government has amplified accusations that they are anti-environment.” (*ibid.* p. 286-7)

If anything, that trend continued through to the mid-2010s.

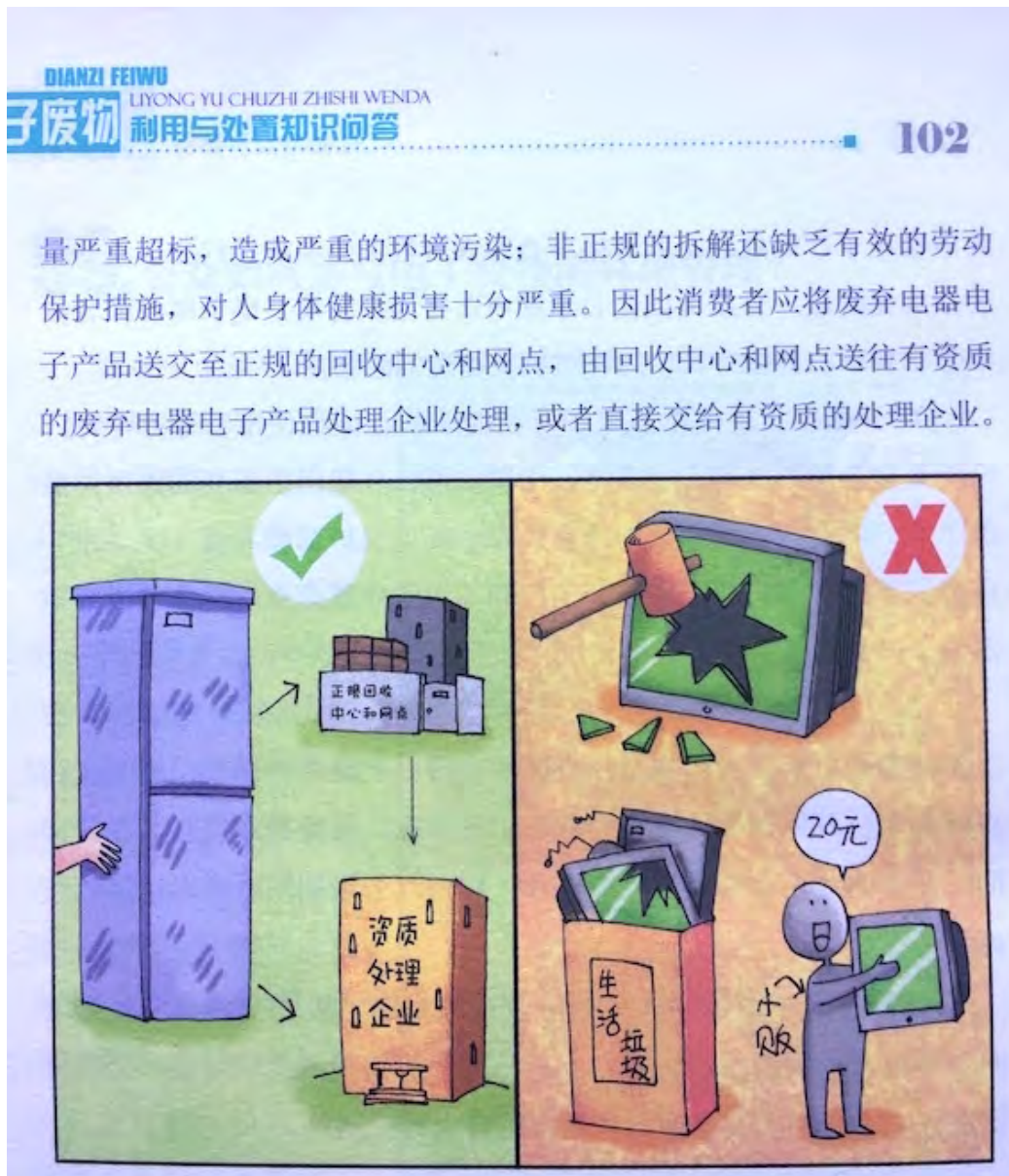


Figure 6.25: A page from a booklet on DEEE published by the propaganda office of the MEP that dissuades owners to sell their EEE to “street peddlers (*xiaofan* 小贩) and recommends bringing it to “formal collection centers” (*zhenggui huishou zhongxin* 正规回收中心) instead. Source: MEP.

Many companies in China took advantage of such representations by playing the green card, irrespective of whether they offered services likely to protect the environment. Buy Green is a case in point. Fundamentally, the platform fulfilled much the same role as independent collectors (considered collectively): it bought back used smartphones and sold them to people who would either refurbish or dismantle them and did not verify how this was done. The only major difference was that Buy Green used digital technology to access phones and redistribute them. That, in itself, had little to do with protecting the environment, but the company operating the platform, the aptly named Buy Green Environmental Protection

(*taolü huanbao* 淘绿环保) claimed it did. In its 2014 annual activity report²²⁶, the company stated for instance that “smart recycling is more environmentally friendly because it uses technology” (*zhineng huishou, you keji, geng huanbao* 智能回收，有科技，更环保).

Buy Green Environmental Protection put in great efforts, including through public relations, to emerge as a paragon of virtue. It posted abundantly on social media on the topic of DEEE recycling and its articles were always in favor of everything “formal” — which made the company sound almost like a mouthpiece of the Party-state. This should not come as a surprise, as Buy Green Environmental Protection’s board chair and CEO, a man in his thirties named Manson Lu (卢海滨), was simultaneously a high-ranking official: he served as vice-president of the China Resources Recycling Association (中国再生资源回收利用协会). Ironically, though, Manson Lu had grown up in Guiyu, out of all places, and was most likely a member of one of the town’s numerous recycler families. He had made his way to the top of the local industry’s official structure, the Guiyu Renewable Resources Association (贵屿再生资源协会), where he acted as vice-president and secretary general. Few people were better positioned than him to understand how crucial environmental discourse had become in contemporary China, how deeply it had been integrated into Party-state propaganda, and how advantageously it could be harnessed for business purposes. Manson Lu made sure he came across as a green guy — regardless of the nature of his engagement with DEEE.

6.3 Conclusion

In this chapter, I observed that independent collectors dominated DEEE collection in China in the mid-2010s. I showed how, and explained why, most other entities struggled to access these objects. DEEE’s commercial value, or price, depends on what is, or can be, done with it. Licensed companies’ obligation to focus on materials recovery prevented them from taking into consideration all aspects of DEEE’s materiality. They were forced to prioritize

²²⁶ See <http://www.taolv365.com/html/20150210/101124264491.html> and <http://www.taolv365.com/YearReport/Default.aspx> (accessed January 26, 2018).

composition over function and to forgo reuse opportunities. Hence their competitiveness problem, I argue. Proof of this can be seen in, among other things, the success of digital C2B platforms that factored in (smartphone) reuse. Collecting DEEE also required making operations thoroughly cost effective, a domain in which independent collectors and aggregators excelled. Chinese institutional experts routinely emphasized licensed companies' adherence to rules and standards as a source of higher operating costs. In truth, however, these companies' overall performance as commercial ventures remained well below that of their competitors — which is due in no small part to their double nature as profit- and rent-seeking operations.

Attitudes toward independent collectors varied greatly. Within the state apparatus, for instance, certain state agencies at the highest administrative level (i.e. the central government) issued recommendations that the Chinese population abstain from using independent collectors' services, whereas a lot of officials at the lowest levels (i.e. subdistrict offices) sought to integrate these people into local sanitation teams and take credit for their action. Among companies involved in reverse logistics, some had plans to hire independent collectors, others to bypass them. The fact is, however, that independent collectors were difficult to dislodge. These people formed an extensive network that reached into every nook and cranny of the urban landscape and catered to the local population in effective and convenient ways. Residents relied on them for all kinds of services, including but not limited to DEEE collection or take-back — much like they also relied on other migrant workers for services such as plumbing, building renovation and person care. On the whole, as my ethnography shows, they had good neighborly relations with independent collectors. In sum, independent collectors in downtown Guangzhou made a crucial contribution to the smooth running of daily life in Chinese cities, which was widely acknowledged at the local level, but they lacked broad recognition and support, which made them vulnerable and threatened their livelihood.

Although DEEE collection, and recyclable waste collection more generally, was carried out almost entirely by independent collectors, there was little concern for them and their survival among municipal, provincial and the central governments. Quite the opposite in fact, as many municipalities had plans to do away with these actors (see also Gidwani 2015). In Beijing, for instance, scrap aggregating stations and secondhand markets for DEEE were

forced to relocate further away from the city center every few years, as the sites they occupied were demolished to make room for urban development, and municipal waste management planning prescribed that recycling should not take place within the limits of the city (Tong & Tao 2016, Chen 2017). Given the sheer size of Beijing, this complicated the work of independent collectors and aggregators considerably. In conjunction with the low material prices characteristic of the mid-2010s, it even forced many of them out of business.

A key way in which various entities were conjointly trying to redirect DEEE flows away from independent collectors is by altering representations of these objects and of the people most involved in trading, transporting and transforming them. Old EEE was portrayed as valueless and dangerous, and so-called informal actors as either absent, untrustworthy or incapable of carrying through the environmental revolution that China needed. This reveals an effort to act on the source itself, namely on owners or consumers of EEE, and to alter the behaviors of these people so that they would discard EEE sooner, hand it in for free, and only use the services of licensed, or so-called formal, companies. Chinese experts advocated a “change of mentality” among the population as a necessary step towards solving China’s “e-waste” problem. They emphasized the responsibility of individuals in making the right choices.

Much has been written to criticize approaches to environmental problems that emphasize individual responsibility and limit the individual’s role to that of consumer. As I pointed out in chapter 1 of this thesis, the industry and its supporters maintain a strong focus on individual action and present enlightened, uncoordinated choices made by consumers with regard to the objects they possess as the key to solving waste-related problems. They do so under the influence of a nowadays rather pervasive neoliberal rhetoric, which misleads the public into believing that it holds all the cards, when in fact it does not. The public is kept busy or distracted (MacBride 2012) and does not pay attention to more problematic sources of waste and more effective ways to reduce waste (Liboiron 2014). As environmental sociologist John Bellamy Foster and his colleagues (2010) observe, the emphasis on consumption leads to erroneous assumptions as to where waste-related environmental problems arise and who can do something about them (see also Lepawsky 2012 on DEEE):

“[An] error arising from the blending of these two different concepts of consumption [i.e. consumption as all economic activity and consumption as consumer demand] is to be seen in the **frequent conflation of total environmental waste in society with waste related to direct**

household consumption, that is, taking the form of municipal solid waste (garbage). All too often garbage is treated as a problem mainly associated with the direct consumption of consumers. But municipal solid waste in U.S. society is estimated to be only some 2.5 percent of the total waste generated by the society, which also includes: (1) industrial waste, (2) construction and demolition waste, and (3) special waste (waste from mining, fuel production, and metals processing). This other 97.5 percent of solid waste disposal, outside of households, is invisible to most individuals who, in their role as consumers, have no direct part in either its generation or disposal." (Foster et al. 2010:382-383, my emphasis)

In a similar vein, Michael Maniates (2001) stresses that individuals can hardly have an impact on environmental issues unless they consider themselves as more than just consumers:

"When responsibility for environmental problems is individualized, there is little room to ponder institutions, the nature and exercise of political power, or ways of collectively changing the distribution of power and influence in society. Confronting consumption requires individuals to understand themselves not primarily as consumers but rather as citizens in a participatory democracy, working together to change broader policy and larger social institutions.

The idea that the systemic nature of waste problems can be hidden behind the veil of individual responsibility has deep historical roots. Writing on the emergence of litter as a social problem in twentieth-century Britain, Tim Cooper (2013) argues, for instance, that "to ßensure that litter represented individual moral failure, rather than systemic crisis, was crucial to ensuring its validity to the instrumental rationality of preservationist organizations, government and capitalist industry" (p. 268). The history of environmental concerns around waste abounds with examples of attempts at exercising control over individuals' ideas in order to produce the ideal subjects for a particular political project. In that regard, the emphasis placed on individual responsibility in the field of "e-waste management" in contemporary China is hardly new or unique. And yet, it has certain specific features, in particular with regard to the modes of governance that bring out this subjectification.

In recent scholarship in English, the predominant emphasis on individual responsibility as a mode of governance has been approached mainly from the angle of neoliberalism (see Springer et al. 2016) and in reference to Foucault's theory of governmentality (Foucault 1991[1978/79], Burchell et al. 1991). Leading authors in this field describe neoliberal governmentality as a form of governance that relies on a generalized praxis of

“responsibilization”, which operates through ascribing freedom and autonomy to individuals and agents (e.g. as autonomous “consumers”) while simultaneously appealing to individual responsibility-taking, independent self-steering and “self-care” (Lemke 2001, Rose 1992, Barry et al. 1996, Rose et al. 2006). This analytical framework has been applied to a wide range of topics, including environmental politics (see, e.g., Fletcher 2010). Originally, the concepts of neoliberalism and governmentality emerged from the study of modes of governance found in Western countries. An important question is therefore: Are they useful to analyze the Chinese context as well? In particular, what is the link between neoliberal governmentality and *suzhi*, which, as we have seen in the introduction, is both a moral discourse and an instrument of state governance in China?

In his comparison of neoliberalism and *suzhi* discourse, Andrew Kipnis (2007) argues that there are both similarities and differences between these two “circulating forms of governmentality”: “*Suzhi* discourse informs the rhetoric and policy-making decisions of elites as well as the speech of everyday interactions, as do the various forms of discourse that might be considered neoliberal” (p. 395). *Suzhi* discourse should not be considered simply as some local instance of a more general neoliberalism that would span the entire planet, but neither does it work in entirely different ways from neoliberalism when both are considered as forms of governmentality. Without going into too much detail, for this is a complex theoretical question, what needs to be emphasized here are the specific characteristics of *suzhi* discourse, in particular as it plays out in environmental issues. As we have seen in chapter 1, *suzhi* discourse valorizes a certain category of Chinese citizens, namely the members of China’s urban, educated elites or new “middle-class” (Rocca 2017). It portrays them as the only ones capable of bringing about the ecological modernization of the country. Only they possess the knowledge necessary to understand environmental problems from a scientific and technological perspective, and only they have the means of solving those problems in ways that would simultaneously ensure economic growth. This point is particularly captured by Hubbert (2015)’s study of the Shanghai Expo:

“[The Expo] proposed an ideal for the environmentally aware subject. The content of the various exhibitions not only targeted an educated citizenry with the proper social and cultural capital to understand the expo’s high-technology message, but also with the attendant economic capital to consume the green products the displays deemed necessary to save the planet. The promotion of this particular environmentally aware subject reinforced a development project that was moving

away from a reliance on low-wage, low-skill labor toward the development of a larger middle class and increased domestic consumption.” (Hubbert 2015:38)

“ecological progress was not about curtailing consumption but enhancing it through the purchase and use of “green” products.” (ibid., p. 40)

The same applies to the field of DEEE recycling, where not only *suzhi* but also state propaganda, or “thought management” (*sixiang guanli*, 思想管理, see Brady 2011), corporate marketing, and NGO advocacy, among others, converged to promote the emergence of environmentally aware subjects who would automatically scrap their old EEE and replace it with new EEE.

It may seem obvious by now, yet it is worth repeating: the way individuals were pushed to dispose of their DEEE in China in the mid-2010s was a recipe for shortening product lifespans and boosting consumption rates, but hardly one for reducing a population’s ecological footprint.

7 BACK FROM THE DEAD

The Chinese experts I studied in the mid-2010s commonly assumed that used, old, obsolete or defunct EEE had reached its “end of life” (*shouming jieshu* 寿命结束). DEEE amounted to “waste” and needed to be transformed back into raw materials, or “resources”, in order to be born again. For those experts, a return to the starting point necessarily required passing through the decomposition stage. Like God, who told Adam: “Dust thou art, and unto dust shalt thou return”, institutional experts left DEEE little hope of making it as more than bits and pieces or particle matter. Their take on the materiality of DEEE was hardly unique. A focus on materials recovery dominated in research and policy-making in a great number of countries.

On the ground, however, DEEE resurrection took many forms in twenty-first century China and materials recovery was but one of them. While these objects had their undertakers, they also had their surgeons, who treated their injuries, transplanted their organs, or improved their appearance through cosmetic interventions. Repair shops abounded in neighborhoods throughout China; every major Chinese city had a few districts specialized in fixing certain types of devices; and the country hosted what must have been at the time the world’s largest center for electronics “refurbishing” (*fanxin* 翻新). Those are facts that Chinese experts preferred to ignore but that stood out, nevertheless, particularly in Guangdong Province, the birthplace of many of the world’s electrical and electronic devices.

This chapter identifies the various actors who made a living by extending DEEE’s lifespan in China the mid-2010s. It describes their methods and maps their networks. Direct reuse of

whole, functioning devices has already been highlighted in the preceding chapter in connection with independent collectors' practice of buying back used EEE and reselling it as secondhand goods. Here, I rather focus on physical interventions aimed at bringing DEEE back to life — or back from the dead, so to say.

The chapter is made up of two sections. The first one draws on ethnographic observations I conducted in the neighborhood I lived in, in downtown Guangzhou. It explores the options residents of that neighborhood had for maintaining or repairing the EEE they possessed. My observations highlight EEE's frequent breakdown or breakage, in particular that of newer models, designed to last for a shorter period of time than older ones. Special knowledge and skills are usually necessary to repair EEE, but most people lack them. This relationship of dependence, and the fact that residents in my neighborhood could not judge repairmen's expertise, provided a fertile ground for mistrust and suspicion. It would have been interesting to dig deeper and try to understand the psychology of both categories of people, unfortunately my data on this topic is limited.

The second section groups together case studies on electronics refurbishing that I conducted in various places throughout the Pearl River Delta (Schulz 2016, 2017). It looks more particularly at two types of products: high-end smartphones and flat-panel displays. I describe the region's role as a commercial hub and center of expertise of global significance, where DEEE gets recaptured, rehabilitated, and redistributed. A key observation I make in this section is that Chinese state authorities' stance toward the refurbishing sector evolved depending on whether it risked harming the interest of the domestic EEE manufacturing industry. When it did, they suppressed it. But as long as it did not, they tolerated it, assumedly because it contributed to national GDP, created jobs, and provided opportunities for reverse engineering, a process crucial to understanding and appropriating new technology, and, by implication, to upgrading domestic manufacturing.

The fact that, legally speaking, Chinese refurbishers always navigated a grey zone had a direct impact on my research. It made data production much more complicated and forced me to reflect thoroughly on data reliability. Few people accepted to talk with me and those who did kept silent on most issues. Some even put me on tracks that, as I later found out, were misleading. To circumvent the problem, I multiplied the number of sites I went to, people I talked to, and methods I used, and I triangulated as much as I could.

7.1 Object care in the middle of a megalopolis

In the mid-2010s, having a device repaired or maintained was relatively easy for residents of large Chinese cities. In downtown Guangzhou, every neighborhood had a few repairmen able to fix basic devices such as home appliances and every district selling more elaborate ones, such as electronics, had a great number of specialists able to tackle complex technical problems involving miniature components.

7.1.1 Mending white and brown goods

Repair shop abounded in the neighborhood I lived in. In a rectangular area of one kilometer in length centered on the metro station Nongjiangsuo, I counted no less than twelve of them (see fig. 6.3 in chap. 6). They usually consisted of a single, small room containing a few devices and a lot of spare parts and tools (fig. 7.1). All of these repair shops were operated by independent families, most of whom originally came from Guangdong Province, but not from Guangzhou. Men took care of technical and commercial activities and were often away, providing services at customers' homes. In the meantime, women looked after the shop — their involvement in the business pretty much stopped there — and the children. Most repairmen in my neighborhood had attended a vocational school, where they had received basic training in electronics. “You need to get the theory right”, one of them told me. But they had acquired the bulk of their skills and knowledge through practice. Experienced and successful repairmen accepted to take apprentices, whom they taught the tricks of the trade in exchange for free labor.



Figure 7.1: A neighborhood repair shop in downtown Guangzhou (near total view). Photo credit: the author.

One day, my air conditioner broke down, which gave me the opportunity to call Mr. He, a middle-aged repairman from Heyuan who specialized in refrigeration systems. I walked over to his shop, which was located two blocks away from my home, at a late hour and found it still open. Mr. He was having dinner with his wife, but he offered to accompany me and fix my air conditioner straight away. While he was inspecting it, I asked him a few questions. As someone who had been handling that type of appliance on a daily basis for seven years, Mr. He had first-hand experience of when and why air conditioners fail.

“[Yours] must be fifteen years old. It should last for another five years. Old models can be used for about twenty years. For new ones it’s more like eight to ten years. [...] The main difference is the quality of the materials. Take the iron sheet [*tiepi* 铁皮], for instance. On old devices, it starts rusting after ten years or more, but on new ones only after five years. [...] If producers used better materials, they’d have higher costs and they’d be forced to raise [product] prices. That could affect business [*yingxiang shengyi* 影响生意].”

The trend towards shorter periods of (possible) use may have benefitted manufacturers, but it reduced the number of business opportunities for Hr. He:

“It’s getting more difficult every year. Now air conditioners are only worth a few hundred yuan, so people buy new ones. They don’t want to have old ones fixed anymore [*bu yuanyi xiu le* 不愿意修

了]. If they've had one for ten years or more, they just think it's time to change and buy a new one.”

For now, however, Mr. He did not face too many difficulties in running his shop. The neighborhood hosted a lot of “jobbers” (*dagongzhe* 打工者) and low-income “white collars” (*bailing* 白领) — Mr. He jokingly called them “vain collars” (*baibai ling* 白白领), because they worked long hours for salaries that barely covered their expenses — who could not necessarily afford to buy new products. His revenues did not make him rich, but they allowed him to “support his family” (*weichi shenghuo* 维持生活). What worried him more were his rent, which increased continually (he paid 1800 RMB, or close to 300 USD, per month in 2015 for a small commercial space in a back alley), and the risks he had to take while on the job. Air conditioners usually consisted in two modules, one of which could be accessed only by climbing on buildings (fig. 7.2). With age, Mr. He felt that he had become less agile and therefore more exposed to danger. “I’ll do this for another two years”, he said, “and then I’ll stop”. He thought of himself as a jack of all trades, who would have little trouble “switching to another profession” (*huan ge hangye* 换个行业).



Figure 7.2: This repairman fixed my air conditioner by replacing a component. He sometimes has to climb on building facades to access that type of appliance. Photo credit: the author.

Mr. He pointed out that independent repairmen were quite free to run their business as they saw fit. They had very little legal rules to comply with and administrative procedures to go through. They did not need any special authorization, for instance. A basic “license to do business” (*yingye zhizhao* 营业执照) was enough. Officially, people who climbed on urban infrastructure needed to take a test and obtain a permit. But, according to Mr. He, anyone would pass the test and it was easier to buy a fake permit anyway (*ni yao gao de hua, zhijie gao jia de* 你要搞的话，直接搞假的). He himself did not have a permit and considered it unnecessary, as controls were infrequent, according to him. Repairmen were exempt from paying taxes, which Mr. He explained by the fact that they did not have proper “companies”

(*gongsi* 公司). That also prevented them from issuing certified invoices (*fapiao* 发票), which Chinese companies widely used for accounting purposes, but that was not a big problem: at the time, a sizeable black market catered to anyone who needed a fake invoice.

Mr. He may have been critical of new models' shorter lifetimes, but he was also not a big fan of secondhand devices and components. He told me that he avoided replacing defunct parts with used spares and only occasionally sold used devices, because he considered them more prone to failure than new ones. He feared having to offer free repair to customers. This said, Mr. He acknowledged that several types of devices and components had a good reuse value. Fully functional compressors, in particular, were often salvaged and sold to people who refurbished them. Later, while on a short research trip in the outskirts of Beijing, I stumbled upon several businesses involved in this type of activity (fig. 7.3). A young worker showed me how he emptied a compressor, refilled it with new refrigerant gas, reshaped its tubes, repainted its body and tested it. The whole process took him ten to fifteen minutes. He called it "refurbishing" or "reconditioning" (*fanxin* 翻新) and distinguished it explicitly from "repair" (*weixiu* 维修), which he told me they did not bother with. A small refurbished compressor worth 130-160 RMB could be resold for a profit of 30 RMB, larger ones fetched higher prices and allowed for wider margins.



Figure 7.3: A young man refurbishes compressors from air conditioners in the outskirts of Beijing. Photo credit: the author.

7.1.2 Tackling cyber breakdown

Nearly everyone in Guangzhou owned a mobile phone, which was a “smart” one in the vast majority of cases. Many people also possessed a computer and/or a tablet. In addition, the city’s many offices were each filled with computers, monitors, servers, printers, photocopiers, and so on. These high-tech devices inevitably malfunctioned at some point and, when that happened, their owners had to refer them to specialists, because the issue could be complex and could involve microtechnological components (e.g. PCBs or FPDs). It seems that only foolish, malicious or exceptionally gifted neighborhood repairmen and tinkerers claimed to be able to deal with that kind of equipment. The ones I interviewed

tended to declare themselves incompetent outright. In Guangzhou, a multitude of small shops offering specialized repair and maintenance services could be found in all districts selling electronics. In the northern part of the city center, I identified at least five areas devoted to smartphone and four to computer repair (fig. 7.4). Most shops focused on either one or the other of those two types of devices, presumably because most business opportunities arose in connection with them.

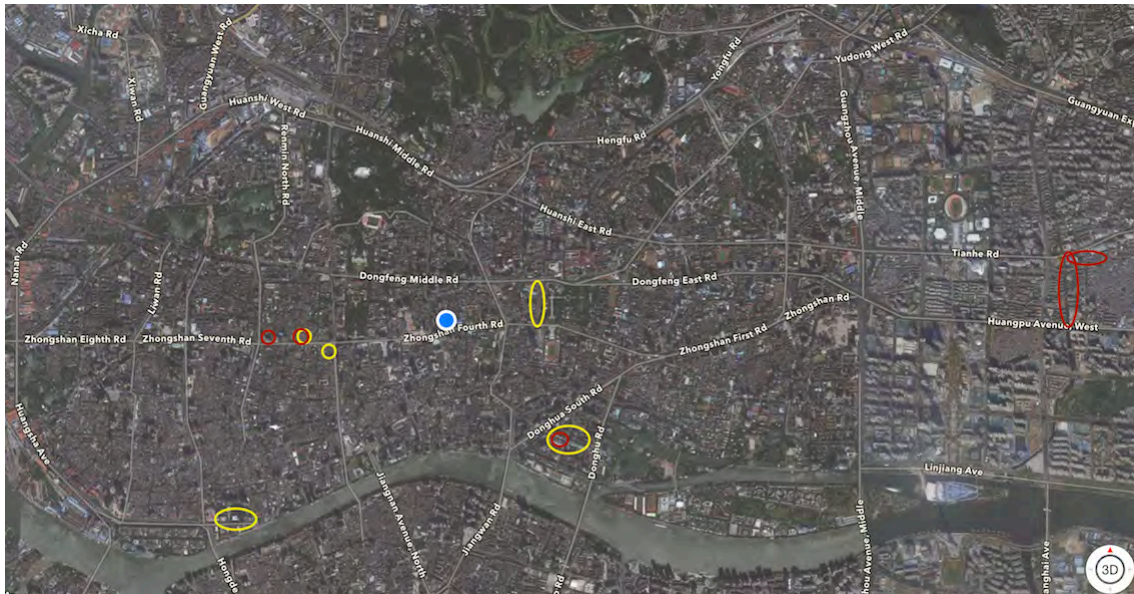


Figure 7.4: Location of some of the electronics districts located in the Northwest part of downtown Guangzhou where secondhand goods can be found. Red: areas that specialize in computers. Yellow: areas that specialize in mobile phones. Source: Apple Maps, annotations by the author.

Specialized repair shops were nearly always independently owned and operated. They catered for both individual and corporate customers. Owners of defective high tech electronic equipment could bring it either to the shop where they had purchased it or directly to a specialized repair shop located in an electronics district (fig. 7.5). In any case, it ended up in the hands of the same kind of people, namely independent repairmen, because retailers rarely had an in-house repair department. One could save time and money by going straight to repairmen, but that meant one had to shoulder the fees. Addressing retailers first added one step in the process but could be advantageous if the product was still under warranty.



Figure 7.5: A repairman in a building selling secondhand computers in downtown Guangzhou tries to fix an old laptop. Most of the components behind him are kept as potential spare parts. Photo credit: the author.

Many owners had no choice but to go straight to independent repairmen. While I was interviewing people in Gangding in March 2014, a young woman popped up holding in her hand an iPhone 5S with a shattered glass surface. She had just purchased her phone and had already dropped it on the ground — like millions of smartphone users do every day — and the LCD screen had not withstood the shock. I knew that Apple had released the iPhone 5S a mere six months earlier and that the company offered a one-year warranty, so I asked the woman why she did not simply bring her phone back to an Apple Store and claim a free repair or a replacement. She seemed a bit confused and replied that “it might be more expensive”. Yet, a few seconds earlier, she had claimed that she was willing to pay “several

hundred yuan” for repair if need be. The repairman noticed my puzzlement and filled me in: “most iPhone 5 and 5S available in China are refurbished devices [*fanxin ji* 翻新机]. They are not under warranty [*bu zai baoxiuqi nei* 不在保修期内]. Buyers only get after-sales service [*shouhou fuwu* 售后服务].”

7.1.3 Rescuers or impostors?

Practically everyone in Guangzhou relied on independent repairmen to have devices fixed. From the perspective of residents, repairmen and their services were a boon, because they saved them the trouble and expense of having to replace malfunctioning devices, but also a bane, because their unique knowledge and skills gave them access other people’s valuable objects and put them in a position of power that they could misuse — after all, this profession, like every other, had its quacks and incompetents. Accordingly, residents often took precautions when interacting with repairmen. The young woman mentioned above, for instance, asked friends for recommendations before heading to the shop where I met her. Other EEE owners visited several repair shops, each time asking for a diagnostic and a quote, before opting for one of them.

Trust was a real issue. I heard numerous stories of how repairmen swindled their customers. One of them involved the company that maintained computers for the downtown campus of the Sun Yat-sen University. My assistant, who studied there, reported having been warned by several of her peers not to use this company’s services to have her own, personal computer repaired. They alleged that the company took advantage of students by stealing new or valuable components from their computers and swapping them for older or less valuable ones. For an anthropologist like me, it does not matter whether such claims were true or not. They are interesting even as unsubstantiated rumors, because they point to an uneasy relationship between repairmen and their customers.

In Guangzhou, and perhaps in other Chinese cities as well, some repairmen were criticized for attempting to appear as more formal than they actually were. The media dubbed them Li Gui (李鬼²²⁷) (fig. 7.6) in reference to a character from the Water Margin (*shuihuchuan* 水浒传), one of the four great classical novels of Chinese literature. In the novel, Li Gui takes advantage of his name's resemblance to that of Li Kui (李逵), a brave, strong and fierce fighter belonging to a group of outlaws, to extort money from people. Eventually, Li Kui finds out about Li Gui's hoax and kills him. The analogy portrayed repairmen who pass themselves off as belonging to formal companies as impostors — and forecasted their disappearance. However, drawing a line between formal and informal actors in the field of repair and maintenance in China is tricky, be it only because, as we have seen above, the latter often worked with, or for, the former.

²²⁷ The name literally means “Li the Ghost”.



Figure 7.6: A satirical drawing published in an online press article that features a repairman who wears a shirt with the characters 李鬼 (*li gui* or Li the Ghost) and holds a signboard that reads “formal household appliances repair services”. His drills have the shape of the symbol used to represent the yuan (the Chinese currency) and banknotes are flying out of his bag. Source : Changsha Evening Paper.

Repairmen who claimed to be formal were under suspicion regardless of their intentions. In a news article published in 2012²²⁸, repairmen are classified into several categories, depending on their public identity, or “vest” (*majia* 马甲): (1) “formally registered outer garments” (*zhuce zhenggui waiyi* 注册正规外衣); (2) “mixed small and medium lesser known brands” (*hunza yu zhongxiao zapai zhong* 混杂于中小杂牌中) (3) “fake formal service centers aimed at ‘attaching themselves to big money’” (*jiamao zhenggui wangdian bang dakuan* 假冒正规网点 “傍大款”)²²⁹. The journalist goes on to address the emergence of a fourth, “new vest” in the early 2010s that made “Li Gui” more difficult to identify and catch. In the past, repairmen advertised their services using flyers or stickers (fig. 7.7) that often mentioned untraceable shop addresses or unregistered businesses. When residents “denounced” (*tousu* 投诉) them, the Guangzhou Trade and Industry Bureau (GTIB or 广州市工商局) could investigate and prosecute (*chachu* 查处) them for being unregistered (*wuzheng wuzhao* 无证无照). Now, however, most repairmen did register and the GTIB could only intervene in proven cases of repair fraud. One could have interpreted repairmen’s new strategy as a well-meant effort by professionals to abide by the law, but, interestingly, the journalist depicts it instead as a further attempt by malicious impostors to deceive people. Such mistrust of independent repairmen was widespread at the time of my fieldwork.

²²⁸ “On the Repair Market for Electronic Products, the Good Is Mixed up with the Bad and Li Ghosts Are Likely to Adopt Another ‘Vest’” [电子产品维修市场良莠不齐 李鬼也会换 “马甲”], *China News* [中国新闻网], March 13, 2012. URL: <http://www.chinanews.com/it/2012/03-13/3740799.shtml> (accessed January 26, 2018).

²²⁹ This is a literal translation of the expression *bang dakuan* 傍大款, which is more often used figuratively, in connection with greedy women, and then means “to date rich guys” or “to be kept by a sugar daddy”.

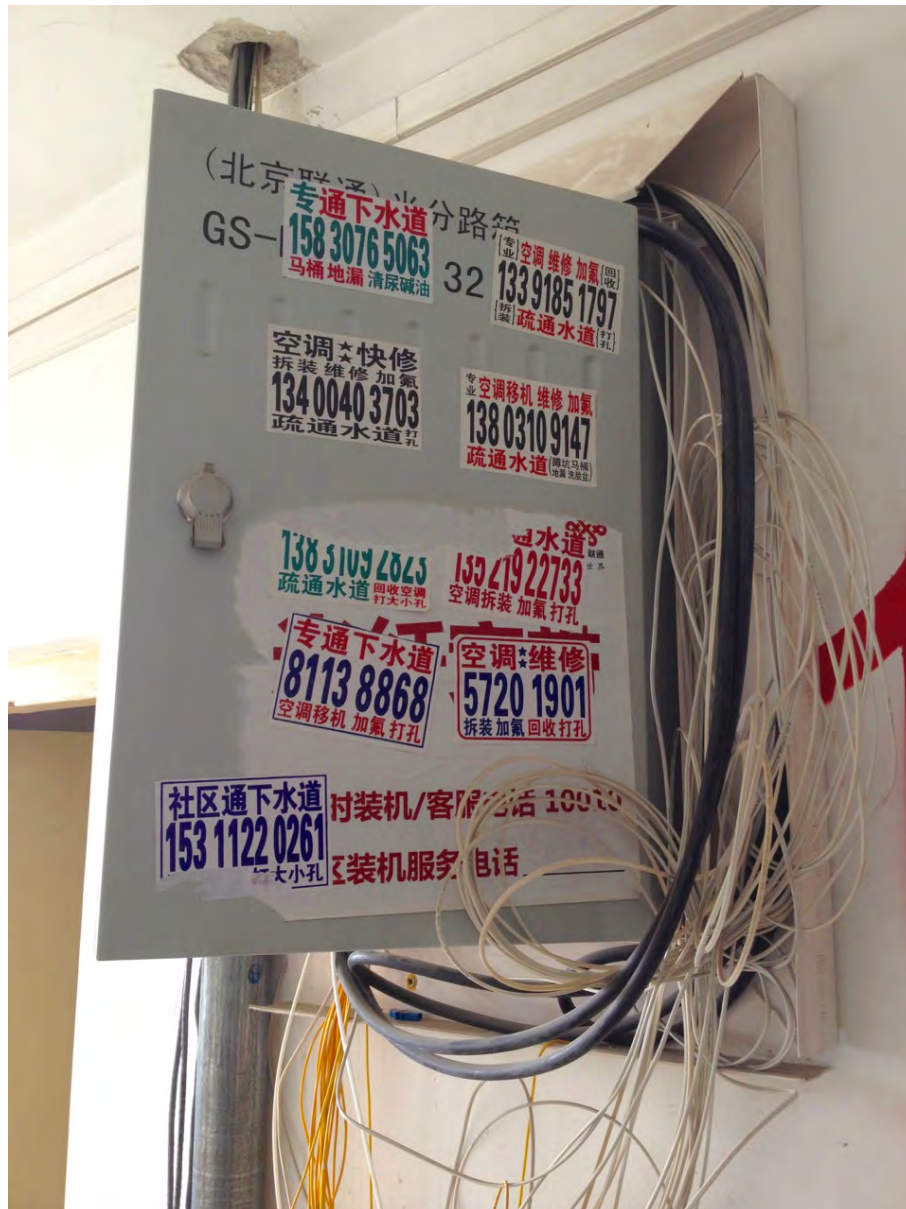


Figure 7.7: Stickers in the staircase of a residential building in Beijing, some of which advertise for specialized DEEE repair services (air conditioners and other types of house appliances). Photo credit: the author.

7.2 Alchemy in a global hub

In my view, the phrase “to turn trash into treasure” (*bian fei wei bao* 变废为宝), which was often used in the mid-2010s to promote urban mining (materials recovery), applied much better to the metamorphosis that electronics underwent in the Pearl River Delta. Craftspeople and tradespeople who populated that area of China refurbished and remarketed products in ways that astonished many an observer, including me. Thanks to large and intricate networks, they repatriated products to a global manufacturing hub, restored them to working condition, and put them back into circulation, thereby extending

their lifetimes. As Minter (2013:183) writes, this type of activity dates back a long way in China and was quite widespread:

“Since the 1980s, at least, China has been home to a thriving business devoted to remaking and refurbishing the developed world’s and China’s own used electronics. Nobody knows the scale of it, or the revenue, but this I know for sure: there isn’t a town, village, or city in China that doesn’t have at least one used electronics market. In bigger cities, entire malls [...] are devoted to the reuse — rather than the recycling — of electronics.”

The city of Shenzhen played a key role in China’s refurbishing industry (Schulz 2017). It is one of China’s “special economic zones”, where trade with foreign countries is greatly facilitated by favorable policies, especially regarding import and export. As the Mecca of electronics manufacturing, Shenzhen attracted goods and people from all over China and the world, and provided the necessary spare parts, know-how, workforce, machines, infrastructure, regulations and social networks. But the city did not exist in a vacuum, quite the contrary. It was part of a larger matrix that extended to other parts of the Pearl River Delta and beyond, and that included non-geographical sites such as the Internet. Not all sites were involved in refurbishing in the narrow sense of the word (i.e. the physical activity), but all of them contributed to China’s electronics refurbishing industry in crucial ways.

Hong Kong, Asia’s most prominent global city, acted as a trading hub through which not only scrap (see chap. 3) but also still functional or repairable devices and components collected in rich countries transited on their way to mainland China, in particular to Foshan, Shenzhen and Guangzhou. For years, Guiyu, the infamous DEEE dismantling hotspot (see chap. 4), also supplied those cities with an abundance of salvaged components that could be reincorporated into new devices at the manufacturing stage (fig. 7.8) (Minter 2013:198). In every major Chinese city, Guangzhou included, self-employed collectors bought back electronics and sold them to people in Shenzhen and Guangzhou who would refurbish at least part of those devices or use them as stocks of components (see chap. 6). On business-to-business (B2B) digital portals connecting Chinese and foreign tradespeople, like Alibaba.com, many offers concerning electronics also came from Chinese buyers wanting to source certain types of reusable devices or components from abroad.



Figure 7.8: This bus links Shenzhen to Guiyu several times a day and departs from the entrance of a large building in Huaqiangbei that specializes in electronic microcomponents. Photo credit: the author.

In the opposite direction, a lot of refurbished devices originating from Shenzhen and Guangzhou were sold on specialized marketplaces located either in those cities themselves or elsewhere, including online. In Shenzhen, the vibrant downtown area known as Huaqiangbei (华强北) abounded with buildings selling just about anything electronic, from the smallest capacitor to the largest flat screen TV. Not all devices and components sold in Huaqiangbei were refurbished — in fact, maybe most of them were not — but the impressive scale of this marketplace implied that even low relative figures translated into high absolute ones. On any given day, Huaqiangbei was filled with buyers from other Chinese provinces and from abroad, who shopped for devices and components that they could resell at a profit back home (fig. 7.9).



Figure 7.9: Buyers and sellers conduct transactions in one of the buildings dedicated to smartphones resale in Shenzhen (Huaqiangbei). Photo credit: the author.

In Guangzhou, the same districts where consumers went to buy electronics or have them repaired also sold refurbished devices and components, and more components could be found in the city's outskirts (Schulz 2016). Guangzhou also catered for foreign buyers, many of whom lived in the city on a semi-permanent basis and belonged to its large community of African and Middle Eastern tradespeople (fig. 7.10). In addition, buyers from just about every country flocked to Guangzhou on the occasion of the world-famous China Import and Export Fair (中国进出口商品交易会, better known as Canton Fair 广交会) (fig. 7.11), an event that took place twice a year since 1957. Finally, online marketplaces such as Taobao.com and Aliexpress.com put Chinese retailers in contact with, respectively, Chinese and overseas consumers and were widely used as sales channels for refurbished devices.



Figure 7.10: In this workshop located in a building selling secondhand electronics in downtown Guangzhou, two buyers (most likely from some African country, like the majority of buyers in this building) negotiate service fees with the (Chinese) manager. Photo credit: the author.

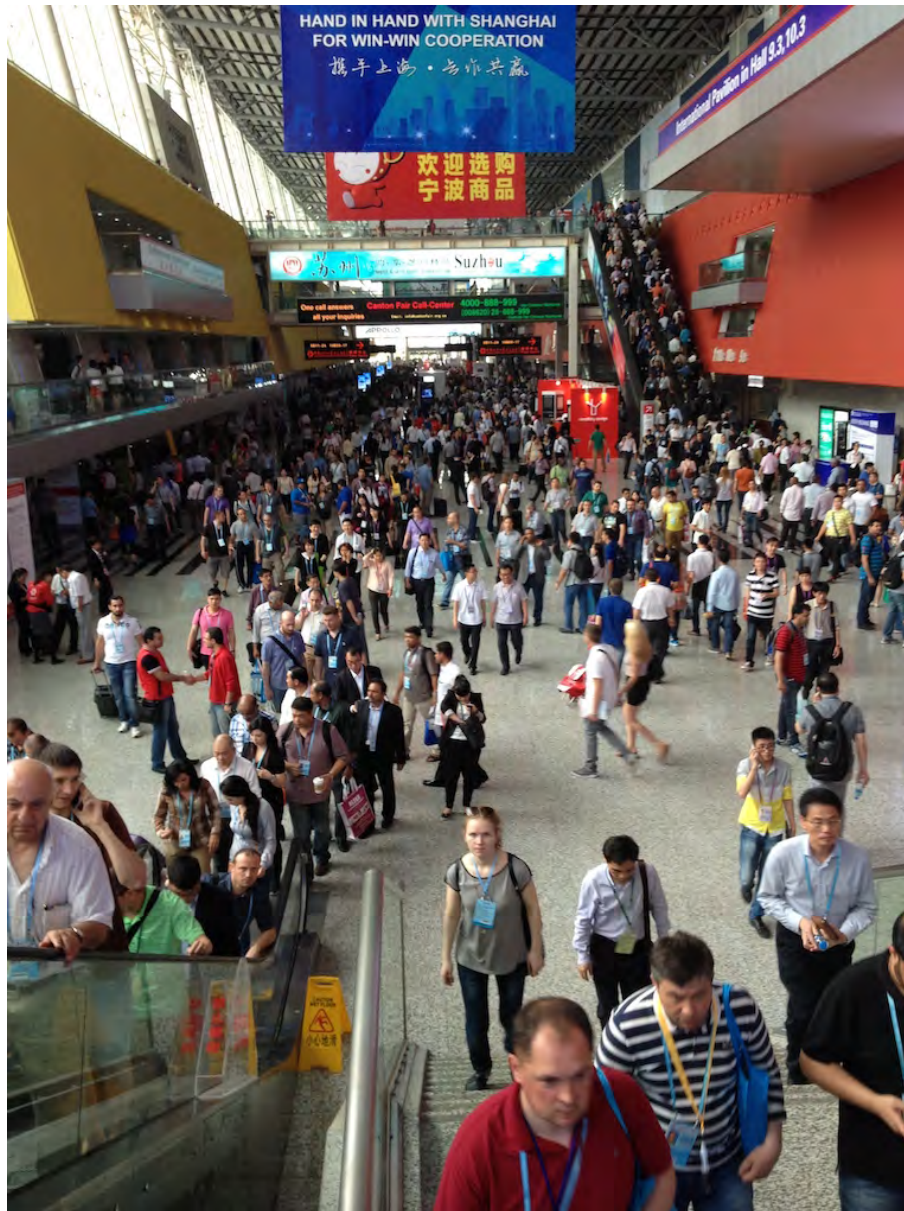


Figure 7.11: A view from outside one of the halls dedicated to EEE at the Guangzhou Fair. Tens of thousands of buyers from all over the world flock to Guangzhou twice a year to attend this event. Photo credit: the author.

7.2.1 Two case studies

Not all devices and components lend themselves to refurbishing. A series of criteria have to be met for refurbishing to be worthwhile technically and commercially. Most of the people I met in the Pearl River Delta in the mid-2010s were interested in either high-end smartphones (or various components thereof) or monitors of the sort used in computers and television sets (because of the FPDs they contain). There were markets for other types of electronic devices and components as well, but they did not compare in scale with those for smartphones and FPDs.

7.2.1.1 Smartphones

The importance of smartphones in the twenty-first can hardly be overstated. Humanity's love affair with these gadgets began in the late 2000s and has grown stronger ever since. Smartphones have transformed people's lives and will continue to do so for the foreseeable future. Addiction to smartphones has become a widespread phenomenon and a serious problem that reaches pathological levels in masses of users — in Chinese, addicts, who generally have their eyes riveted to their screens and therefore their neck bent, are derisively referred to as the “tribe of the lowered heads” (*ditouzu* 低头族) (fig. 7.12). Small size and hyperconnectivity make smartphones the world's first truly personal computers, which goes a long way in explaining why they spread like wildfire²³⁰. But their popularity is not only due to their functionalities. Smartphones, in particular new models from famous brands, are also widely regarded as status symbols. Apple's iPhone, for instance, attracts huge interest and desire worldwide, as evidenced by the long queues that build up in front of retail stores on the eve of every official release. In China, high-end smartphones from the Apple's iPhone or Samsung's Galaxy series serve as markers of belonging²³¹. Owners of such a device are automatically considered as members of the upper middle class, whether or not they really have the associated income, lifestyle and level of education (see Baudrillard 1998[1970]). It should not surprise, therefore, that some people are willing to make huge sacrifices to acquire such devices. One case that made the headlines in China involved a young man who

²³⁰ “Why Smartphones Are the Best-Selling Gadgets in History”, *Business Insider UK* [from *The Economist*], February 28, 2015. URL: <http://uk.businessinsider.com/why-smartphones-are-the-best-selling-gadgets-in-history-2015-2?r=US&IR=T> (accessed January 26, 2018).

²³¹ Recently, Chinese brands such as Xiaomi, Honor, OnePlus and Huawei have started producing high-end smartphones. Oppo and Vivo have also released smartphones that cost half the price of high-end ones and offer comparable functions. Chinese customers have adopted those devices en masse. As a result, Apple and Samsung have been relegated to a secondary role in terms of sales in China. But their devices are still regarded as top-class, cutting-edge products. Source: “Oppo knocks: Beating Apple, Xiaomi and the Gang in China”, *The Economist*, February 4, 2017. URL: <https://www.economist.com/news/business/21716080-how-two-obscure-local-smartphone-manufacturers-made-it-top-beating-apple-xiaomi-and> (accessed January 26, 2018).

sold one of his kidneys to buy an iPhone. The anecdote gave birth to a Chinese idiom, “selling a kidney to buy an iPhone” (*mai shen mai iPhone* 卖肾买 iPhone), which is now used to describe people’s willingness to make a big sacrifice in exchange for some kind of material belonging, especially consumer goods.



Figure 7.12: A typical everyday life scene in downtown Guangzhou: people have their eyes riveted on their smartphones. Photo credit: the author.

Smartphones have a very quick replacement rate, quicker than that of most EEE²³². Many factors account for that, including: (1) brands place new models on the market every year or so and put great efforts into convincing consumers to buy them; (2) providers of telecommunication services offer deals that make smartphones available for a fraction of

²³² “The Life Expectancy of Electronics”, *Consumer Technology Association*, September 16, 2014. URL: <https://www.cta.tech/News/Blog/Articles/2014/September/The-Life-Expectancy-of-Electronics.aspx> (accessed January 26, 2018).

their initial price, sometimes even for free, in an effort to attract new customers and secure the loyalty of existing ones; (3) retailers in some countries accept to take back recently purchased smartphones if buyers change their mind within a certain period of time (typically fourteen days in the USA) and to reimburse them, but are forbidden by law to resell those devices as new; (4) the whole electronics industry is engaged in a frantic race for the production of the thinnest devices that feature the largest screens and the most cutting-edge technology, which discourages designers and manufacturers to take heed of issues such as robustness, durability and real life usage; and (5) owners tend to use their devices in places (e.g. bathrooms), situations (e.g. while jogging) and ways (e.g. as a toy for children or pets) that expose them to a considerable risk of breakage. Since I started this PhD research, I became aware of the fact that smartphones are constantly being dropped on the ground and that screens often do not resist the impact. When combined, these factors lead to the generation of great quantities of unused and unusable smartphones on a global scale, many of which are not even old or badly damaged.

Some of these devices are not even discarded, but end up in owner's drawers or cupboards, a phenomenon often referred to as "stockpiling" (*chubei* 储备). Shi Dong, a researcher at the Chinese Academy of Science (中国科学院) who was finishing a PhD in environmental science on smartphone recycling, told me in an interview in 2014 that 0.6 to 0.7 billion mobile phone were "retired" (*shi... tuixiu* 使.....退休) in China every year, according to his calculations. However, his colleague Xie Peng promptly qualified this figure, adding that: "this doesn't mean discarded. Actually, a lot of these phones are simply put away." Shi Dong's research revealed that half of all mobile abandoned phones in China did not leave their owner's home or office; twenty to twenty-five percent landed in other people's hands and were reused directly, as whole devices; a similar proportion morphed into either reusable components or recoverable materials; and only two to three per cent ended up in rubbish bins — but Shi Dong claimed that most of the latter were extracted from the MSW

flow before reaching landfills²³³. According to Shi Dong, owners in China were particularly concerned about data security and reluctant to hand over smartphones and computers, which he attributed to the revelation by the media of numerous buy-back scams aimed at stealing people's data in order to blackmail them.

Commercial entities that collect smartphones have no trouble reselling them. On one of my trips to Hong Kong, I visited a company called Fair Bargain Co. Ltd. that bought back mobile phones from all over the world, especially from North America, Europe and South America, and resold them to specialized buyers. Every week, Fair Bargain organized three auctions in which anyone could participate. The company also took orders from large buyers and catered for their needs more specifically. Fair Bargain claimed to be "one of the world's main suppliers of secondhand mobile phones" and described itself as follows:

"23 years of dedication and experience in mobile phone industry

An annual turnover exceeding US\$220 million

Headquartered in Hong Kong with properties overseas across more than 20 countries for branch offices and global sourcing in Europe, America and Asia-Pac

Directly purchase from 32 global telecom giants as well as more than 100 supplying vendors as our closely-tied long term partners

Supply an extensive range of second-user mobile phones from iPhone, Samsung's, BlackBerry's along with all the other major global brands

Thousands of models always in stock and ready for immediate sale and delivery

A large supplier and customer base throughout the world, maximizing the value of 14-day and second-user mobile devices"

Fair Bargain had many competitors and most of them were also based in Hong Kong, certainly because the autonomous territory does not require import-export companies to register and does not tax imported and exported goods (except cigarettes and alcohol). Fair

²³³ Those figures vary from one country to another. Disposal, for instance, is certainly more common in more affluent regions of the world.

Bargain alone dealt with impressive volumes. Its office, located in downtown Hong Kong, consisted of several floors packed with cardboard boxes containing all kinds of mobile phones as well as other types of telecommunication devices. At an auction that took place on January 27, 2016, approximately 70,000 items were on offer in the main category, “used mobile phone bidding list”, which contained almost exclusively smartphones²³⁴. Fair Bargain did not disclose the number of effective transactions made on each auction day, but the company waited only a week before discounting unsold batches, which suggests that it strove to maintain a high product turnover. Given smartphones’ rapid devaluation, keeping stocks made no sense at all.

Fair Bargain catered to customers from all over the world and offered prices likely to attract just about anyone. Taking Apple’s iPhone 5S (16GB) as example, Fair Bargain announced a reference price of 200-205 USD per used but functional item. A professional seller on a Swiss e-commerce website asked for 320 CHF (direct sale) or 250 CHF minimum (auction) (more or less the same amounts in USD) for the same model and I bought one directly in Shenzhen (Huaqiangbei) for 1500 RMB (around 228 USD). The Swiss and Chinese sellers’ margins (50-120 USD and 23-28 USD per item respectively) suggest that they could both source devices from Fair Bargain and make profit. Faisal, a Hong Kong-born, twenty-five-year-old Pakistani salesman who had been working for Fair Bargain for several years when I met him in 2016, explained to me that his customers came from Russia, Germany, Eastern Europe, and so on. At the same time, he acknowledged that Fair Bargain conducted business chiefly with mainland Chinese. This was evident in the fact that only two out of Fair Bargain’s ten salesmen were non-Chinese and that very few transactions were made at the time of my visit, namely just before Chinese New Year, a period during which business is always slack in China. According to Faisal, Chinese traders bought most of Fair Bargain’s “used mobile phones” and refurbished them in Huaqiangbei. I passed myself as a potential buyer and

²³⁴ Other categories included: brand new/nearly new/14-day mobile phone; handset; main board; tablet; computer; laptop; accessories; and network card and router.

pretended to be interested in the same kind of devices, but Faisal reoriented me toward new/nearly new/14-day mobile phones from well-known brands like Apple and Samsung, which he described as “hot-selling items” in Western Europe. Fair Bargain also sold “locked” high-end smartphones “without codes” (*wuma tigong* 无码提供), which Faisal discouraged me from buying, arguing that it was “too complicated” for someone like me — I later found out that specialists in Shenzhen cracked, or “flashed” (*shuaji* 刷机), such devices on an industrial scale.

Practically all “used mobile phones” sold by Fair Bargain and similar companies in Hong Kong crossed the border to Shenzhen and were refurbished in Huaqiangbei. What happened to them next is described quite faithfully by Frank Chen, a Hong Kong journalist and ICT expert²³⁵:

“Once the used iPhones are bought by a Shenzhen bidder — or more precisely, scalper — the old devices are given a new “life”. Old phones find their way to the mainland mainly through smuggling. The destination is Shenzhen’s Huaqiangbei, one of the country’s largest markets for used smartphones and laptops. Because of the volume it handles, the market has become like a de facto supernumerary production base for iPhone. According to local media reports, used iPhones sourced from Hong Kong undergo “plastic surgery”, which means burnishing their casings and replacing broken parts like a malfunctioning circuit board. Spare parts come from usually defective components thrown away by official Apple suppliers or compatible units found in knockoff products made in the city. The standard process is to open the smartphone, clean the logic board and check if there are any parts or connectors that need repair. Then the old iPhone will be sealed in a package that is almost indistinguishable from the new one, together with accessories such as earphones, cables and a user’s manual. Judging from the outside, one can hardly tell it’s a used phone. About 10,000 household factories are engaged in this recycling business in the city, according to a Southern Metropolis Daily estimate. These seemingly brand-new iPhones are then flown to black markets in lower-tier cities or towns in central and western

²³⁵ “From HK to Shenzhen: How Used iPhones Are Given a Second Life”, *ejinsight*, April 30, 2015.

URL: <http://www.ejinsight.com/20150430-how-used-iphones-are-given-a-second-life/> (accessed January 26, 2018).

China where there is no officially authorized Apple outlet and are sold at prices cheaper than that of a genuinely new one.”

My understanding of the market described by Frank Chen tallies largely with his account, but certain points need to be specified or qualified. First, the journalist assumes that the same people who bought phones in Hong Kong also refurbished them and resold them in Shenzhen or elsewhere, which leads him to conclude that they made huge profits — hence his use of the term “scalper”. In my experience, however, different people assumed different tasks, which suggests that profits were distributed throughout the network. Frank Chen’s calculation that each refurbished iPhone 5S (16 GB) generated “a fat margin of around 1,000 yuan” in 2015 seems correct, but only if we consider this figure to account for the total of all profits realized by everyone involved in the process, and not only that of Fair Bargain’s customers. This said, even at a more realistic level — say 200 RMB per item on average at each stage — profit margins made this line of business extremely attractive.

Second, the focus on the electronics industry’s flagship smartphone, the iPhone, should not be overdone. To be sure, most shops in Huaqiangbei specialized in iPhones, partly because of Chinese consumers’ fondness for Apple’s revolutionary product. But other high-end smartphones could be found there as well, especially Samsung’s Galaxy S5 and S6, which were more popular in other regions of the world, such as South and Central Asia, the Middle East and Africa. A whole building specialized in Samsung smartphones and attracted a lot of foreign buyers.

Third, spare parts (*peijian* 配件) came from a variety of sources. Chen mentions two of them, but they are not the most important ones. Rather, my data indicates that the vast majority of spare parts originated from either the global trade in used smartphones or local manufacturing plants catering especially to the smartphone refurbishing industry. In a fashion that evokes organ transplants, craftsmen in Huaqiangbei dismantled imported smartphones that were in poor condition, “extracted” (*chai chulai* 拆出来) components that could still be used and placed them in devices worthy of refurbishing (fig. 7.13). Often, they also replaced dysfunctional or damaged parts or components with newly manufactured ones, referred to as “high-quality imitations” (*gaofang* 高仿 for *gao zhiliang fangzhipin* 高质量仿制品), that did not originate from official Apple suppliers but from small Shenzhen-based factories specialized in counterfeiting one or the other element found in high-end

smartphones (fig. 7.14). Two main terms served to distinguish components and devices according to their origin, composition or career: *yuanzhuang* (原装), which was synonym with “genuine product” (*zhenpin* 真品); and *zuzhuang* (组装), which indicated that the device (or component) had been “(re)assembled” and was therefore likely to contain non-original components (or subcomponents). During one of my visits in Huaqiangbei, I asked Zhang Yaozu, a young man selling machines to the smartphone refurbishing industry (fig. 7.15), how many of the high-end smartphones sold in Huaqiangbei had not undergone any alteration. “Very few”, he replied.



Figure 7.13: An image taken from an advertisement by an online shop that sells spare parts for the iPhone. The text reads: “original motherboards from dismantled iPhones. Fourth generation, 4S, fifth generation, 5S. Wholesale and retail”. Source: shop website.



Figure 7.14: Left: an “original” (*yuanzhuang* 原装) screen module for the iPhone 4. Right: a “high-quality replica” (*gaofang* 高仿). Unlike experts, laypeople can find it very difficult to distinguish between the former and the latter. The workshop owner described the former as more “durable” (*naiyong* 耐用) than the latter. Photo credit: the author.



Figure 7.15: Still from a commercial video for a company that sells industrial equipment for smartphone refurbishing. Photo credit: the author.

Going back to Chen's article, I find a fourth point misleading. His use of the terms "black markets" and "lower-tier cities" to describe the retail trade of refurbished smartphones from Huaqiangbei brings to mind clandestine activities, remote or peripheral areas and a marginal phenomenon. In fact, the Chinese market as a whole was glutted with refurbished smartphones in the mid-2010s, a great many people knew this, and state authorities tolerated it. One of my informants, a craftsman involved in smartphone repair and refurbishing, reckoned that Huaqiangbei placed several tens of thousands of iPhones on the market each day — that is, several millions each year. Not all of those smartphones were refurbished devices. Some of them were "entirely new ones" (*quanxinde* 全新的) from abroad that had been smuggled into China (*shuihuo* 水货), transformed into native mainland Chinese iPhones (*gaibanji* 改版机) and still awaited their first user. But most of them had been brought back to life. People who bought smartphones in Huaqiangbei resold them either in physical shops located throughout China or in virtual ones. In 2016, e-commerce had become a key sales channel and virtually every business had a presence on the Internet, e.g. through B2C websites or China's multi-functional app, WeChat (*weixin* 微信). According to Zhang Yaozu and another of my informants, more than half of the foreign brand smartphones sold on the online shopping platform Taobao.com (the Chinese equivalent of eBay.com) had previously transited through Huaqiangbei and been refurbished, reassembled or modified in some way.

Last but not least, Chen's mention of the "10,000 household factories" — "shops" or "workshops" would be more appropriate in many cases — involved in smartphone refurbishing and resale in Shenzhen does not specify that the vast majority of them belonged to, and were operated by, people who came originally from one and the same region of China, namely Chaoshan, in eastern Guangdong Province. In theory, anyone could trade smartphones in Huaqiangbei, but in practice Teochew Nang (in dialect or *chaoshanren* in Mandarin 潮汕人) dominated the trade — and vast swathes of Huaqiangbei, more generally. This ethnolinguistic group established powerful networks based on mutual aid between people belonging to the same (extended) family (*qinqi* 亲戚) or clan (*zongzu* 宗族), or having common geographical origins (*laoxiang* 老乡). That gave the Teochew Nang an advantage over their competitors: they could start a business more easily, for instance, or negotiate better deals. According to Zhang Yaozu: "The Teochew Nang run the business.

You do find people who come from other regions [of China], but not many, and they play only a secondary role.” Walking through the buildings where smartphones are resuscitated in Huaqiangbei, I noticed signs of the presence of the tea-loving, ancestor-worshipping Teochew Nang everywhere: every shop had a small earthenware set for traditional Chinese tea drinking (*gongfucha* 功夫茶) and many of them even had a small altar used to burn offerings. The Teochew Nang dominated Huaqiangbei thanks to a cartel-like organization. John Chow, a “maker” and long-time observer of the district, explained to me during an interview that:

“Teochew Nang are tough businesspeople, but they really stand together. They can get rich at the expense of others, but not of their community. That’s why they’re so secretive: when one of them discovers a trick [i.e. a business opportunity or technical intervention] that works, he/she might share it with his contacts, so they can develop it together, but he/she’ll make sure outsiders know nothing about it.”

Due to the Teochew Nang’s domination, the sector’s wealth was concentrated in the hands of one ethnolinguistic group. But it was also distributed within that group. The Teochew Nang’s decentralized, non-hierarchical organization allowed many families to “make a fortune” (*facai* 发财) in prosperous times or to survive through tough times.

The scale of the Chinese trade in high-end, refurbished smartphones was not lost to the big brands whose devices powered it. Apple, in particular, had long realized that used and broken iPhones still had considerable commercial value. In many countries, the American company bought back its products from consumers, “remanufactured”²³⁶ them, and resold them through its own retail stores²³⁷. No one was in a better position than Apple to gauge how much profit could still be made with used iPhones: according to some calculations, the

²³⁶ The term “remanufacturing” is used to refer to refurbishing carried out by, or with the assent of, the original manufacturer or brand-owner.

²³⁷ E.g. for the UK see <https://www.apple.com/uk/iphone/trade-up/> (accessed January 26, 2018).

brand's margin on new, unused ones amounted to around half of retail price²³⁸. In 2015, Apple partnered with its main supplier, Foxconn (*fushikang* 富士康), and launched a similar trade-in scheme in China. Foxconn bought back iPhones and iPads at fixed prices and paid with “credit” (*jifen* 积分) that sellers could use to purchase new Apple devices. The Taiwanese company then remanufactured the devices and resold them with a warranty to other Chinese customers. The scheme was aimed explicitly at fighting against independent refurbishing as practiced in Huaqiangbei, which Foxconn spokesman Louis Woo referred to as “the illegal manufacturing industry of counterfeit Apple products”²³⁹.

The Apple-Foxconn trade-in scheme became effective at a time when Apple was having great success on the Chinese market. That same year, the brand ranked number one in China in terms of smartphones sales²⁴⁰. Its rapid progression led CEO Tim Cook to place great hopes in the Chinese market: he claimed that Apple would soon record more sales in China than in the USA, the company's largest market, and planned to double the number of Chinese Apple Stores²⁴¹. It is certainly no coincidence that Apple decided to tackle smartphone refurbishing in China at that period. The management team must have taken a dim view of people who benefited from Apple's highly successful brand image but did not contribute to the company's revenue — though one could also present things the other way

²³⁸ “Spendy but Indispensable: Breaking Down the Full \$650 Cost of the iPhone 5”, *Digital Trends*, July 26, 2013. URL: <http://digitaltrends.com/mobile/iphone-cost-what-apple-is-paying/#ixzz4ScbTq3S9> (accessed January 26, 2018).

²³⁹ “Apple's Recycled iPhones and iPads to Go on Sale in China on April 15”, *South China Morning Post*, April 15, 2015. URL: <http://www.scmp.com/news/china/article/1764390/apples-recycled-iphones-and-ipads-go-sale-china-april-15> (accessed January 26, 2018).

²⁴⁰ “China Mobile Internet Insights in H1 2015”, *China Internet Watch*, October 20, 2015. URL: <http://chinainternetwatch.com/14378/china-mobile-internet-insight-h1-2015/> (accessed January 26, 2018).

²⁴¹ “Apple Plans China iPhone Trade-In Program With Foxconn”, *Bloomberg Technology*, March 25, 2015. URL: <http://www.bloomberg.com/news/articles/2015-03-26/apple-said-to-start-china-iphone-trade-in-program-with-foxconn> (accessed January 26, 2018).

around and argue that the iPhone's popularity in China owed a lot to Huaqiangbei. By getting rid of free-riders, Apple could have captured more profit and increased shareholder value, to use the vocabulary of economics.

Having smartphone refurbishing and resale operations shut down in China, especially in Huaqiangbei, was certainly in foreign brands' interest. After all, the district had developed into a "de facto supernumerary production base", as Frank Chen calls it, over which they had practically no control and from which they did not benefit, at least not directly. But competing against such shrewd business people as the Teochew Nang was more easily said than done. Apple's Chinese trade-in scheme, for instance, proved no match. It attracted many consumers but remained unavailable to most of them²⁴², due chiefly to unfortunate choices regarding platform (few people knew about Foxconn's physical shops and online shopping website, Flnet.com, which crashed when confronted with heavy traffic), prices (broken and functional devices were worth the same amount of credit) and modalities (many limitations, e.g. only iPhones made for the Chinese market could be traded in, credit could only be used to purchase Apple products, and consumers could only buy one device per person). Like many similar schemes, this one proved quite inconvenient and most likely resulted in a failure.

For several years, Chinese state authorities adopted a laissez-faire approach to the trade in used high-end smartphones. In theory, officially approved companies regulated and monitored refurbishing and resale operations in Huaqiangbei and ran the buildings that housed them. That gave state authorities indirect control over the sector. But the rules these companies adopted and the messages they sent out went largely unheeded. Tradespeople and craftspeople viewed them as a matter of form and held enforcement for unlikely, so they ignored them. To take only one example, everyone knew that smartphone refurbishing as

²⁴² "Foxconn Website Overwhelmed on First Day of Sales of Recycled Apple iPhones and iPads", *South China Morning Post*, April 22, 2015. URL: <http://www.scmp.com/tech/enterprises/article/1773449/foxconn-website-overwhelmed-first-day-sales-recycled-apple-iphones> (accessed January 26, 2018).

practiced in Huaqiangbei did not comply with intellectual property laws. Yet, in all buildings, one could read official slogans telling people to abstain from violating intellectual property rights (fig. 7.16). Had people obeyed this injunction, business would have come to a halt. But that is not what state authorities wanted to achieve. Rather, rules and slogans served as a reminder of the state's capacity to decide what is legal and what is not, and to reserve its right to intervene at any time under the pretext of illegality.



Figure 7.16: A propaganda banner located in a building specialized in smartphone resale in Huaqiangbei that reads: "Activities that violate intellectual property rights are strictly forbidden. Photo credit: the author.

Chinese state authorities' approach to smartphone refurbishing will certainly change in the near future. Recent events suggests that it will become less lenient: in August 2016, six months after my departure from China, official controls in Huaqiangbei led to the closure of

numerous shops and workshops specialized in smartphone refurbishing²⁴³. Such incidents are likely to occur more and more frequently, because Chinese smartphone brands are now rising and becoming global leaders, and the central government supports them. As long as the lucrative business of refurbishing and reselling high-end smartphones ran counter to the interests of foreign brands only, Chinese state authorities had few reasons to put an end to it. But now that Chinese companies (e.g. Oppo, Huawei) have taken the lead on the Chinese smartphone market and started to produce top-of-the-range products too, the situation is different. Smartphone refurbishing increasingly threatens the interests of domestic producers as well. Tellingly, in 2016, some refurbishers in Huaqiangbei had already started to work on Chinese models. That may prompt the central government, which promotes and protects big Chinese brands, to take decisive action against Huaqiangbei. Clamping down on the independent smartphone refurbishing sector also has the potential to reduce the popularity of foreign competitors and their products, which the central government has repeatedly tried to achieve in recent years, e.g. by launching numerous attacks against Apple and the iPhone²⁴⁴.

On the other hand, one event suggests that the business of refurbishing and reselling high-end smartphones was still thriving in Huaqiangbei until very recently, at least if we focus on foreign-branded products. In April 2017, Scotty Allen, an American software engineer turned

²⁴³ “Business is Getting Bad in Huaqiangbei as Markets Raise Rents Again: Driven Away and Cut off Businesspeople Are Struck by a Tide of Bankruptcies” [華強北生意差商場仍加租 趕絕商戶爆倒閉潮], *on.cc [東網]*, August 20, 2016. URL: http://hk.on.cc/cn/bkn/cnt/news/20160820/bkncn-20160820132152381-0820_05011_001.html (accessed January 26, 2018).

²⁴⁴ See, e.g., “China Takes Another Swipe at Apple”, *The Telegraph*, March 26, 2013. URL: <http://www.telegraph.co.uk/technology/apple/9955056/China-takes-another-swipe-at-Apple.html> (accessed January 26, 2018) and “Chinese state broadcaster CCTV attacks Apple, Samsung over 'substandard' smartphone cameras”, *South China Morning Post*, August 31, 2015. URL: <http://www.scmp.com/tech/social-gadgets/article/1854089/chinese-state-broadcaster-cctv-attacks-apple-samsung-over> (accessed January 26, 2018).

global adventurer, released a film²⁴⁵ on the Internet explaining how he spent several months in Huaqiangbei attempting to build an iPhone 6S from the sum of its parts and eventually succeeded (tellingly, he had to buy a salvaged, secondhand motherboard at some point during the process). His story went viral soon after it was released, attracting millions of clicks on Youtube.com alone. Allen describes himself as a “DIY enthusiast”. When he embarked on this adventure, he had no professional training in electronics, no prior experience in working on the iPhone, no personal contacts in Shenzhen, and no language skills in Chinese. He was basically an amateur and an outsider. It is therefore impressive that he achieved his aim. To be sure, the popularity of Allen’s story has to do with his shrewdness and intrepidity as an individual. But, more crucially, it proves that people, especially those living outside of China, are fascinated by Huaqiangbei’s alchemical powers and prowess.

²⁴⁵ “How I Made My Own iPhone - in China”, *Strange Parts*, April 12, 2017.

URL: <https://www.youtube.com/watch?v=leFuF-zoVzA> (accessed January 26, 2018).



Figure 7.17: American DIY enthusiast Scotty Allen holding the iPhone 6S that he assembled from scratch thanks to the complex specialized networks found in Huaqiangbei. Source: Strangeparts.com.

7.2.1.2 FPD monitors

A considerable part of humanity spends several hours a day in front of a monitor, whether for work or leisure. Television sets and personal computers have become an essential part of our lives and they are all partly monitors. Over the last two decades, the bulky and heavy boxes many of us grew up with have morphed into thin, light and large boards, thanks to a progressive switch from cathode-ray tubes (CRTs) to flat-panel displays (FPDs). Technology evolves quickly in this field and, as a result, great quantities of monitors worldwide become obsolete and are discarded. A considerable proportion of those devices are still functional, though, and can be reused.

In rich regions of the world, recycling companies are at a loss as to how they ought to deal with monitors. Both CRT and FPD monitors pose many challenges in terms of materials recovery, which complicates the quest for commercially viable recycling solutions (Matharu & Wu 2009, Salhofer et al. 2011, Lepawsky & Mather 2014). In late 2013, I visited two medium-sized DEEE recycling plants located in Europe, one of them in Switzerland and the other in Italy, and in both of these plants, FPD monitors appeared to be a real issue. The

operations manager of the Swiss plant, a man named Greub, told me that recycling FPDs “pose[d] many problems”. In particular, dismantling had to be carried out manually and required a lot of time and know-how, because each model had a different design and recoverable materials were often hard to access. “First-generation panels [we]re the worst”, Mr. Greub explained, because they were equipped with backlighting tubes that contained mercury, a highly toxic substance. Those objects had to be removed from the rest and handled with great care so as to avoid contamination. That generated additional labor, which, given the high level of wages in Switzerland, raised operational costs considerably. Asked what happened to FPDs once they had been extracted from monitors, the manager first replied that they were “stored” (fig. 7.18) and then explained that it was a “sensitive topic”, on which he was not allowed to tell me more.



Figure 7.18: FPDs stored on pallets in a DEEE recycling plant in Switzerland. Photo credit: the author.

During my visit in the Italian plant, I noticed a batch of monitors that had just been delivered (fig. 7.19) and asked Matteo Agnoni, the plant owner, where they came from. “Certainly from a company that has replaced its old equipment”, he replied. His employees were going to separate FPDs from monitor casings and circuitry, place them in industrial “big bags”, and ship them to customers (fig. 7.20). Mr. Agnoni acknowledged that his

company did not have the means to deal with FPDs on site. “Certain types of devices or components contain too little metal for us to undertake dismantling here. Labor costs would be too high. So we store them and sell them to companies that use other methods.” But in 2013 very few companies had found a way to make FPDs recycling profitable. Those components simply contained too few valuable materials. Many engineers had gotten down to devising special extraction methods for indium, in particular, but those methods had yet to be applied at an industrial scale. In other words, back then “other methods” basically meant either disposal or export, but not recycling²⁴⁶.



Figure 7.19: FPD computer monitors that have just been delivered to a DEEE recycling plant in Italy. Photo credit: the author.

²⁴⁶ In the late 2000s, academic researchers observed that FPDs collected in Europe and in similar regions of the world were rarely recycled and assumed that they mostly ended up in landfills or incinerators (Matharu & Wu 2009, Salhofer et al. 2011).



Figure 7.20: FPDs piled up after they have been extracted from monitors in an Italian recycling plant. Photo credit: the author.

I do not know for sure what happened to the monitors and FPDs I saw in Switzerland and Italy, but I have good reasons to suspect that a considerable proportion of such devices and components left Europe and found their way to global import-export hubs (Huisman et al. 2015) and then to manufacturing places in China and elsewhere. The likelihood that great volumes of FPDs and monitors crossed borders and travelled to far away destinations is even higher for countries like the USA or Japan, where governments take a more permissive stance on the issue of DEEE export (USITC 2013, Kirby & Lora-Wainwright 2015). Chief among push factors is the fact that, in all rich regions of world, recycling companies made money when they resold FPDs but lost money when they disposed of them. Chief among pull factors is the fact that used, cheap FPDs were a godsend for manufacturers operating in emerging countries like China (or India, or Mexico), which supplied good-enough goods to low-income consumers located in the Global South.

At the spring 2015 edition of the Canton Fair, I visited more than a dozen stalls belonging to small and medium-sized Chinese enterprises, or “original equipment manufacturers” (OEM), specialized in low-quality FPDs monitors and enquired about their products’

specifications. It turned out that nearly all of these OEMs used refurbished FPDs in their small and cheap models. At one stall, a salesman told me that his company used exclusively refurbished panels for all the models that relied on the old cold cathode fluorescent lamps (CCFL) technology (fig. 7.21), but mostly new ones for those that relied on the newer light-emitting diodes (LED) technology. “LCD [read CCFL²⁴⁷] panels are not manufactured anymore”, he explained — visibly, though, that did not apply to devices containing such panels. His customers, he told me, were for the most part tradespeople from “poor countries” located in Africa, Southeast Asia and South Asia. At another stall, a female representative acknowledged that her company also assembled “LCD” [read CCFL] monitors using refurbished FPDs, but quickly added that: “Printed circuit boards, casing, cables, all the rest is new.” Her company also produced monitors to order. “We can use any panel, from any brand you want”, she said, “but if you don’t specify, we’ll just use those that are available.” She told me that her company sourced used FPDs from Japan and Hong Kong. Customers willing to go for monitors that contained refurbished FPDs could save a lot of money on their purchases. A monitor with a 17-inch screen, for instance, cost thirty per cent less when equipped with a refurbished (CCFL) FPD (48 USD) instead of a newly manufactured (LED) one (65 USD)²⁴⁸. That kind of price difference mattered a great deal to traders from low-income countries.

²⁴⁷ Backlighting in FPDs relies on either CCFL (in older models) or LED (in newer ones). Everywhere, people make a distinction between CCFL and LED technology, but in China they refer to CCFL as “LCD”, which actually stands for liquid crystal display, a screen (not backlighting) technology all FPDs are equipped with. Confusion is partly avoided by the use of the expression *yejing xianshiqi* (液晶显示器) in China to refer to LCD technology.

²⁴⁸ All prices quoted here are for bulk orders only (minimum order quantities vary).



Figure 7.21: One of the numerous television sets assembled using refurbished FPDs that could be found at the Guangzhou Fair. Photo credit: the author.

One of the salespeople I met at the Canton Fair invited me for a visit of his company's newly built plant located in the suburbs of Guangzhou. I went there in April 2015, presenting myself as a businessman, and met with the owner, Lu Shaoqiang, or Richard, as he asks his foreign customers to call him. Richard showed me around and explained in broken English that his company, Qingbo Electronics Co. Ltd. (广州市华野电子有限公司), assembled monitors using mostly components (e.g. PCBs, speakers) manufactured by other Chinese companies, except for plastic casings (or "cabinets"), which the company molded on site, and FPDs, which it mostly bought in used condition. All of its small-sized models, regardless of backlighting technology (CCFL or LED), were equipped with refurbished FPDs and some of the medium-sized ones as well. Only large-sized models (32-39 inch in diagonal) contained exclusively newly manufactured FPDs, because used ones were not (yet) available in such dimensions. During the visit, I saw several pallets on which used monitors had been piled. Richard also showed me monitors made to order for a "friend" from the Middle East and specified that they all contained refurbished FPDs.

Back in Richard's office, I told him that I might be interested to collect used FPD monitors in Europe and sell them in China to companies like his. He strongly encouraged me to do that, claiming that demand was strong and that shipping goods to China was not particularly difficult. Richard himself sourced his used FPDs from a variety of entities and places, including foreign traders based abroad and licensed DEEE dismantling companies operating China.

Richard: If you doing this business, you have no worry to the selling. Don't worry the selling!

[...]

Richard: I think this business very large [...]. One of my friend selling Hong Kong, they're selling almost 50,000 piece one month.

Yvan: 50,000 pieces one month!

Richard: Just one of him. One person, one company selling this.

Yvan: Wow! That's really interesting!

Richard: Also I'm, also in my property, we are buying 20,000. In the future, we are making 60,000 piece of TV, cabinet TV. Also we need these panels.

[...]

Yvan: But the problem is importing into China, it's not... it's not allowed, I think.

Richard: It's allowed. I just import to Hong Kong or the Guangxi Beihai.

Yvan: Oh, this is allowed? Special conditions for industrial parks?²⁴⁹

Richard: Yes, only just that place in China, special. [...] If you wanna make the business first in TV, you can just, recycling the panel [i.e. collect panels from TV sets], it's enough. Because it's a very large business, it's enough. I [...] buy the panel with the Japanese, Korean and the, like Beijing, Chinese, all recycling companies.

Yvan: You buy directly from them?

Richard: Yeah. They just give me the companies' monitor.

²⁴⁹ Actually, Beihai is a free trade zone.

[...]

Richard: Normally we buy from the recycling companies. You know it's like [...] work with the government.

Yvan: Those that work with the government?

Richard: Yeah, work with the government, the recycling company. Like Beijing, Beijing recycling company work with the government.

Richard explained that there were various quality grades and prices. Monitors from Japan, for instance, fetched the highest prices, because they usually arrived in good condition thanks to a special packing method (attached in pairs, screens facing each other). In any case, Richard bought FPDs by the ton, shipped them to Guangzhou and then had his workers separate the wheat from the chaff.

Yvan: When you see a monitor, you don't necessarily know what panel is inside, no?

Richard: Yeah, yeah.

Yvan: So how do you know [...] which panels you're getting?

Richard: Normally, panel taking [i.e. once we receive a panel], check the panel, check is it glow or not glow and check it again. And normally monitor [...] just a little problem, they don't have big problem. There's only broke or not broke.

Yvan: How do you know if the panel is from a good brand or not so good?

Richard: We always interest to try once. If try once, ok, ok we continue the business, we interested.

[...]

Richard: [Buying is] like a bet, like betting. You bet, [...] how much percent is the, the good [i.e. the percentage of FPDs that are in good condition]. [...] Japanese monitor is the best of the world.

Yvan: Why is that?

Richard: Because they [...] pack the monitor very well.

Yvan: So when you get them here, they're all in good condition, no?

Richard: In America, US panel they're like the rubbish [...]

[...]

Richard: You need to select which monitor is from which country. USA, anybody, afraid, USA. If Japanese, everybody buys.

[...]

Richard: If you recycle the [...] monitor, for the sale, you don't need to do a lot of process[ing], [just] select which [device] is broken or not broken. Yeah, just like this. And pack well and you can sell, like this. [...] The Japanese, they are selling, like ninety percent, ninety-five per cent very well [i.e. fully functional FPDs]. They make the price very high. They can sell the price high.

Yvan: [...] What methods do they use to pack their monitors?

Richard: They use to pack with the monitor from front base, from front side with front side together, and make the tight together. Just like this: two pieces together. [Richard presses the palms of his hand together.]

Yvan: Only like this, nothing else around it?

Richard: No need, because they have the cabinet around the panel. That cabinet protect.

Qingbo had to dispose of dysfunctional panels but could reuse slightly defective ones. On certain models, for instance, the company used “B-grade” by default, namely batches in which up to thirty per cent of panels had (a few) blind dots. For an extra charge of around thirteen per cent of the price, customer could opt for “A-grade” instead, that is, one hundred per cent fault-free panels.

Qingbo belonged to Richard, but it was an offshoot from an older company founded by his father, Dabo Electronics Co. Ltd., whose plant was also located in the suburbs of Guangzhou. Dabo specialized in CRT television sets (fig. 7.22) and assembled monitors using exclusively refurbished CRTs. The company also catered to customers based mainly in the Global South. I was surprised to learn that many companies in China still produced that kind of device. Somehow, I assumed that everyone on this planet now wanted FPDs. But, visibly, I was mistaken (see Lepawsky & Mather 2014): the CRT business was still profitable — that is, if one used refurbished components. The price difference between CRT and FPD monitors was big enough to make CRT attractive to buyers with modest means. For instance, in small screen sizes, Dabo sold CRT monitors for around 30 USD, whereas the equivalent FPD monitors from Qingbo were fifty per cent more expensive on average, at 40-50 USD. On the other hand, shipment costs were higher for CRTs than for FPDs: one could only fit up to 1600 small CRTs in a 40-foot container, compared with up to 3600 small FPDs, according to Richard. But non-economic factors certainly played an important role as well. For instance, CRTs were very resistant and lasted longer — Richard mentioned that several Panasonic monitors tested at Dabo had been running 24/7 for over 30 years and did not

show signs of wear. CRT technology had also been around for quite a while, so many people throughout the world, including in poor countries, were capable of fixing CRT devices.

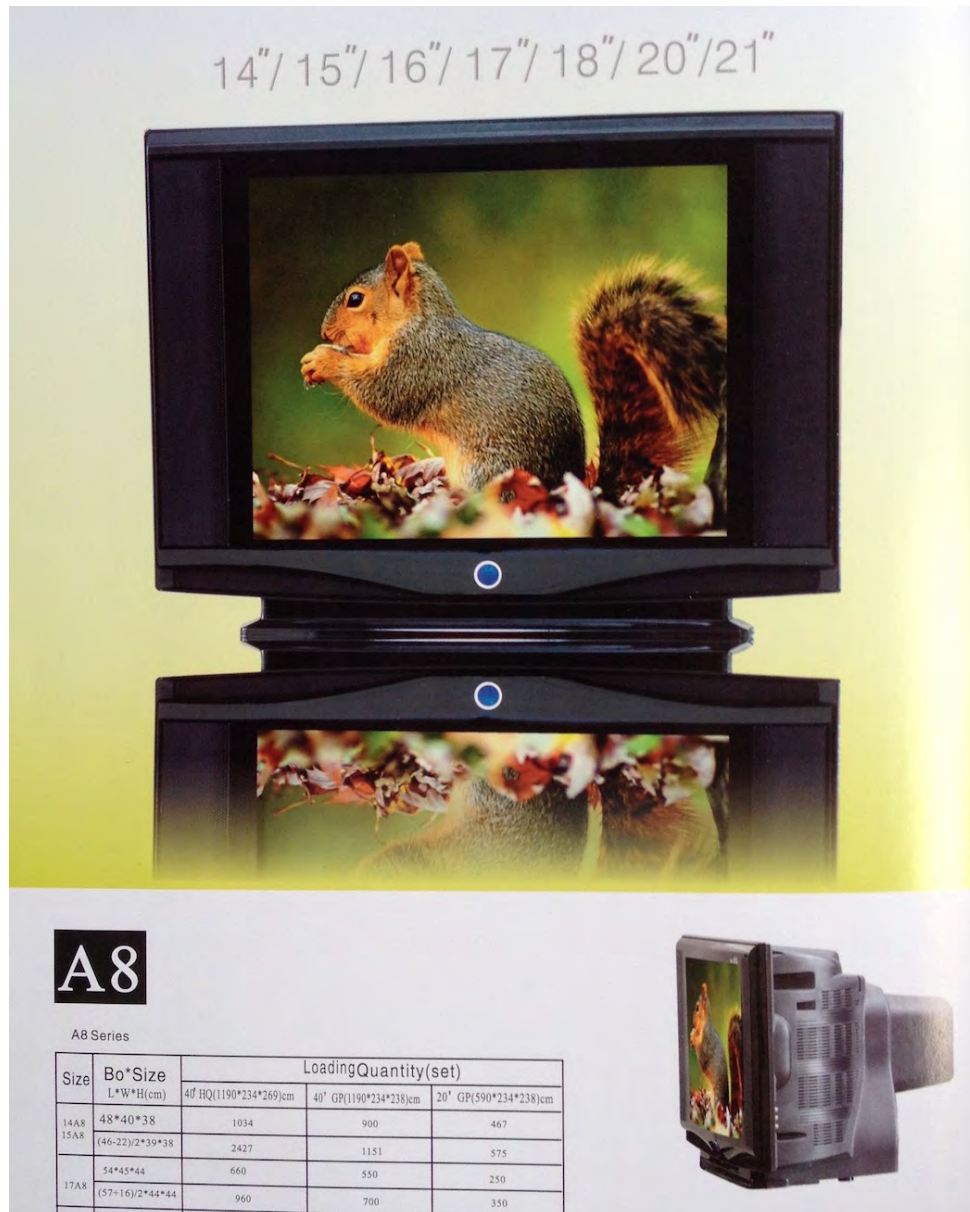


Figure 7.22: A page from the catalogue of a Chinese company that assembles television sets using refurbished CRT and sells them to foreign customers. Photo credit: the author.

Another reason why the continuance of CRT refurbishing and reuse in China surprised me is that I had heard previously of a massive government crackdown on the sector. According to Minter²⁵⁰:

“From the 1990s into the mid-2000s, China was home to a huge, highly profitable monitor reuse and refurbishment industry. These days [i.e. in the early 2010s], India, Mexico, and Africa are home to thriving and growing industries as well. The potential profits are huge. During the glory days of the Chinese reuse and refurbishment industry, monitors were bought in the United States and European Union for less than \$10, refurbished in China, and then resold for \$100. The trade was, however, a victim of its own success and of the changing times: the Chinese government shut down these businesses to protect new monitor manufacturers, many of whom are government owned and connected. Meanwhile, China’s consumers got rich and started coveting flat-screens.”
(Minter 2013:114)

Considered jointly, the examples of FPDs and smartphones reveal what I take to be a policy pattern: as soon as domestic manufacturers start producing a certain type of device or component on a large scale and are poised to take a dominant position on the global market, the Chinese government intervenes and obstructs the refurbishing of that type of device or component. Had that stage been reached with regards to FPDs in the mid-2010s? Not yet, I would argue. In the mid-2010s, most FPD manufacturers (e.g. LC, Samsung, AOC, ALC, HKC) were either Taiwanese or South Korean, and Chinese companies still lagged behind. But they were making great strides and could catch up anytime, as indicated by China’s rise within the pecking order of the global electronics industry.

I had the feeling that the people practicing FPD refurbishing and resale in China were fully aware of that and cautious not to attract attention. Few businessmen involved in that type of activities behaved like Richard, who spoke openly about his activities, at least to potential foreign partners. Most of them were secretive and on guard. In spring 2014, I discovered,

²⁵⁰ See also Robin Ingenthron, “Why We Should Ship Our Electronic ‘Waste’ to China and Africa”, *Motherboard*, [date unknown]. URL: <http://motherboard.vice.com/blog/e-waste-recycling-exports-are-good> (accessed January 26, 2018).

almost by coincidence, what was perhaps Guangdong Province's largest commercial hub for used and refurbished FPDs and FPD monitors. Located in the outskirts of Guangzhou, in the “urban village” (*chengzhong cun* 城中村) of Dashan (大山), this marketplace consisted of thousands of shops and workshops, some of them located at the street level, other in dedicated buildings. One those buildings (Mighty Communication Electronic Digital City 伟讯电子数码城) (fig. 7.23) contained almost exclusively used FPDs. I estimated that there were several tens of thousands of items distributed over three floors and stored in piles or boxes. Judging by the screen sizes found in Dashan, the “village” supplied mostly manufacturers of television sets and computer monitors.



Figure 7.23: Outside view of a building in Guangzhou that sells almost exclusively refurbished FPD. Photo credit: the author.

I visited this marketplace several times and tried to strike up a conversation with dozens of tradesmen and craftsmen, to no avail. Some of them ignored me, others remained silent, others yet talked nonsense or tried to deceive me with misleading explanations. I really felt like they had a secret and did not want to share it with me — or with any outsider, for that matter. Dashan was one of the most sensitive places I visited. When I took pictures, for instance, people hid their faces or drove me away. In that regard, Dashan reminded me of Guiyu — though the level of pollution was not nearly as serious. I have argued elsewhere (Schulz 2016) that tradespeople and craftspeople in Dashan certainly feared being associated with “e-waste” and affected by this public problem’s negative image. I still believe this to be true. But I now see another reason for their secretive behavior, one that is more specific to their wares. If we assume that the days of the Chinese FPD refurbishing sector were numbered in the mid-2010s — or at least that independent businesspeople would be forced to operate on a much smaller scale in the near future — then it becomes obvious why they

kept a low profile and mistrusted a young white man who behaved like journalists do, asking a lot of questions and taking pictures. That was a way for them to stay off the radar.

Only two people in Dashan agreed to talk to me about their activities. The first one, a certain Mr. Hu, owned a workshop that specialized in refurbishing “open cells”, i.e. FPDs’ outermost layer, which contains the liquid crystals. Open cells are covered with a plastic film whose function is to reduce reflections and protect the underlying glass against dust, grease (from fingerprints) and scratches. Mr. Hu and his staff replaced that film, thereby erasing traces of usage from the screen surface and restoring open cells to an unblemished appearance. Together, his six workers managed to process seventy to eighty items a day (or up to one hundred when working overtime), using only cutters, stain remover and glue (fig. 7.24). In the past, Mr. Hu used to repair the PCBs that connect open cells with FPDs’ other electronic components, but his eyesight had deteriorated, forcing him to switch to another type of activity.

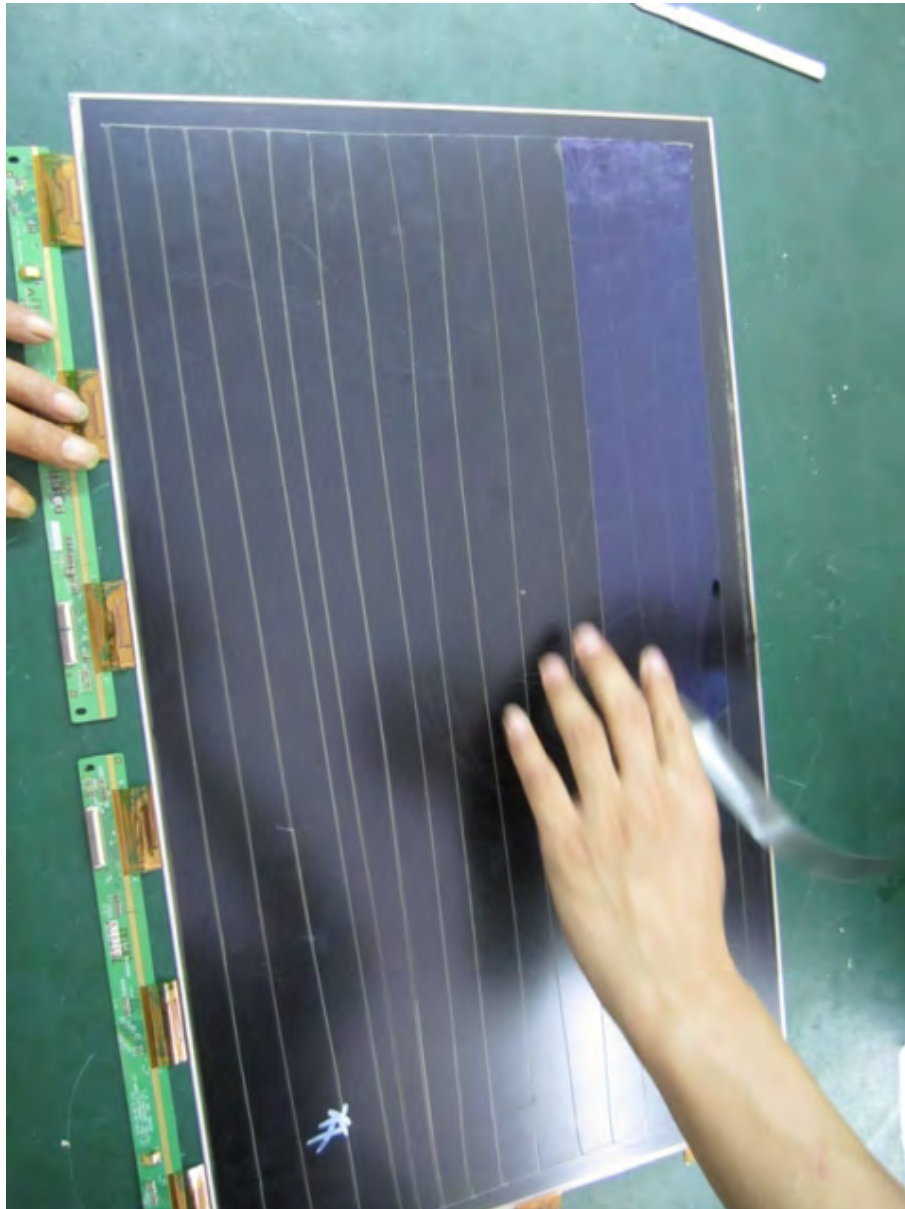


Figure 7.24: FPD can be made to look new by replacing the plastic film that protects the screen surface. Several workshops in Dashan (Guangzhou) specialized in that type of activity. Photo credit: the author.

The second person I managed to receive information from was called Mr. He. His main business resembled Richard's. I offered to sell Mr. He a container of used FPD monitors from Europe, which triggered his interest. He claimed to have many contacts in Hong Kong, so he could easily have goods stored in the autonomous territory and then shipped to mainland China (Foshan). According to him, FPDs in the autonomous territory typically cost 25 RMB (3.5 USD), 45 RMB (6.5 USD) and 80 RMB (11.5 USD) depending on screen size (17-19, 22-24 and 26-32 inch, respectively). Import — or rather smuggling — into mainland China cost around 30 RMB (4.3 USD) for two kilos (which corresponds roughly to FPDs' average weight). "The process can be fast or slow, that depends on how strictly [*yange* 严格]

regulations are being enforced”, he explained, adding that “sometimes, I have to wait one or two months before I can ship goods over from Hong Kong.” Once in mainland China, small FPDs (17-19 inch) typically sold for 75 RMB per item. Businessmen like Mr. He certainly did not make huge profit margins, but even at a realistic level of 5 RMB per item, a single 40-foot container brought them a very reasonable 18,000 RMB (2700 USD).

7.2.2 Opaqueness, trickery and risk

Much like repairmen, refurbishers were suspected of having deceitful practices and of trying to get rich at customers’ expense. One agency offering help to foreign clients wanting to buy goods in Shenzhen warned on its website that shopping in Huaqiangbei’s largest building for refurbished smartphones, Tongtiandi Communication Market (通天地通讯市场), entailed risks: “You can find good quality phones here and make large profits as well as get swindled and lose your money”²⁵¹.

Producers of refurbished devices or components and wholesale merchants tended to be honest about their products’ origins, composition and specifications, maybe because they expected to be dealing with knowledgeable partners and wanted to establish long-term business relationships. But retailers, who catered to consumers, tended to pass refurbished products off as something else. On Taobao.com, for instance, the vast majority of online shops described their wares as “entirely new” (*quanxin* 全新), even though people familiar with the trade agreed that this B2C website contained mostly modified devices. In some cases, models did not match retailers’ description. Zhang Yaozu reported for instance that: “A portion of the iPhones 5c [...] are resold as iPhones 5S. These two models have a similar architecture, but people want 5S, not 5c. As a result, 5S are expensive whereas 5c are hard to sell. Someone [in Huaqiangbei] invented a way to place the body of a 5c into the casing of a

²⁵¹

Source:

http://www.shenzhenpurchaseagent.com/index.php?option=com_content&view=article&id=108&Itemid=200
(accessed July 4, 2017).

5S. Then, someone else discovered a way to reflect that change at the software level.” Such practices were common.

There was pressure within the sector of electronics refurbishing and resale to not divulge the mechanisms on which it relied, at least not to outsiders. While Zhang Yaozu and I were walking down a back alley in Huaqiangbei, discussing smartphone refurbishing and reuse, he got a talking-to by an old lady selling broken iPhones. “What are you doing?”, she asked him abruptly, “he’s a foreigner! You shouldn’t reveal our secrets [*jiemi* 揭秘] to foreigners. That’s bad for business!” While only an anecdote, I think that the old lady, being particularly candid, expressed thoughts that many people around us shared but did not dare say out loud. On rare occasions, however, secrets did get out, notably when insiders communicated openly about their activities. In 2014, one of them posted a short account of smartphone refurbishing and resale on WeChat. Entitled “Do you dare buy an [iPhone] 5S for 3300 [RMB]?”, this post began with the sentence: “Today, a well-informed man risks his life to take you into the deep waters of the smartphones industry.” A series of photos and comments followed that disclosed the steps required to transform “secondhand” (*ershou* 二手) smartphones into “entirely new” ones. One of these steps consisted in repackaging refurbished devices (fig. 7.25):

“A heat gun [*fengqiang* 封枪], sealing material [*mifeng zhuangzi* 密封装子] and, once it’s sealed, you can sell it to customers claiming it’s intact, entirely new, [the box] has never opened and [the device] has never been activated. The waters of Taobao are deep: ninety-nine percent of mobile phones [found there] are refurbished or returned devices [*guanhuanji* 官换机]. Could you [really] sell entirely new devices on a discounter [*yige pin jiage de difang* 一个拼价格的地方]?”

Browsing through the Chinese Internet, I found a few similar insider accounts. In all of them, the author made more or less the same argument: iPhones that sell for half of Apple’s official retail price simply cannot be entirely new, so consumers should be realistic about it. Such accounts, it seems to me, responded to accusations of fraud and served to clear refurbishers of guilt.



Figure 7.25: Through repackaging, refurbished iPhones can be made to look new. One of the steps consists in sealing boxed devices with plastic film. Source: anonymous blogpost on WeChat.

In order to reintroduce used smartphones on the market, Chinese tradespeople and craftspeople needed to rid them of traces of the past, because consumers wanted virgin devices, not used ones. They achieved this not only through physical methods (e.g. replacing a scratched part with a flawless one), but also through non-physical ones such as hushing up objects' true careers. All these techniques created opaqueness for consumers and justified the idea that they were being cheated. But did consumer fall for the pretense that they were buying “entirely new” and “original” devices? It is difficult to say. The vast majority of them were most likely attracted first and foremost by low prices and cared little about the rest, so they did not inform themselves. They were happy as long as their device could be used and

tried to have it fixed if it malfunctioned. Others certainly suspected that their device might have had a previous life, but still accepted to buy it. Yet others kept away from independent retailers and bought only from large official shops, to increase the likelihood that they acquired unrefurbished goods — but only wealthy people could afford to do that.

Sellers rarely offered a warranty on refurbished devices or components. For instance, I bought a monitor in Gangding that contained a refurbished FPD and the saleswomen scribbled on my invoice: “Screen: no warranty. Circuit board: warranty one year.” Many customers did not care much about warranty anyway. This is particularly true of foreign traders, for whom shipping a dysfunctional device all the way back to China to have it repaired or replaced made little business sense. My interviews with these people reveal that they simply assumed that a certain percentage of the devices they bought would not function properly and hoped that this percentage would be low.

It is an undeniable reality that reuse involves risks. The refurbishers I saw at work in the Pearl River Delta subjected devices and components to basic testing only, so certain defects or dysfunctions certainly went unnoticed and untreated. However, institutional experts and the media, in China and elsewhere, often exaggerated those risks and used them to undermine the credibility of the repair and refurbishment sector. In her documentary on “e-waste”, filmmaker Cosima Dannoritzer (2014) advances for instance that component reuse can lead to catastrophic accidents such as train derailments and airplane crashes. I have looked everywhere for a case that supports such a statement but not found any. This should not surprise, because large companies producing consumer electronics en masse or particularly high-tech machines source their components directly from large manufacturers, not from marketplaces like Huaqiangbei or Dashan. In other words, the likelihood that refurbished components end up in a Boeing plane or a Siemens train is negligible.

This said, electronics components and devices in general can pose a significant safety risk. Ironically, the greatest scandal that occurred during my research did not involve reused products but newly manufactured ones. Shortly after the Galaxy Note 7’s release, it became clear that Samsung’s new smartphone was likely to catch fire while charging. This prompted the aviation sector to ban the model on airlines for fear of midflight explosions. Growing discontent and negative publicity forced Samsung to issue a global recall. Some observers

described this incident as one of the most damaging and costliest product safety scandals in the electronics industry history.

7.2.3 Refurbishing's "formal" cousin

Electronics refurbishing, repair and reuse was largely unregulated in China in the mid-2010s (Chi et al. 2011:736, Steuer 2016). Chinese institutional experts were oblivious to reuse's potential to extend product lifetimes. For them, practices aimed at restoring devices' and components' functionality and/or appearance aggravated the "e-waste" problem rather than alleviated it. They rarely paid attention to them and, when they did, it was usually to criticize them: reused components posed a risk, they argued, because they failed more easily than newly manufactured ones.

One form of refurbishing, however, was in favor with institutional experts, namely "remanufacturing" (*zai zhizao* 再制造). This form of refurbishment involves returning used or worn-out products to an as-new functional state and adding an equal warranty to newly manufactured equivalents (Ijomah 2002). It must be carried out by the original manufacturer or by an external company but under the aegis of that manufacturer. In the mid-2010s, Chinese state authorities had been promoting remanufacturing through official documents for over a decade, but no specific regulation had been adopted yet (Tan et al. 2014, Steuer 2016)²⁵². If that happens eventually, it would not amount to promoting electronics reuse in general, because the vast majority of actors in China's large repair and refurbishing sector have no connection to original manufacturers and could not possibly work for them. Rather, the adoption of a law on remanufacturing would strengthen manufacturers' control over their products and weaken as well as delegitimize all the other actors involved in refurbishing and reuse (see Ijomah & Danis 2012).

²⁵² Rules on repair or refurbishment can be found other national or international regulations on DEEE recycling, such as the EU WEEE Directive, but their impact remains very limited thus far.

7.2.4 Reformers, not revolutionaries

One might be tempted to associate China's vibrant electronics repair and refurbishing sectors with the growing interest for repair and maintenance practices that can be observed in Western Europe and North America (and possibly Japan) since the early 2010s. This has been done already (Houston et al. 2016). However, the two phenomena have little in common. The latter is driven by the rising level of consciousness, in rich regions of the world, of the negative repercussions of contemporary modes of consumption, production and disposal, and by the quest for alternatives, whereas the former can be explained by DEEE's high residual value and the need for individuals and families to secure a living. One is mostly ideological, the other mostly practical.

Chinese professional repairers and refurbishers do not see themselves as green heroes or anticapitalist rebels, and quite rightly so. Their action has a lot of positive effects and deserves to be valorized: it prevents the wasting of vast quantities of consumers goods by redistributing them on a global scale. It bridges the digital divide better than any intervention to that effect by bureaucratic organizations (e.g. state or international development agencies)²⁵³. It also extends product lifetimes, thereby reducing the need for manufacturing new EEE, replacing existing EEE, and making old, abandoned EEE disappear (see Stahel 1982). But professional repair and refurbishment does not challenge, stand in opposition, or represent an alternative to contemporary industrial capitalism. It lives off mass production, consumption and disposal, for it depends on a profusion of products, a strong demand and rapid decay and turnover.

Viewed from the perspective of professional repairers and refurbishers, planned obsolescence is a business opportunity, not a regrettable and condemnable scheme by multinational companies to increase their profit at the cost of consumers and the planet (see Slade 2006, Sterne 2007). It can be exploited, so there is no reason to fight it. Unlike

²⁵³ For a critique of the idea that there are information "haves" and have-nots", and that the divide between them can be bridged, see Qiu 2009.

amateur tinkerers and citizen activists who salvage decade-old, antiquated devices and use them, delighting in what they see as an act of defiance, professional repairers and refurbishers tend to accept that EEE has an expiry date. In the Pearl River Delta, in the mid-2010s, I found it hard to sell my iPhone 3. People almost laughed at my face when I insisted that it was fully functional. “Nobody wants that kind of old device anymore” (*zheyang de lao jiqi, mei ren yao le* 这样的老机器，没人要了), they told me (see Minter 2013:187, 207 & 264). I faced the same reaction when trying to have my father’s first-generation digital camera fixed. “You’d better buy a new one” (*haishi ni mai xin de* 还是你买新的), several repairmen told me.

If anything, repair and refurbishment in China can be seen as a corrective to some of the drawbacks of a globalized economy. It limits the domination of the electronics industry by multinational companies. The latter’s efforts to corner the market, to appropriate profits for their shareholders, to control access to objects through product and supply chain design, to automatize processes, and to reach rich consumers are mitigated by concurrent ones that run in the opposite direction and for which much smaller, but well-positioned and well-connected, actors must be credited (Schulz 2017). Scholars who studied the role of small enterprises in the world economy point that they manage to adapt to globalization and even to take advantage of it (Smart & Smart 2006, Mathews et al. 2012). The case of electronics refurbishing shows that they can do more than that, namely affect globalization, or act as a driver of another kind of globalization than the one we are used to. While we associate globalization with corporations moving stuff from low-income countries or regions (e.g. extraction, processing) to middle-income ones (assembly) and then to high-income ones (usage), refurbishing clearly features the reverse movement. And it reveals a more even pattern of distribution of risks and profits among the various actors along the chain.

7.3 Conclusion

Little is known about repair and refurbishing in China, which makes it a fertile ground for fantasies and speculations. My main aim in this chapter was to present the protagonists that populate these sectors and to shed light on their practices, values and representations. We have seen that urban dwellers in China had no difficulty in getting help from professionals when their EEE let them down and they needed it fixed. For the most part, these repairmen had set up their own business, were self-employed, possessed a basic license, but did not file

or pay taxes. Some of them worked as subcontractors for larger companies, including for major EEE retail chains. If we think in binary terms, are these actors to be considered as formal or informal? Here, the exchanges and overlaps between the two sectors become obvious and so do the limits of the distinction. But, regardless of the label, the fact is that repairmen performed an essential service to the urban population and did not get much recognition for it, much like the independent DEEE collectors described the previous chapter.

Moving from repair to refurbishing, this chapter has revealed the existence of global networks that circulate used and used up electronic devices and components on a global scale and transform them back into new products — or at least into what can be sold as new products to individual consumers. It has emphasized the crucial role played by the Pearl River Delta as a center of activity and described several of the marketplaces that can be found in this region. My research indicates that DEEE refurbishing activities are only allowed to take place in China as long as they do not threaten the Chinese domestic EEE manufacturing industry. When they do, they start facing numerous attacks, which attempt to delegitimize them, the people who engage in them and the objects that result from them. Every stride the domestic manufacturing industry makes forces independent refurbishers to abandon their current line of business and find a new one. As a result, the practice of DEEE refurbishing is constantly put in jeopardy.

This deserves to be highlighted, because it contrasts with the image of China as being at the vanguard of efforts to make the economy more circular (Mathews & Tan 2011 & 2016, Geng & Doberstein 2008). As we have seen earlier, the circular economy has become an official national development goal in China. Beijing expressed its commitment to this goal by adopting the world's first national law on the circular economy in 2008 and has since then regularly reaffirmed it by integrating the concept in numerous policy documents as well as by launching several “pilot projects” throughout the country in the form of eco-industrial parks. In China, much like elsewhere, the circular economy is presented as a “new economic model to effectively resolve the problems of resources and the environment” (Yong 2007). For Walter Stahel, who first coined the term, the circular economy is all about product reuse (Stahel & Reday-Mulvey 1981, Stahel 1982, Stahel 2016). His understanding of the concept has proved quite influential (see, e.g., Ellen MacArthur Foundation 2013). By contrast, the

Chinese take on the circular economy lays emphasis on materials recovery and ignores just about all practices leading to product reuse. For the moment at least, it boils down to industrial symbiosis in large eco-industrial parks, i.e. exchanges of waste, water and energy between firms located within a clearly defined and enclosed areas. Tellingly, that is what most Chinese researchers focus on (Geng et al. 2009, Shi et al. 2010, Su et al. 2013, Shi & Yu 2014).

My case study on refurbishing shows that other types of symbioses already exist on the ground in China, which owe little to government initiatives and take very different forms from those classically associated with industrial ecology (see also Gregson et al. 2012, Gregson et al. 2015). DEEE refurbishment took place on a massive scale in the mid-2010s. It was anything but a marginal phenomenon and it had been going on for a while (see Shinkuma & Huong 2009:27). Refurbishing is widely regarded as reaching higher ecological standards (StEP 2009). One would therefore expect that it would qualify as a better instance of circular economy. But then, why was it not being acknowledged as such, and valorized and promoted in China? Why was it not even being taken into account? The answer is a simple one: because it did not fit with the central government's plans for the development of the Chinese economy and the upgrading of the Chinese industry. Or, to put it differently, because it regularly stood in the way of modernization.

This is true of independent refurbishing as practiced in the Pearl River Delta, but not of all practices leading to product reuse. The promotion of remanufacturing by the central government, though not yet accompanied by concrete implementation measures, indicates that Beijing is open to such practices as long as they involve corporations exclusively and serve their interests. The main difference between refurbishment and remanufacturing is that anyone with the necessary skills and knowledge can practice the former, whereas the latter is restricted to brand owners and manufacturers (or their subcontractors), whether for practical, technological or legal reasons (Ijomah 2002, den Hollander et al. 2017). Remanufacturing therefore allows large companies to keep control of their products and potentially make more profit out of them. The fact that remanufacturing represented the only type of refurbishing worthy of official recognition in China sheds a very different light on calls to “close the loop” and to trigger the advent of a circular economy. It reveals the exclusive character of development plans, or the modernization project more broadly, and

their exclusionary effects for the multitude of actors already engaged in bringing objects back into usage and circulation.

This chapter bears a final important insight, namely that it is worth thinking about the biography of things in iterative rather than in linear terms. Consumer goods such as electronics are not only composed and decomposed, but also recomposed, a number of times in some cases. Through that process, they change and become something else. This is just as true of old ships that transform into furniture and building materials (Gregson et al. 2010 & 2012), or rags into blankets (Norris 2012), as it is of smartphones that transform back into smartphones. Something else necessarily means something at least partly unknown. Uncertainty steps in and it becomes difficult to trace and classify objects. As a result, relations are characterized by mistrust: humans are suspected and accused of being dishonest, objects of being defective, even dangerous. As the expression “back from the dead” suggests, there is something both magical and uncanny about object rebirth. When faced with a repaired or refurbished device, many of us worry that something might go wrong — like when zombies lose an arm or turn against the living.

8 CONCLUSION

While I was writing this thesis, Xinhua (新华通讯社), China's official state-run press agency, published a short article in English²⁵⁴ that struck me as addressing precisely the topic of my research. Though it was written in connection with China's recent ban on scrap imports, this article can be interpreted more broadly, as a summary of what Beijing has been trying to achieve for years and is going to push for even harder in the future, or so it seems. Several paragraphs in this article resonate with my thesis, especially chapters 2 to 5. I have therefore decided to reproduce the article in full and point out to the correspondences (in square brackets).

China moves to standardize recycling industry

Aug 17, 2017 Xinhua

BEIJING — China has moved to standardize its solid waste recycling industry, which, considered a burgeoning green sector, has on the contrary stoked environmental concerns due to reckless expansion. [Chapter 2]

²⁵⁴ “China Moves to Standardize Recycling Industry”, *Xinhua*, August 17, 2017. URL: http://english.gov.cn/state_council/ministries/2017/08/17/content_281475797192556.htm (accessed January 26, 2018).

The Ministry of Environmental Protection and other government agencies have launched a joint campaign targeting irregularities in the recovery of waste materials including electronics, tires, plastics, clothes and home appliances. [Chapter 4]

From August to the year end, the government will crack down on small workshops producing heavy pollution, improve the infrastructure in industrial cluster districts, and guide the sector's healthy development. [Chapters 4 and 5]

While substandard firms will be shut down, legitimate recycling companies will be encouraged to accelerate business expansion by mergers and acquisitions. [Chapter 5]

The recycling industry is still lagging behind environmental demand with many firms too small and weak in pollution control, Qiu Qiwen, an MEP official said on Aug 17. Some areas have even become destinations for illegal and poisonous foreign garbage due to loose supervision. [Chapters 5 and 3]

Qiu expects the campaign to eliminate outdated capacity, improve recycling infrastructure and step up the sector's transformation. [Chapters 4 and 5]

The combined revenue of the ten major recycled resources, including waste steel and paper, amounted to more than 590 billion yuan (nearly \$90 billion) in 2016, up 14.7 percent from a year ago.

Not covered in Xinhua's article are my chapter 5 on collection and (direct) reuse and my chapter 6 on repair, refurbishment and (indirect) reuse. This omission can be explained by the fact the article focuses exclusively on recycling understood as materials recovery. But it can also be regarded as revealing, for, as I have demonstrated in this thesis, only materials recovery benefited from official recognition and support.

The above article clearly points to a projected in-depth transformation of China's recycling industry. How are we to summarize and characterize it, especially from the angle of DEEE recycling? What did Beijing seek, and to some extent manage, to push through in this domain in the 2000s and 2010s? Where did it run into obstacles and how was it resisted by

opposing forces? And, crucially, does the state scheme I have referred to as formalization²⁵⁵ reveal the emergence of a new “waste regime” in China (REF Gille 2007, 2010)?

I have alluded to Zsuzsa Gille’s concept in the introductory chapter of this thesis but have not used it much in the following chapters. The main reason is that I felt that it could not be applied without being discussed at the same time, and that such a discussion went beyond the scope of each individual chapter. But this is what I want to embark on now. I shall begin by using Gille’s analytical framework to review and summarize my key findings. Then I shall assess and critique it. In my view, the research questions Gille’s formulates are all very relevant and useful, but less so her argument that a single, unitary waste regime can be identified for a given society at a given point in time. That idea seems to me quite problematic and misleading.

8.1 Formalization: a summary à la Gille

Before we begin, it is worth recalling Gille’s definition of a waste regime:

“What appears to be unique in different time periods and different societies are the types of waste produced [...]; the key sources of waste production [...] and the dominant mode of waste circulation and metamorphosis; the socially and culturally determined ways of misperceiving waste's materiality; the ways in which, as a result, waste tends to “bite back”; the cultural, political and moral inclinations to resolve waste's liminality [...]; and, finally key struggles around waste [...]. To systematically study these patterns I propose the term ‘**waste regime**’.” [...] (Gille 2007:34)

First of all, analyzing a waste regime, according to Gille’s definition, requires paying attention to “the types of waste produced” by a given society at a given time. DEEE clearly qualifies as a type of waste unique to the contemporary era. As I have indicated in the introductory chapter, the twentieth and twenty-first centuries are characterized by an ever-growing quantity and diversity of EEE, much of which is itself characterized by rapid obsolescence. In countries like the USA, Switzerland or Japan, most homes were equipped

²⁵⁵ Xinhua uses the term “standardize” but it is basically synonym for “formalize” (see chap. 4).

with at least a few household appliances as early as the 1960s. China, in that respect, was a latecomer. Forty years ago, EEE remained rare in the country and DEEE as well. But the situation has changed drastically since then.

Second, Gille recommends identifying the “key sources of waste production”. In China, two sources contributed to DEEE production and both of them are linked to the country’s economic take-off during the reform era. The first source is from abroad. With the opening-up and growth of the Chinese economy, demand for raw materials shot up. The domestic manufacturing industry, in particular, needed vast amounts of base metals, precious metals, plastics, paper, corrugated cardboard, and so on — even electronic components, as we have seen. This drove scrap imports, including DEEE imports, into China. By the mid-2000s, the country acted as the world’s main destination for recyclable waste and the global scrap trade largely functioned thanks to Chinese demand. The second source is domestic. With the advent of mass consumption in China, EEE became a permanent fixture of living and working environments. Given EEE’s tendency to rapidly become obsolete, domestic DEEE generation eventually reached very high levels. By the mid-2010s, China was on its way to becoming the world’s largest producer of DEEE — which is partly due to the size of its population, of course, but not only²⁵⁶. My research only looked at DEEE, which is but one form of waste associated with the production and consumption of EEE. As I made clear at several points in this thesis, however, the EEE industry is responsible for many other forms as well. In China, in particular, the advent of a large-scale EEE manufacturing sector was certainly accompanied by numerous forms of postproducer waste.

Third, Gille draws attention to “the dominant mode of waste circulation and metamorphosis”. Insofar as the formal system of DEEE recycling promoted by the Chinese central government can be considered as an expression of “the dominant mode” (more on

²⁵⁶ At that time, the USA generated slightly more DEEE than China, but had a population less than a fourth the size of Chinese population. By contrast, India had a population of a comparable size to China’s but generated only a fifth of what China did.

this below), this mode can clearly be said to have involved, in terms of circulation, reverse logistics and, in terms of metamorphosis, materials recovery. The system ensured that DEEE would find its way back to the industry. It channeled DEEE towards large-scale, capital-intensive recycling plants — which were still very reliant on manual labor at the time of my fieldwork but had plans, and were encouraged, to mechanize. The term “reverse logistics” itself is quite revealing of the rationale: after having left the industry and spent some time in their final destination (e.g. offices, businesses, households), products are supposed to come back in the opposite direction and eventually reach the very entities that have created them. The system also ensured that DEEE transformed back into its most basic constituents, namely materials. The newly created recycling subsector specialized in crushing objects and churning out so-called resources. Materials recovery became the preferred method for recycling DEEE because, unlike others, it is conducive to larger and faster material cycles. That made it compatible with the Chinese government’s goals of boosting domestic consumption and strengthening the domestic industry, in particular the EEE manufacturing sector. Viewed from this angle, the ban on imports of DEEE can be attributed to two factors: a significant part of imported DEEE either did not make it back to the industry (e.g. because of product reuse) or did, but in forms that stood in the way of technological upgrades (e.g. component refurbishing and reuse, high levels of material impurity).

Fourth, Gille’s analytical framework requires us to ask what “socially and culturally determined ways of misperceiving waste’s materiality” can be observed. With regards to DEEE recycling in China, I would argue that DEEE appeared as both dangerous and precious, in other words as containing substances that are harmful for human health (e.g. heavy metals, organic pollutants) as well as substances that fetch high prices (gold, silver, palladium, copper). This marked emphasis on environmental degradation and economic enrichment, it seems to me, owes a lot to the social construction of “e-waste” as a public problem, in particular to the considerable and sustained attention given to Guiyu by a wide

variety of social actors, both within and outside of China²⁵⁷. Since the early 2000s, Guiyu epitomized the “e-waste tragedy”: it was regularly cited as an example of what recycling should not look like. The artisanal methods used in Guiyu, it was argued, should be replaced by industrial ones, more likely to prevent pollution and isolate valuable fractions in efficient ways. Why does this constitute a misperception of DEEE’s materiality, to use Gille’s vocabulary? Because it focuses exaggeratedly on a certain type of objects and a certain method of value extraction, and obfuscates others. Guiyu, it should be stressed, specialized in — or rather was known to specialize in, which is not quite the same — the recovery of materials from electronic devices and components. The town therefore projected a particular and partial image of what “e-waste” is and what types of material engagements it calls for. My thesis has shown, however, that other framings of DEEE’s materiality and material engagements with DEEE existed and abounded in China. The image changes completely if we switch the focus to, say, household appliances and device reuse²⁵⁸, which took place on a very large-scale too.

Fifth, what unintended consequences did this misperception of DEEE’s materiality have, or, to use Gille’s vocabulary, how did waste “bite back”? If we look exclusively at the Chinese state’s attempt at industrializing the recycling sector, several such consequences stand out. One of them is that some categories of DEEE (e.g. air conditioners) rarely made it to licensed recycling plants. This is due to the fact that DEEE can, and often is, worth more money as a product, i.e. as an object with functions, whether actual or potential, than as a bundle of materials. Since there were markets for such products in China in the 2000s and 2010s, reusable DEEE usually landed there and not — at least not directly — in workshops

²⁵⁷ It should be made clear that Gille’s “socially and culturally determined ways”, here, are not uniquely Chinese. They are influenced by a global discourse on “e-waste” — which they influence in return — and marked by the same selective fascination for broken computers and smartphones as the epitome of “e-waste” that can be observed elsewhere, notably in Western Europe or Northern America

²⁵⁸ This exposes the limit of the concept of DEEE. As an overarching category, it brings together a great variety of objects, many of which have very different properties from one another.

and plants practicing materials recovery. Another consequence is that licensed recycling plants, which were supposed to do things entirely differently from Guiyu-style recycling workshops, ended up employing much the same methods, in particular manual dismantling. The reason is that DEEE are complex technical objects made up of numerous parts that are attached together in intricate ways. They are not simply a mix of substances that need to be separated from each other. Humans are very effective at taking DEEE apart and labor costs are the main reason why machines are used instead in some parts of the world. Thus, in China, DEEE's materiality, together with low labor costs, stood in the way of a true sectorial upgrade. A final consequence is that, in order to make China's new industrial subsector a reality, vast amounts of money had to be pumped into it. Officially, the argument went that pollution control is costly. But, as my research has shown, this control was not always needed, or carried out, for that matter. Another factor seems to have played a more important role, namely that, for many categories of DEEE, the value of materials simply did not cover the costs of moving them — intact, as required by the law and the notion of reverse logistics — to a remote specialized facility.

Sixth, “the cultural, political and moral inclinations to resolve waste's liminality”, in the case of Chinese DEEE recycling, were manifold, but I think they can all be grouped under the heading of modernization. As we have seen in the introduction to this thesis, waste and modernity are intricately linked. The way that played out in the formalization of DEEE recycling in China, which forms part of the larger project of ecological modernization, is through calls for the country to both gain better control of waste and produce more waste. China was to resemble its models, even beat them at their own game, so it needed to become high-tech, green and profligate. Most crucially, it needed to break with the past, that is, put an end to practices of thriftiness and object stewardship, get rid of informality, and stop feeding on other countries' refuse. This is evidenced by the numerous moral discourses I have addressed in this thesis: the demonization of the inhabitants of rural recycling hubs, who allegedly soiled the motherland through their selfish and reckless pursuit of profit; the parallel celebration of large companies as disinterested and principled saviors; the exhortation to individuals to assume responsibility for environmental problems and endeavor to solve them through conscientious consumer behavior (which, in this case, involved renewing EEE regularly, handing in old EEE exclusively to so-called formal companies and expecting no payment in return); the forceful declaration by the Chinese

government that it would not let China serve as the world's dump anymore; the nourishment of anxieties around repairers' and refurbishers' honesty; and so on.

Seven, and this is the last point, Gille's definition points to "key struggles around waste". The main one, in the case of Chinese DEEE recycling, is that between high-level state agencies, large companies or corporations and experts of various professions, on the one side, and self-employed workers, family businesses and micro and small enterprises, on the other. The former strove to deprive the latter of access, legitimacy and autonomy. But did the latter offer any resistance? Not as far as I can tell, or at least not in any public or easily recognizable way. This may be attributable to China's history and political economy. Martin Jacques (REF 2012) argues that in China, at least for the last millennium: "The state has consistently been seen as the apogee of society, enjoying sovereignty over all else" (p. 260). According to Jacques, a government informed by the highest ethical values represented the universal interest and

"different interests did exist but they were not politically recognized and did not press to be recognized: rather, they operated out of the limelight and on an individualistic basis, lobbying government and seeking personal (rather than corporate or collective) favour which might give them exemption or advantage" (Jacques 2012:261).

For Jacques, this is a major difference between China and Europe, for instance, where the Church, the nobility and the bourgeoisie all acted as competing sources of authority. Covert resistance is probably what went on in rural recycling hubs, for instance, where workshop bosses seem to have convinced local officials that protecting business was in their common interest. In any case, a struggle did take place, as one camp clearly sought to oust the other.

8.2 Can DEEE stand for China's waste regime?

Above, I have used Gille's research questions to summarize my main findings. I did not follow her exact recipe²⁵⁹, nevertheless we can see that the exercise proved fruitful. Should we conclude, on this basis, that there exists a particular waste regime in China? I do not think so, for one main reason: Chinese society produces a wide variety of types of waste that can be considered as characteristic of the contemporary era. That may not be problematic if we stick to types that resemble DEEE. Used and used up cars or other personal vehicles, for instance, bear many similarities with DEEE²⁶⁰. Other postconsumer waste would also allow for a meaningful comparison. But what if we move the focus further away, to construction waste or agricultural waste, for instance? Then, the concept of waste regime becomes problematic. Those types of waste could also be conceived as unique to the contemporary era in China, not because they did not exist prior to that era, but because they have changed radically in recent years, especially in terms of scale, composition and impact, to the point where they now appear as new phenomena. But the production, representation and management of these types of waste have little in common with those of DEEE. Thus, China's waste regime would look very different if we focused on these types instead of focusing on DEEE. And the concept would become meaningless if we tried to group all types of waste unique to contemporary China into the same waste regime. Should we conclude, therefore, that the choice of one (or several) types of waste is arbitrary or at the discretion of the researcher? Or that China has several parallel and coexisting waste regimes? Both options, it seems to me, run counter to Gille's original intention, which was to highlight the distinctive characteristics of a relationship to waste that is unique to a given place and period.

²⁵⁹ The main difference, as I see it, is that Gille encourages researchers to devote less time to studying how waste is dealt with and more to how it is produced, which is not what I have done in this research.

²⁶⁰ To the point where I played with the idea of embarking on a side research project on Chinese car scrapping.

Then, can we at least identify a waste regime that would be proper to DEEE, or an e-waste regime, so to say? Insofar as we can consider China's formal system to be the "dominant mode" Gille refers to, yes, I think so. But that would require reinterpreting the concept and moving away from Gille's understanding of it. In this conclusion, and in this thesis more generally, I have adopted a state-centric approach and assumed that what the Chinese central government is pushing for and trying to achieve can be considered as China's new e-waste regime. Gille's concept and analytical framework are well suited to that kind of analysis — which, by the way, makes perfect sense in the Chinese context, where the state plays a predominant role and can hardly be avoided. But we should keep in mind that many phenomena take place that we know little about. Many places, practices and protagonists have received very little attention thus far, so their role and significance are not well understood — a situation I have sought to redress with this thesis. For instance, how many independent repairers and refurbishers operate in China and how much EEE do they return to usable condition every year? How much DEEE do so-called informal junk collectors buy back? What percentage of DEEE collected in Chinese cities finds its way to the countryside? Data on these questions is very scarce, even non-existent, which makes it easy to dismiss them as irrelevant or insignificant. In a way, declaring that formalization has brought forth a new e-waste regime in China is almost like declaring that formalization has been successful. One easily gets the impression that things are more ordered and more steered from above than they are in reality. Perhaps this has to do with the connotations of the word "regime", which evoke the government, a system and order. In sum, the concept of waste regime does not only point at something unique, it also conveys the idea of something unitary or uniform. That, in my view, is misleading. I hope that the present thesis has not fallen into this trap but on the contrary revealed how complex and diverse the world of Chinese DEEE recycling actually is, or, to put it as one of my interlocutors once did, how "deep" are its "waters" (*shenshui* 深水).

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