E-waste in the twilight zone between crime and survival

Wim van Herk¹ & Lieselot Bisschop²

Introduction

The transport of discarded—non-functioning or outdated—laptops, televisions sets, refrigerators and other electronics – also known as e-waste - from industrialized countries to developing countries has become common practice in the last decades (Baldé, Wang, Kuehr, & Huisman, 2015; Ferrell, this volume)). Discarded but reusable electronics are an important market share of the reusable electronics sold on the global second-hand market (Miller, Gregory, Duan, Kirchain & Linnel 2012). Many other discarded electronics are however non-reusable, never make it to the second-hand market and are immediately disassembled for recovery of their raw materials. The reusable share can legally be traded between OECD (Organization for Economic Cooperation and Development) and non-OECD countries, but the non-reusable share is illegitimately traded as ‘second hand goods’. The dismantling of this trafficked e-waste happens in precarious circumstances, with toxins leaking into the air, soil and water, causing harm to the environment and human health (Bisschop, 2014b; Brigden, Labunska, Santillo, & Johnston, 2008). Moreover, the dismantling is often performed by vulnerable groups (e.g., poor, minors, religious minorities), who lack or are not provided with the proper means to protect themselves from the toxins that are released, such as when burning the plastic casings of devices of to recover the valuable components (mainly precious metals) (Eidgenössische Materialprüfungs- und Forschungsanstalt (EMPRA), 2009; Sepúlveda et al., 2010).

Several non-government organizations (NGOs) have targeted campaigns to producers, consumers and traders of (discarded) electronics to raise awareness about the social and environmental effects

¹ Wim van Herk is an analyst at ING bank.

² Dr. Lieselot Bisschop is an Assistant Professor at the Erasmus School of Law, Department of Criminology and the interfaculty Erasmus Initiative on Dynamics of Inclusive Prosperity, bisschop@law.eur.nl
of trading and crudely dismanteling these electronics (Brigden et al., 2008; Kuper & Hojsik, 2008). E-waste has also been on the radar of policy makers who consider it a hazardous waste due to the fact that e-waste is a mixed waste which contains hazardous components such as lead, mercury, flame-retardants and cooling gases. Accordingly, the e-waste trade is strictly regulated and is dealt with in increasingly punitive ways, albeit that the actual implementation of e-waste trade legislation presents several challenges (Bisschop, 2014a). Aside from the policy and NGO attention to the topic, e-waste dumping and trafficking has been a topic of study by green criminologists, as well as by criminologists interested in corporate crime, organized crime, and regulation, more generally (Brisman & South, 2013b, 2018; Melvin & Mcgarrell, 2009; van Erp & Huisman, 2010).

This chapter builds on these earlier publications while also drawing from the findings of two empirical studies about e-waste. One of these studies focuses on illegal trade in e-waste between the port of Antwerp, Belgium, and Accra, Ghana (Bisschop, 2012, 2013, 2015). A second study focuses on data from e-waste traders in Hong Kong (Van Herk, 2016). By comparing e-waste trafficking in these two different locations, we aim to illustrate, on the one hand, the importance of paying attention to locality when considering the global dimensions of the e-waste trade, and, on the other hand, to socio-cultural, economic and political factors that influence the definitional processes, social organization and governance of e-waste. This chapter explores the wide range of characteristics of e-waste and its effects and uses, and contemplates the implications for control and prevention policy.

We continue this chapter by examining the international and European legislation which is in place for e-waste. This includes a discussion of the definitional challenges that are inherent to it. Next, we investigate the growing (informal) e-waste economy and illustrate the harm connected to the trafficking and informal recycling of e-waste. Then, we highlight the social organization of the trafficking and informal recycling of e-waste by focusing on the roles played by formal as well as informal actors in the e-waste economy. This allows us to reflect, in a final section, about the complexities in implementing governance policy about e-waste and about the relevance of this topic for the field of green criminology.

**The current legislation of e-waste trade**

Many international governmental organisations such as the World Bank, United Nations Environmental Program (UNEP), World Customs Organisation (WCO) and Organization for Economic Cooperation and Development (OECD) have developed policies pertaining (hazardous) waste management. Waste management includes the trade in, treatment of and disposal of discarded
products originating from household or industrial processes. The most important piece of legislation on waste trade is the 1989 *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (from here on referred to as the “Basel Convention”). The Convention intended to counter the increased international trade in (hazardous) waste which started after the tightening of the waste treatment legislation in industrialized countries led to skyrocketing prices for domestic treatment and disposal (Clapp, 2001; Pellow, 2007).

The Basel Convention was ahead of its time for it has since demonstrated its applicability to contemporary as well as future waste related issues, such as the increased generation of electronic waste. It requires nations to ensure proper disposal of waste and to “introduce appropriate national/domestic legislation to prevent and punish illegal traffic” (1989:17). The Basel Convention defines “illegal waste trade” as transboundary movements of waste whereby the countries involved have not been notified or have not consented in writing - or have done so based on false information - or when the waste is deliberately disposed of “in contravention of this Convention and of general principles of international law” (1989:11-16). As is true for all multilateral agreements, the Basel Convention requires implementation and operationalization on regional and national levels. In this section, we focus on the definitional challenges that are inherent to the Basel Convention and the European Union’s legislation on hazardous waste trade. The challenges that come with the actual implementation of waste trade policies will be discussed later in this chapter.

The Basel Convention leaves room for interpretation as to how nations should adhere to its requirements and especially section 4, General Obligations 7 (b) has been differently interpreted. This states that each party shall: “[r]equire that hazardous wastes and other wastes that are to be the subject of a transboundary movement be packaged, labelled, and transported in conformity with generally accepted and recognized international rules and standards in the field of packaging, labelling, and transport, and that due account is taken of relevant internationally recognized practices” (1989:11). In comparison, the European Union’s *Directive on Waste Electrical and Electronic Equipment* (WEEE Directive) states explicitly that shipments of used EEE (second-hand electronic equipment) can actually contain or consist completely of e-waste. Consequently, the WEEE Directive applies “minimum requirements” for shipments in order to “avoid unwanted shipments of non-functional EEE to developing countries” (WEEE Directive, p8, paragraph 15). These requirements answer to those found in the Basel Convention, but impose the additional requirement of demonstrating proof of testing of equipment (functionality) and ensuring correct packaging so as not to destroy the goods and thereby prevent them from becoming e-waste in transport. By being able to define shipments of EEE as possible e-waste, the WEEE directive provides a better basis for
crime control by its member states than the Basel Convention. However, also the WEEE Directive leaves it to the member states to develop specific regulations or guidelines as to what constitutes appropriate packaging, labelling and transportation. Should a washing machine be shrink or bubble wrapped or is it sturdy enough on its own? How high can a stack of computers be for it to pose a risk and be considered "inadequately transported"? Should TVs have a cable attached to them or can those be cut? Technically, without a cable, the TVs are not functional, but shippers argue that cutting the cables facilitates transportation and is easily fixed at the destination to render it functional. Do we allow trucks or vans on roll-on/roll-off ships to be packed with used electronics or should those be shipped in containers? Loading trucks or vans with goods is prohibited in Rotterdam and (used to be) allowed in Antwerp - two ports a mere 100 kilometers removed from each other but located in different countries and jurisdictions. These are just some of the questions that arise when shipments of e-waste or second-hand electronics are inspected and that are not clearly answered by the legal guidelines. Because the law leaves room for interpretation, some member states implement stricter controls on e-waste trafficking, while others use more flexible operational procedures and strategies to monitor waste shipments. As a consequence of this divergence in interpretations, participants in the trade can effectively 'shop jurisdictions' and legally exploit these regulatory asymmetries (Passas, 1999). Moreover, countries and ports sometimes see and experience a reputation for being more or less lenient as a competitive advantage (Eski, 2011; Parola & Coppola, 2011).

The Basel Convention's primary objective is to halt "the most abusive form of hazardous waste trade - the trade designed to exploit weaker economies from the OECD group for economic reasons" (Basel Action Network, 2015: 1). The Basel Convention provides limited attention to crime control and instead favours the regulation of legal types of waste trade. In an attempt to overcome some of the loopholes of the Basel Convention, the 1994 Basel Ban (also known as Decision III/1) was developed to amend the convention and impose a ban on the export of hazardous waste intended for disposal, recovery or recycling from Annex VII countries (EU, OECD and Lichtenstein) to non-Annex VII countries. This amendment artificially divided the world in two blocks: developed versus developing countries (Lepawsky, 2015). Some countries wanted to keep trading in recyclables and in organic waste, whereas others wanted a total ban on all waste imports and exports. As a result, the Ban amendment has not been signed by sufficient countries for it to enter into force, which means we fall back on the requirements of the Basel Convention. This distinction between 'developing and developed' countries is also rather problematic in the context of waste trade. Lepawsky (2015) even refers to the assumptions about origins and destinations of waste as specified in the Basel Ban as geographical imaginaries because it misconceptualizes the transnational trade in (hazardous) waste.
as one primarily from the West to the rest. Similar geographical imaginaries can be found in the EU’s WEEE Directive because it groups countries as developed or developing without recognizing the significant differences within those groups of countries and without recognition of the importance of regional trade in (hazardous) waste.

The distinction between the Global North and Global South, the developed and the developing countries, or ‘West to the rest’, also applies to a certain extent to academic research into the hazardous waste trade. Although many accounts of hazardous waste trafficking and dumping are rightfully drawing attention to the injustices and the externalization of harm by industrialized nations, the picture is more complex. It requires contextualization of the scale of waste trade from OECD to non-OECD countries as well as within regions of the world. It also requires investigation about what share of trafficked e-waste actually ends up dismantled in abysmal conditions or dumped in both OECD and non-OECD countries – an estimated 4% of e-waste in developed countries is landfilled (Baldé, Forti, Gray, Kuehr, & Stegmann, 2017). It also relates to questions about who is involved in waste shipments and whether labelling the trade as environmental crime is in the best interest of avoiding further harm to the environment. These and other questions are addressed in the following sections of this chapter based on case studies on the trade in and from Hong Kong and from Belgium to Ghana.

The legislation of e-waste trade has proven to be a complex and even controversial topic. The legal framework provides a basis but leaves room for interpretation. In other words, the criminalization of e-waste trafficking is not clear-cut, similar to other types of (transnational) environmental crime (Halsey & White, 1998).

**The growing (informal) e-waste economy**

This section discusses global estimates of illegal e-waste trade but also pays attention to the changes in consumption of electronics that influence the amount of discarded items. As for the geographical orientation, the focus is on the major regions and countries of origin, transit and destination. We consider both interregional (North-South) trafficking and the emerging intraregional trade among developing nations. Finally, a critical discussion on the difficulty of identifying waste streams and their volumes is provided.

In 2016 about 45 million metric tons of e-waste was generated globally (Baldé et al., 2017). The e-waste market is not only one of the fastest growing markets in scale but also in toxicity (Duan, Miller, Gregory, & Kirchain, 2013; Pellow, 2007). The growth rate for e-waste is between 3 and 5 per cent
which is up to three times that of other waste streams (Singh, Li, & Zeng, 2016). E-waste consists of both dysfunctional and unwanted ‘old’ electronic devices (Jaspers & Bisschop, 2017) and has grown exponentially keeping pace with the increased number of users of electronics and the internet globally and thus increased consumption, often of multiple devices (Brisman & South, 2015). It also keeps pace with the increasingly quick replacement cycles of mobile phones, tablets, and computers driven by the marketing strategies of producers of electronics within the global free-market economy (Aladeojebi, 2013). The sustainable use of resources in the development and production of new devices, often takes a back-seat when these would increase production costs (Singh et al., 2016).

The volume of discarded electronics for (South) East Asia increased exponentially between 2010 and 2015, driven by increased prosperity totalling 18.2 metric tons in 2016 (Baldé et al., 2017; S, Khetriwal, & Kuehr, 2016). Africa only generated 2.2 metric tons of e-waste but little is known about collection or trade. Studies show that on a global scale about 20 per cent of all e-waste is recycled and 74 per cent is unaccounted for, which means it was either dumped, traded, or recycled in substandard circumstances (Baldé et al., 2017). The above figures are estimates, because most countries do not systematically collect statistics on e-waste generation, recycling, or trade. In fact, e-waste has proven to be a problem that, both in scale and complexity, has outraced the policy attempts to contain it (Premalatha, Tabassum-Abbasi, Abbasi, & Abbasi, 2014, p. 1577).

As for our two research sites, Hong Kong and Accra, the e-waste generation is different and yet has strikingly similar dynamics. As a Special Administrative Region (SAR) of China, Hong Kong maintains separate administrative, judicial, and legal systems from the rest of the country, and has a more liberalized economy than that of the mainland (although this has been changing with China’s economic reforms). Consumerism plays a major role in Hong Kong society, which means that goods may become “waste” without becoming unusable. As a local citizen of Hong Kong remarked: “People just want the newest gadgets. If you have Iphone 5 and someone at work shows up with the Iphone 6, you feel bad, you want to buy the new one too” (FC-LC, 2016). Whereas Hong Kong is mostly an e-waste market with fairly new devices resulting from the formal electronics economy, Accra is mainly dealing with the largely informal consumption of imported and then refurbished equipment, which often has a very limited lifespan, as well as with the increased domestic consumption of new devices. As explained above, a portion of the imported electronics can be refurbished and reused, but many others are unsuitable for reuse and end up discarded (Prakash & Manhart, 2010). Ghanaian importers recognized the ease with which transshipments of e-waste, informal though not less organized than their formal counterparts, move between and through Africa’s ports (Grant & Oteng-
Ababio, 2012). These developments have proven to be a significant challenge for effective governance of trading in e-waste.

Tracking the developments in the consumption of electronics, one finds not only large-scale consumption in the formal economy, but similar patterns of consumption among those participating in the informal economy or in the black market (Williams et al., 2013). In other words, consumerism takes place at all points on the economic spectrum, in which the buying and selling of discarded electronics not only feeds crude recycling operations, but also a growing market for second-hand goods in developing nations. This development is reflected in contemporary findings which suggest that of those discarded goods arriving in West Africa or South East Asia, only a relatively small portion is actually destined for processing or recycling (between 9% and 15%) (Prakash & Manhart, 2010; Schluep et al., 2011; Shinkuma & Huong, 2009). The largest portion is destined for reuse, or is refurbished for reuse. Some of those refurbished or reused products might work for only a few more months or years at best, which then in turn creates a recycling challenge.

With the demand for discarded objects in developing countries increasing, both for purposes of stripping for valuable components and refurbishment, the number of ways in which waste is defined and valued by traders also grows. Participants in the trade regularly redefine economic and practical value and thereby the meaning of the objects they are trading, relative to the destination countries of their clients. Although the supply of e-waste originates from all regions of the world, demand is often more limited to specific countries. As one Hong Kong trader of Pakistani descent describes: “Air conditioner, AC-compressor, refrigerator, these all go to UAE (United Arab Emirates). Things like hospital beds, medical equipment, these things are wanted in Pakistan” (IC-ET1, 2016). Interestingly, whereas legislative efforts on all levels use limited typologies to determine what constitutes “waste” and what does not (e.g., devices with the wires cut off), traders conveniently employ significantly more diverse typologies, depending on their local supply and international customers. This fluidity allows for a diversity of explanations for calculating a certain value for an item, depending on the destination country’s needs and wishes.

Whether a discarded hospital bed is waste or an object of value is contingent entirely on whether the Hong Kong trader to which the item becomes available is able to find a Pakistani buyer. Accordingly, the value one attaches to the hospital bed is dependent on the worth of the bed in Pakistan’s market, rather than how the bed was regarded by the person or institution that initially discarded it. Similar examples were provided by a Nigerian man, who has experience in the e-waste trade, but who has since withdrawn from it: “Ghanaians are very picky. In Ghana, the people keep track of what is the
latest equipment and will select only the newest ones” (IC-FT1, 2016). This development opens up new possibilities for competition within the global informal market for discarded goods because differential demands give way to unconventional power struggles between developing countries and their diasporas.

Although it might seem like legal definitions do not influence the social constructions of waste in the informal sector, several examples do exist where legal dynamics affect the route, cost and eventual risk of operations. One of these examples is given by a Ghanaian trader from Hong Kong, who remembers an encounter that one of his clients had with a West-African customs agent.

“The agent, he wanted some money as well, you know. He wanted him to pay the money, so he would get his container into the country. But this man, he borrowed already all of the money for this transport. He could not pay for the bribe, you know? So this time, the officer took the container and sold the stuff himself! This happens, you know.” (IC-FT1, 2016)

Accounts such as the above make clear how important it is for green criminologists to pay attention to various dynamics of e-waste and think beyond legal-illegal dichotomies or beyond the focus on harm to human health and the environment. Actions of traders are not informed solely by the formal context of e-waste - both legal and economic - but also by more informal conceptualizations that the traders themselves employ. The interconnectedness between informal and formal, between legal and illegal, is a tool that enables traders to connect and exchange values, norms and beliefs. It allows them (within their networks) to construct and uphold social boundaries that serve to legitimate their actions, where legalities remain locally bounded. Legality, a seldom seen guest in the e-waste trade, is replaced by contextual legitimacy, empowering participants to design what can be seen as an alternative regime of truth, outside of a formal economy (Foucault, 1980; Suchman, 1995).

As suggested above, an important assessment to make is the interaction between intra-regional trafficking developments and other, mostly economic, developments in such regions. The consumption of electronic equipment in developing countries has increased significantly, with some authors expecting the generation of obsolete computers in developing countries to soon exceed that of developed ones (Yu, Williams, Yu, & Yang, 2010). E-waste generation correlates more strongly with a country’s GDP than it does with the size of its population (Kumar, Holuszko, & Espinosa, 2017). Hong Kong and Singapore, for example, are regarded as non-OECD but enjoy significant economic development, and along with China, which is often viewed as a destination instead of a departure country, increasingly generate electronic waste due to increased consumption by their populations. India and China have similar populations but China’s gross domestic product and purchasing power
is higher, resulting in higher e-waste generation (Kumar et al., 2017). Such increases in domestic waste impact greatly on intra-regional trade because “used-computer flows from Africa [e.g. South Africa, Nigeria, Tunesia] to Ghana skyrocketed in 2009, and traders expect this to continue” (Grant & Oteng-Ababio, 2012, p. 9). Such flows, informal in nature and as novel as they are dynamic, are just some examples of waste streams not recognized in official trade data and not fitting within the Annex/non-Annex legal dichotomy. Currently, official trade data have not been able to account for wrongfully submitted manifests and illegal shipments (Lepawsky & McNabb, 2010), revealing the need for empirical studies in providing estimates. Even though this might be culturally or politically difficult to undertake, it is necessary because the intricacy of this trade lies exactly in the legislative and cultural factors that are at play in each country.

Harm and livelihood

This section discusses the ecological and health damage that might occur in e-waste trafficking and substandard treatment and dismantling processes in destination countries. We also focus on economic and social harm that accompanies adverse environmental consequences. We also invert the argument, however, and ask the question whether e-waste might actually be an economically valuable opportunity for some informal workers, as a sole source of livelihood.

Gibbs and colleagues (2010) note that legally recycling a computer in the United States costs approximately $20. By selling that computer to an importer, however, the previous owner is able to earn $15 dollars. As discussed earlier, the proper recycling of e-waste is a costly process, so much so that it oftentimes costs more than it produces. So, why is the cost of recycling so low in undeveloped countries? The primary reason lies in less stringent or non-existent environmental and labor regulations in developing countries (Chi, Streicher-Porte, Wang, & Reuter, 2011; Oteng-Ababio, 2012). Substandard recycling techniques allow for the extraction of precious metals: wires that contain copper are burned, while circuit boards are smelted in order to extract their gold. This highly toxic and hazardous labor is performed mostly by unskilled workers, who often have no knowledge of the dangers that their work entails (Oteng-Ababio, 2012; Puckett & Smith, 2002).

In absence of well-equipped waste management systems, this imported and domestically generated e-waste harms the environment, the local population but also affects the economy of the these destination countries. Toxic substances remain in the environment for many years after they are absorbed in the air, water and soil, continuing to harm the ecosystem, animals, and people living and working nearby (Eidgenössische Materialprüfungs- und Forschungsanstalt (EMPA), 2009;
Premalatha et al., 2014). One improperly discarded device may have minimal impact, but the sheer quantity of waste makes this significant. Continued exposure to hazardous substances also plays a role. The inadequate health and safety measures in the dismantling and recycling of e-waste, often with no existing precautions or protection, impacts the health of workers (Puckett & Smith, 2002; Puckett, Westervelt, Gutierrez, & Takamiya, 2005; Sepúlveda et al., 2010). In the Western African countries of Ghana, Ivory Coast, Nigeria and Togo, adults and children search barehanded through the heaps of dumped electronic and electrical equipment looking for valuable materials, and often dismantle them without protective equipment. These e-waste workers often do not know about the harms they face or, if they do, lack the ability to do anything about it (e.g., exert political pressure, obtain protective gear) (Hall, 2013; Jarrell & Ozymy, 2012).

People living nearby crude e-waste processing sites, using the water contaminated by the dumping or burning, inhaling the toxic smoke of the burning e-waste and eating the crops grown on the toxic soil feel the effects. The harm from e-waste also ties to social and ecological inequalities. Several Ghanaian respondents explained that importers and sellers of second hand goods constitute an important group of voters, causing politicians to hesitate in drafting more stringent regulation (Bisschop, 2012). Moreover, those most severely harmed by the burning and dumping - to be precise, those informal workers at the Agbogbloshie dump site in Accra - constitute a (religious) minority group who travelled from the north of Ghana to the capital in search of alternative sources of income which their region could no longer provide due to a loss of agricultural jobs (Bisschop & Vande Walle, 2013; Konadu-Agyemang, 2000).

These illegal transports of e-waste can also be harmful economically and politically. Cleaning up dumps is expensive and exacts a heavy toll on developing countries. Illegal transports also have economic advantages over legitimate transports due to lower processing costs, therefore adversely affecting trade and competition. Facilities that attempt to engage in environmentally friendly collecting and recycling practices experience these illegal transports to be false competition.

Besides hazardous substances, electrical and electronic devices also contain valuable metals like copper, palladium, gold, silver, indium and germanium that are inevitably lost if not recovered in an early stage of waste treatment. From a global perspective, this loss of scarce metals has to be compensated by intensified mining activities, which again lead to severe sustainability impacts in mining areas worldwide. Moreover, the concentration of these metals in electronics is much higher than in the ores from mining, which implies that mining, smelting and refining e-waste results in less environmental impacts (Sthiannopkao & Wong, 2013). The recovery of all types and quantities of
metals is however not possible via crude processing. The informal ‘recycling’ sector has a lower recovery rate of (precious) metals, which means that more metals need to be extracted from the environment.

The picture, however, is more complex than the above description. Those who participate in the trade have very different conceptualizations of harm. A Nigerian client visiting Hong Kong to purchase equipment exhibits how the possible harms of improperly handling e-waste can be dismissed in the following interview excerpt:

I:“Isn’t it dangerous for workers to take apart the stuff that you send to these countries?  
R: No, they have specialists for that, who know what they are doing.  
I: But what about cancers, lead in the blood, or breathing problems?  
R: Those people who have that, they were probably already sick.  
(IC-C1, 2016)

As simple and limited as the answer above might seem, preconceived notions of sickness and disease can serve as enabling mechanisms for the trade, based on denial of problems. For this trader, the e-waste that is sent to African countries is not what has caused the workers to experience lead poisoning and various forms of cancer. Several respondents mentioned that technicians, because of their expertise, are not harmed by the toxicity of electronic waste, nor do they expose others to it. This aligns with Oteng-Ababio’s (2012, p. 13) findings about fieldwork in Ghana, in which he reports that individuals involved in scavenging valuable parts from discarded electronics did not fully recognize the causes of their sicknesses: “Their perceived impact was restricted mainly to accident-related and other obvious effects (burns, cuts, etc.) that are in sharp contrast with those reported in other epidemiological studies”. During our own fieldwork in Ghana, a young e-waste scavenger mentioned that he could no longer run and play soccer, but he did not connect this to his ‘job’ of burning cables to get to the copper.

I: Do you think the average participant in this trade is aware of the consequences or cares about them?  
R: They see no consequences. For them it’s just about the money. They have no knowledge of the toxicity and pollution that they and their environment can be exposed to.  
(IC-FT2, 2016)

A majority of respondents in the Hong Kong study (Van Herk, 2016) indicated that to them, harm to individual health is not necessarily connected to the trade and dismantling of e-waste. Instead, the traders seem to develop a spectrum of toxicity. Some respondents seem to suggest that because
dismantling and refurbishment was limited to specialist laborers (whom they often referred to as ‘technicians’), the consequences of toxic substances were very limited. Although such a construction of hazardousness could be dismissed as a disregard for the problematic characteristics of discarded electronics - a form of denial or example of neutralization - it shows how those actors outside of the formal economy uphold wholly different realities.

This alternative conception of harm is crucial to understanding the dynamics of the e-waste trade. Perhaps, what is hampering policy and legislation to accurately control this trade is a limited understanding of the convictions and motivations for participating in the global informal network of e-waste trade. A comprehensive understanding of the e-waste trade requires acknowledgment of the possibilities and economic opportunities that this trade offers for participants with ‘unconventional’ livelihood strategies. In other words, in recognizing the imminent harm caused by the e-waste trade, let us not dismiss participants’ agency in utilizing this trade as a vehicle to challenge their economic mobility. “If people notice that somebody is making money sending all of this scrap to Ghana, they think: ‘why not go there yourself, send the waste yourself and make more money?’” (IC-FT1, 2016). Based on his research among scavengers in Accra, Ghana, Oteng-Ababio (2012, p. 3) concludes that the current data deficiency on the topic of livelihood strategies in the e-waste trade “tends to give justification for the occasional castigation of the practice by some media and environmental NGO’s”. Therefore, any study of informal activity, including the trade in electronic discards, should take into account the concerns of those involved directly in the trade and how they conceptualize their participation and motivations for doing so.

Moreover, in several locations, informal waste workers play a role in waste management (collection) that either supplements formal/official systems or exists in the absence of public waste collection or management (Coletto & Bisschop, 2017; Davis, Akese, & Garb, 2018). The informal waste workers’ role in collecting waste and thus secondary raw materials is important in times of scarcity of natural resources. Moreover, informal e-waste workers in Ghana and other destination countries make up a considerable size of the population which solely relies on these imports of e-waste for their livelihoods. Of course, recycling techniques could be improved and protective equipment worn and used. Actually, when a proper recycling infrastructure would be developed, countries like Ghana might be able to avoid the environmental and human harm while at the same time benefiting from better material recovery times in times of resources scarcity (Amankwah-Amoah, 2016). This would require sufficient influx of material to keep a processing facility operational and economical.
Essentially, a more nuanced study of e-waste trafficking requires the incorporation of the agency and experiences of participants in an analysis of causes, directions and developments concerning it. This warrants not only a more thorough exploration of the aforementioned factors, but indeed exposes the fluidity of what actually constitutes waste, and how such definitions are constructed.

**Social organization**

This section focuses on the social organization of e-waste trafficking, paying attention to the different motivations of the participants in the trade. Given the complexity and global nature of transnational environmental crime, it is difficult to determine which actors are involved. In this regard, a local research setting, such as that of Ghana or Hong Kong, allows for an identification of the actors involved in these specific illegal trade flows and what their respective roles are or might be. Based on our research and studies by others, we try to determine whether these actors and their roles can be considered legal or illegal (or perhaps both) and illustrate the legal-illegal interfaces in e-waste flows. Moreover, this case study analyzes push and pull factors, considering what motivations and opportunities shape the flows of e-waste.

Various actors in different parts of the world play a role in the illegal transports of e-waste and their reasons to get involved are equally diverse. Earlier in this chapter, we touched briefly on the role played by consumers and producers in generating increasingly larger quantities of e-waste. Consumers might discard e-waste in substandard ways due to a lack of awareness and due diligence or a conscious choice for cheaper illegal disposal and for the externalization of harm. The formal waste management sector also plays a role in e-waste trafficking. Corporations that treat e-waste legally and have environmentally sound management systems are few and their prices can be high. This makes it attractive to look for cheaper and less environmentally sound alternatives. This is the background against which potential interfaces between legal and illegal actors emerge. E-waste collection involves metal scrap dealers, urban recycling centers, refurbishers, official take-back systems, registered metal collectors (e.g., picking up disposal skips from electronic hardware stores) and informal actors (e.g. waste tourists, charities). Many of these e-waste collectors and recyclers follow environmental and ethical standards while others engage in direct or indirect export - often through brokers - to developing countries.

At the end of the e-waste flows - in countries of destination - legality, illegality and informality are inextricably connected. West African governments play a role in this when they allow substandard shipments to be imported, even levying import taxes on (used) electronics. Informal collectors and
dismantlers are often the large majority of actors in the trade. E-waste is a massive industry, with recycling, second-hand EEE, parts, fixing, and refurbishing; only a part of all discarded devices truly goes to waste. In this context, informality has actually become normalized and illegality might even be legitimized (Oteng-Ababio, 2012; Suchman, 1995). The informal trade in e-waste is then an economic strategy no different than formal entrepreneurship, moving beyond explanations of participation in illegal activity, towards explaining participation in activities to uphold livelihoods, whether legal or not. Arguably, participants find empowerment in their economic strategies in what is recognizable as an alternative regime of truth, outside of the formal economy (Foucault, 1980).

R: Ghana, this country is progressing. They don’t even want the scraps, they have the new stuff now! And I think that’s a good thing.
I: If Ghana becomes more developed, doesn’t that decrease your chances of finding business there?
R: Yes! But if the country was doing well, I wouldn’t have to do this! (IC-C1, 2016)

Many of these informal actors in turn connect to the legal recycling industry in supplying them with secondary raw materials. The extracted metals feed back into the production of electronics and other consumer products. Respondents in Ghana also referred to Chinese organized crime groups buying up copper for extortionate prices. Similar findings were presented in a 2009 report on the linkages between organized crime and pollution crimes by Interpol (2009:31), which stated that: “the involvement of organized criminality in pollution crimes is more loosely structured”. It remains unclear however to what extent organized crime groups have been involved in e-waste trafficking.

Also in Hong Kong, the informal economy and its social impact is rather significant. Any and every person with both financial means and a strong network is able to participate. Although the smuggling of women, drugs and weapons is commonly attributed to one criminal organization, the Chinese Triads, a custom offices explains why the e-waste business is egalitarian and small-scale rather than extortionate:

“Hong Kong is too small for criminal organizations to grow enough for them to become more powerful than others. There is simply so much competition on a small piece of land, that crime groups do not get to grow to a remarkable size.” (FC-CO, 2016)

The absence of highly organized operations in Hong Kong can likely be explained by its size, contributing to a competitive market, in which e-waste traders can be considered direct colleagues, working in the same conditions and depending on the same “institutional boundaries” (Webb, Tihanyi, Ireland, & Sirmon, 2009). Furthermore, one may argue that such a competitive small-scale trade aids the perception of its legitimization and normalization. The relatively small size keeps the
trade from being detected by formal control such as customs (which we will describe in the next section), while simultaneously reifying the importance of reliance in an informal economy. Such reliance presents itself in the form of interdependence and trust, as one Pakistani trader explains:

“From what I know, it’s all legal, right? But that doesn’t really matter, because what really matters is trust. Because if someone needs to be bribed, I need to know I can trust you. This is more important than whether something is legal or not” (IC-ET2, 2016).

Although ethnic or other social ties play a role, repeat interaction and routinized market transactions are key in establishing trust (Van de Bunt, Siegel, & Zaitch, 2014). The social aspects of economic exchange seem most important to the social organization of Hong Kong’s e-waste trade. To illustrate how trust is utilized in the trade, consider the account of Popalzai (hereafter referred to as PZ), a renowned trader in Hong Kong: “You can always spot PZ’s goods, because every piece has his initials written on them with a marker. Every television, AC, whatever, they all say ‘PZ’, ‘PZ’, ‘PZ’” (IC-ET1, 2016). As noted by one former trader, however: “To a large extent, Pakistanis do most of the collecting and selling, whereas Nigerians do most of the exporting and, well, larger sales” (IC-FT3, 2016). Thus, social organization seems to be characterized by routine as much as by social ties, with members of each respective ethnic group rarely venturing into those parts of the trade which their group is not accustomed to. One may argue that each group is able to count on the other, fortifying each other’s trust.

**Policy, governance and complexity**

In this section, we shift our focus to the complexities inherent to the implementation of policy regarding e-waste and the difficulties that emerge in various interactions between governance actors in preventing harm and controlling crime related to e-waste. It analyses which actors are involved in this legislative framework and provides insights into the facilitating and hindering factors for policy making throughout the e-waste flows. Attention is paid to the importance and difficulty of involving local as well as international government actors, corporations and non-governmental organizations in addressing the e-waste issue. This also allows us to discuss how informal actors in countries of destination of trafficked e-waste might organize themselves and ‘govern-from-below’, thereby contravening, the stereotype of e-waste workers as victims of globalization.

Enforcement targeted specifically at certain violations of law can have a twofold result in the informal economy (Webb et al., 2009). By focusing on a specific crime or misconduct, law enforcement warns the informal entrepreneur about the unlawfulness of his/her activities, yet in seeking to enforce the
laws relevant to the trade of e-waste, the more visible and voluminous actors often offer enforcers a clear target, while the smaller shipments are not paid nearly as much attention. This minimizes pressure on smaller actors like e-waste traders in Hong Kong seem to 'slip through the cracks' and remain relatively anonymous, as one trader explains:

“So when the client comes to Hong Kong, he goes to Sham Shui Po, you know, he buys some goods from a couple of businessmen there. Then he stores those goods, sometimes in my yard, sometimes he finds some other storage location, but eventually he will contact me. He will contact me and say that he wants this much stuff going to his country. I say 'okay', I call with the shipping company and I fill up the container, right? But that's it for me, after that, it is in the hands of the shipping company. I don't have anything to do with how the shipping company organizes the transport.” (IC-ET3, 2016)

This trader’s comments are similar to those of other respondents in our Hong Kong research, who alluded to the important role of the shipping company. “There is no need to lie, because this is all legal, so it is okay for us to put it like this (as is). The shipping company will take care of all of the paperwork” (IC-ET1, 2016). In other words, traders rarely encounter repercussions from law enforcement entities. This is not to suggest that traders never encounter law enforcement officials, but that transnational legal loopholes offer a great advantage. This lack of legislative presence is not simply a misperception on the part of the traders, as it can be argued that the various local, national and regional efforts that have been devised in and around Hong Kong are not in accordance with one another, indeed leaving regulatory gaps. As such, formal governance and its constructions of e-waste (and its shipments) is replaced by the experiences and social constructions of traders. This does not necessarily mean that participants in the informal e-waste trade are unaware of the legal boundaries of their trade. Actually, it is most likely the realization that the boundaries are penetrable if they are even met, that allowed these trades to autonomously develop an economic structure that reflects their interpretation of legitimacy.

“Actually, if you’re talking about risk, it’s the shipping companies that take the real risks, because if customs in another country captures the shipment, the shipping company’s name is on the manifest, not mine. But they have to take those risks in order to keep getting enough clients.” (IC-ET3, 2016)

With risk within the trade of Hong Kong minimalized to shipping companies, one has to wonder to what degree formal stakeholders are effective, if at all. The problem seems to rest, in part, with the lack of congruence among different legislators. Compare, for example, the Food and Environmental
Hygiene Department (FEHD) and the Customs agency. A Hong Kong customs officer explains: “Hong Kong's customs agency does not particularly focus on a single type of smuggled goods, in the sense that everything is monitored equally. No special attention is given to e-waste as such” (FC-CO, 2016). Similarly, one FEHD officer recognizes how the rather partial enforcement of applicable laws contributes to a particularly opportunistic economic environment: “If the EPD [Environmental Protection Department] wants to stop exports of dangerous waste, that is a very different area of law, that's not our job, to look at what people sell. We just make sure nobody is selling things in an illegal way” (FC-FO, 2016).

Any export of waste falls under the responsibility of Hong Kong's EPD, leaning on its Waste Disposal Ordinance (WDO), chapter 354 specifically, which states that:

“for the purpose of waste import and export control, any article or substance once given up by its original user is considered as waste under the WDO, irrespective whether it is still workable or can be sold for a value. As such, used electrical and electronic equipment having hazardous components or constituents (e.g. televisions, computer monitors and batteries) will likely be regarded as waste and fall within the said control unless they will be re-used for their originally intended purpose without repair” (EPD, 2012:1).

Non-governmental stakeholders seem to agree, as a director of one large waste and recycling enterprise made a crucial observation:

“The economy is more important than the environment, essentially. That is why the Treasury Department can grant the rights to a piece of land to some company instead of a recycling facility. E-waste is essentially a problem of the Environmental Protection Agency (EPD), not Treasury” (FC-D1, 2016).

Without a combined effort by all agencies capable of intervening in the collecting, selling or exporting processes, however, the probability of informal activity continuing is high. The importance of good relationship between enforcement agencies (e.g. networks) to be effective in tackling illegal trade is similar to what other studies about environmental enforcement agencies have found (Pink & Lehane, 2012). Though not recognized by government agencies as such, the absence of effective cooperation can be viewed as a silent approval of the construction of alternative social realities, leaving their impacts on the global trade to be determined by others. As this director accurately concludes: “Politicians worry about other stuff”.

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The cooperation between enforcement agencies is equally important in countries of origin of hazardous waste flows. Also there, they are often faced with limited resources and rely on each other for expertise regarding topics on the outskirts of their responsibilities. Take the example of Belgium, which was the country of origin in our study of e-waste in Ghana. Environmental inspectorates, environmental administrations, customs, maritime and environmental police and public prosecutors each play a key role in controlling for e-waste smuggling. Each of these government actors suffers from a lack of funding, with consequences for training, resources and the setting of enforcement and investigation priorities. Not all of these actors moreover have the environment as their primary focus, which often hampers cooperation and information exchange between different agencies (Bisschop, 2013). As a result, law enforcement is perceived as too slow to respond or imposes fines that are too low compared to the profits made with e-waste trafficking, a finding all too familiar in regulating the waste sector (Massari & Monzini, 2004; Rucevska et al., 2015). Whereas coordination within countries can already be challenging, coordinated enforcement throughout the EU in view of implementing the EU’s harmonized policy on waste and e-waste has proven to be even more daunting. It does not seem to result in harmonized implementation as of yet, which results in an unlevel playing field. Moreover, questions remain as to whether stopping all trafficked e-waste at the border of countries of origin is necessarily in the best interest of the environment when the legal shipments of second-hand electronics continue and have no way to be recycled properly once discarded. Moreover, stopping the inflow of e-waste to developing countries might make for an environmentally sound plan but does not necessarily guarantee a socially just outcome because it would take away the livelihood of already impoverished informal workers.

Private actors can also play a role in governing the e-waste flows. Corporations and non-governmental organizations are both involved in e-waste management today. Producers can first of all ensure the recycling of e-waste is less harmful by phasing out hazardous components and can design their products in ways that facilitate fixing (Jaspers & Bisschop, 2017). The engagement of producers and recyclers seems to depend on the potential benefits of being environmentally responsible - either in terms of shareholder profits or corporate image. The lack of raw materials (in the EU) for instance serves as an incentive for European waste corporations to support policy that limits the exports of e-waste from the EU, but protecting the secondary raw materials and keeping those within Europe is increasingly going hand in hand with the objective to avoid further environmental degradation in countries of destination of e-waste transports. Some companies have also started to invest in mining the e-waste that is generated in for instance Western Africa,
organizing transports of motherboards or mobile phones to European smelters for the recovery of secondary raw materials.

Besides the role for corporations, the other crucial non-state actors are civil society representatives, like NGOs, which already play a role in raising consumer awareness and in keeping both corporations and governments attentive. NGOs have also set up capacity building projects to engage local actors, such as the informal workers, in countries of destination. There are NGOs who have a system of renting out tools to dismantle electronics which avoids the burning to get to the raw materials inside them. Capacity building projects regarding sanitation in low-income countries have proven successful (van Welie & Romijn, 2018), but evaluations of initiatives regarding e-waste are lacking. Increasingly, NGO initiatives recognize the agency of the individuals and groups in the informal e-waste sector. They stress the importance of not depriving “vulnerable populations of a much-needed source of livelihood, while ignoring the underlying geo-political, historical and social determinants that fostered the emergence and growth of this [e-waste] industry in the first place (Davis et al., 2018). There are initiatives that are looking to set-up small scale dismantling facilities in West Africa and then ship more difficult-to-recycle components to better equipped countries (see above). It is important to keep in mind, of course, that this entails facilitating the informal recyclers rather than formalising their jobs and taking their sole source of livelihood away from them. Maybe by setting up monitored dismantling facilities and shipping more problematic components to Europe or other well-equipped processing sites, the work that is done in West Africa can be legitimized on a larger scale, thereby advancing social justice as well as avoiding environmental harm.

Conclusion

In this chapter, we paid attention to the problems accompanying legal definitions and policymaking regarding e-waste trafficking. We demonstrated that these legal definitions are not necessarily a reflection of how participants and stakeholders involved in the e-waste business define boundaries, value of e-waste and indeed waste itself. Definitional processes of actors involved throughout the e-waste trade were demonstrated to be rather independent from ‘official’ definitions. A relative, culturally and socially sensitive definition is therefore instrumental to understanding the phenomenon of e-waste trafficking from a green criminological perspective.

We have tried to demonstrate that the governance of e-waste, both on a local and a global level, is inconsistent. Moreover, a large part of the e-waste situation relates to the development of a parallel economy – an informal e-waste industry - in an attempt to fill the void left behind by an incongruent
governance framework, influenced by a variety of social, historical and geo-political factors. Developing stricter legislation and enforcement to counter the trade of e-waste from countries of origin to countries of destination – in other words a punitive approach - does not address the intraregional and domestic consumption and therefore ignores the environmental harms associated with it. Moreover, this does not address the livelihood issue and therefore risks strengthening the informality of their working conditions with all social harms that might come with it. Therefore, efforts to address the e-waste challenge require an understanding of the socio-cultural, political and economic complexity of the e-waste issue in the twilight zone between legal and illegal, formal and informal.

Studying e-waste from a green criminological perspective is about more than the mere study of environmental crime. Making clear which environmental and social harms are associated with the practice of exporting e-waste to countries without processing facilities with necessary environmental and health and safety safeguards in place is an important part of that (White, 2011). A culturally sensitive approach towards the different meanings of waste, the different role played by actors in the formal and informal e-waste sector in different economic, cultural and social context, is essential to gain insights into the variety of catalysts of the (harmful) behavior (Brisman & South, 2013a).

Criminology has the benefit of being a discipline that brings different scientific perspectives such as sociology, psychology, geography, public administration and law and society studies together to understand crime and law enforcement. This is even more true for green criminology because it also ropes in findings from exact sciences like toxicology, biology, physics and ecology to understand the complexity that lies at the basis of environmental challenges the world faces today. Based on our case studies of e-waste markets in two different locations, Hong Kong and Accra, we aimed to illustrate the importance of paying attention to locality when considering the global dimensions of the e-waste trade and to socio-cultural, economic and political factors that influence the definitional processes, social organization and governance of e-waste. Emancipating these ‘polluters’ might then go hand in hand with emancipating the study of crime to move beyond typologies and embracing a broader approach. Such an approach will require of green criminology to scrutinize not only actors and causes, but legislation all the same. It asks us to incorporate meaning not only from the perspective of the researcher, but from the perspective of those actors who, on a day to day basis, experience what is being studied.
Maybe in these particular locations and on this particular topic, it would be worthwhile to explore possibilities of action research, engaging with (local) NGOs and stakeholders to see what works out in practice and what actually makes a difference in avoiding environmental and social harm.

References


