

Economic Corruption Within the E-Waste Problem

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### **The importance and harms of e-waste**

Electronic waste (e-waste), also known as waste electronic and electrical equipment (WEEE), is an important and serious issue currently because of the increasing amount of electronic technology being developed, produced, and displaced in relatively short time periods. For example, personal computers have a life cycle of about three years, while mobile phones have a life cycle of approximately two years (Robinson, 2009). As computer chips become smaller and faster, newer products are able to enhance their possibilities with the utilization of computer processors, meaning that more electronics will be prevalent on the market. Older electronic products become obsolete quickly as well.

E-waste contains some valuable materials that can be recycled and reprocessed for use in new products. Thus, e-waste has an economic value to it, one that is exploited by using inexpensive labor in developing nations. It also contains toxic materials, which are released in the environment because of the simple and dangerous methods used to retrieve the valuable materials. Corruption occurs when businesses want to avoid paying the high costs of recycling in developed nations by illegally exporting e-waste to developing nations.

According to a United Nations Environmental Programme (2009) report, an estimated 20 to 50 million metric tons of e-waste is generated in the world every year. Robinson (2009) suggests that about 8 percent of total global waste is e-waste, of which 80 percent ends up being exported to developing countries. These developing countries also produce their own e-waste, in some cases in larger quantities than are imported. In Mumbai, India, about 19,000 tons of e-waste is discarded per month, in addition to the large amount entering through its port (Pinto, 2008). Although 95 percent of e-waste can be recovered, only a small percentage of e-waste is recycled because the techniques are costly (Robinson 2009; Economist 2013). For example, in developed nations there are worker health and safety regulations and higher wages than in developing nations, making the cost of recycling high. It is much cheaper for developed nations to export e-waste to developing countries such as China, India, Ghana, Nigeria, and Brazil, where such laws are non-existent or not followed and labor is available at mere dollars, or cents, per day (Caravanos, Clark, Fuller, & Lamberston, 2011).

There are two practical reasons to be concerned with e-waste: first, the sheer amount of waste taking up space in landfills around the world, and second, the negative impacts on health and the environment associated with e-waste. E-waste includes metals such as gold, silver, and copper, which are very valuable and can be recycled and reused; however, heavy metals such as cadmium, lead, and mercury are also present.

There are several steps involved in recycling e-waste—retrieving the precious metals—in a large-scale operation: manual disassembly, shredding, and then magnetic, manual, or current separation (Tsydenova & Bengtsson, 2011). In each one of these steps, people risk exposure to harmful chemicals and toxins such as such as fire retardants (polychlorinated biphenyls, PCBs) and the heavy metals. These operations occur in the formal sector in developed countries, which is to say that businesses are registered to do this work. In developing countries, the formal sector exists, but the informal sector is much more prevalent. Large-scale operations are also present and sometimes very near to the facilities that use the metals for producing new products (The Economist, 2013)<sup>1</sup>. Many times in these countries primitive methods are employed for recycling e-waste (Frazzoli, Orisakwe, Dragone, & Mantovani, 2010). Individuals use whatever techniques cheapest and possible to extract the precious metals.

Two of the methods, burning (pyrometallurgy) and using acids (hydrometallurgy), are very dangerous for both the environment and the individuals in more than one way (Tsydenova & Bengtsson, 2011). For example, in order to retrieve copper, the insulation must be burned off; however, toxic chemicals and particles—dioxins, furans, polycyclic aromatic hydrocarbons (PAHs), polyhalogenated aromatic hydrocarbons (PHAHs), and hydrogen chloride—are released into the air, and the individuals may ingest, breathe them in, or absorb them through their skin (Robinson, 2009; Tsydenova & Bengtsson, 2011).

Facilities and individuals using acids, cyanides, halides, or other hydrometallurgical products end up dumping the waste onto the ground or into the rivers they are located next to. For example, these practices occur in China's Guiyu region and Dheli (Tsydenova & Bengtsson, 2011; Sepulveda, et al., 2010). Soils become damaged and either unsuitable or toxic, and once clean drinking waters become graveyards for any life. Plants will absorb

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<sup>1</sup> Manufacturing plants producing iPads are not distant from Guiyu, China, a major e-waste recycling region

these toxins and metals, animals will consume the plants, and in turn human beings will consume the plants and animals (Frazzoli, Orisakwe, Dragone, & Mantovani, 2010). In the Guiyu region, which is a large e-waste receiver, 80 percent of the children have lead poisoning (Vos, 2012). These primitive e-waste recycling methods are not only harmful to those working near the extraction places, but also to those in surrounding environment and even those areas not close by (Tsydenova & Bengtsson, 2011). Many of the individuals are also poor and are unaware of the risks that come along with this dangerous, possibly genotoxic<sup>2</sup>, line of work (Tsydenova & Bengtsson, 2011). Other members of the community are also unaware of the risks and harms that may come along with the contaminated air, water, and wildlife. Furthermore, it is possible for these toxic and harmful consequences to have effects in the rest of the world.

### **Policies currently in place to prevent proliferation of e-waste**

The serious problems pertaining to e-waste have also given rise to international treaties to address the problem. The Basel Ban Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (commonly known as the Basel Convention) is a worldwide treaty adopted in 1994 and ratified by many countries, excluding the US, which bans the export of hazardous wastes to developing nations; e-waste falls into the category of hazardous waste. However, there are no enforcement provisions included. There is also the Bamako Convention on the Ban on the Import Into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa signed by 33 African countries and ratified by 24. More explicit, the Bamako Convention deems all import of hazardous wastes illegal and criminal (Terada, 2012). It is much stricter than the Basel Convention because the ban also calls for member countries to impose criminal penalties on those people who have planned or assisted with illegal importing (Terada, 2012).

The European Union is a leader in the world when it comes to policies relating to e-waste. The Waste Electrical and Electronic Equipment Directive (WEEE Directive), passed in 2003, includes a policy that makes manufacturers responsible for their equipment at the

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<sup>2</sup> Genotoxic refers to the property of chemical agents that damage the genetic information within a cell, causing mutations

end of the product's life, known as Extended Producer Responsibility (EPR) or Individual Product Responsibility. This means manufacturers are financially responsible for take-back, recycling, and final disposal. The application of this Directive has received some criticism regarding member state's writing of the directive into their national laws and for the confusion regarding individual versus collective responsibility (Greenpeace International, 2006). There has also been criticism regarding the Directive's inadequacy to promote re-use and recycling, in addition to the lack of crackdowns on illegal export (Murray, 2012). However, in 2012 the Directive was updated to include several new features such as requiring member states to collect either 65 percent of electronics sold or 85 percent of electronic waste generated by 2019, depending on which one the country wants to adopt (Murray, 2012). The EU also has several other directives including the Restriction of Hazardous Substances Directive (RoHS Directive), which bans the use of certain materials such as lead, mercury, and cadmium, and the Battery Directive. Both Directives are meant to prevent harmful materials that are also found in e-waste from entering into dumps ([http://ec.europa.eu/environment/waste/weee/legis\\_en.htm](http://ec.europa.eu/environment/waste/weee/legis_en.htm)).

On the other hand, in the US there are no such Federal regulations regarding e-waste, but legislation that gives the federal government the power to produce policies regarding the disposal of hazardous waste does exist (Terada, 2012; [www.redemtech.com/ewaste-federal.aspx](http://www.redemtech.com/ewaste-federal.aspx)). Instead, laws are passed by the states individually, as for example in California and recently in New York State. These laws, similarly to the EU directives, only deal with disposal of e-waste within the state, also known as "diversion from landfill" legislature, but maintain language that anticipates companies will dispose of the final products responsibly. Nations such as India, Uganda, South Africa, Morocco, and Senegal have no laws or policies regarding e-waste (UNEP, 2009). Other countries' laws regarding the import of e-waste are lax or not enforced. However, in the beginning of 2013, Nigeria fined importers one million dollars for trying to bring e-waste from the UK (The Economist, 2013). China, on the other hand, has strict laws intended to eliminate the import of e-waste, yet receives an estimate of 70% of e-waste from the world (Bodeen, 2007). The reason this figure is so staggering despite efforts to prevent the export of e-waste is due to lack of enforcement and the lack of recognition given to the informal sector (Lundgren, 2012). This situation is common in developing

nations due to a lack of adequate resources to enforce, a lack of knowledge specific to the operations occurring, and the lack of awareness regarding the extent and possible harms of e-waste.

Although none of these laws are completely comprehensive, it is difficult to say what the most effective laws are. The EU has great directives aimed at reducing the proliferation of dangerous waste, but the implementation of these goals is not as successful. Rather, more localized laws would be able to introduce a change in the flow of e-waste. Drop-off sites for e-waste need to be placed in cities and communities, which is difficult to do with a broad, national-level law. In the US, e-waste laws have only been implemented recently as well, so the impact of the laws is just beginning. These state-level laws require publicity in order to be effective, which may show up to be lacking. As will be discussed later, local laws—both in developed and developing nations—are necessary to ensure success by addressing the local conditions and behaviors. Nonetheless, international laws and agreements are necessary to prosecute those involved in e-waste corruption; there should be no safe-haven for individuals that seek to gain profit at the expense of the health of disadvantaged people. The US needs to at least ratify the Basel Convention and provide a law that incentivizes recycling of e-waste within the country.

### **Definition of corruption**

Corruption is commonly understood as the abuse of some position of power or violating established rules for illegitimate personal gains, and includes actions such as bribery, fraud, embezzlement, extortion, favoritism, and nepotism (Dike, 2008). Corruption is most likely to occur in situations where the payoffs outweigh the chances of being caught and the costs of being caught (MacLean-Abaroa & Tran, 2007). Additionally, Dike (2008) recognizes five other causes for corruption in his analysis of corruption in Nigeria:

1. great inequality in distribution of wealth,
2. political office as the primary means of gaining access to wealth,
3. conflict between changing moral codes,
4. the weakness of social and governmental enforcement mechanisms, and
5. the absence of a strong sense of national community

Klitgaard's (1988) formula provides that corruption occurs when monopoly and discretion exists without accountability. Monopoly is best described as having a secure position of power, while discretion refers to the adherence to and the strictness of the rules.

Accountability refers to whether the individual can and will be caught. Other causes for corruption include globalization and the methodologies and ideologies involved with it (Achankeng, 2003). For example, Widmer, Oswald-Krapf, Sinha-Khetriwal, Schnellmann, & Bo'ni (2005) summarize an argument made by former Chief Economist of the World Bank and former Harvard University President Larry Summers in 1991:

- the countries of with the lowest wages would lose the least productivity from "increased morbidity and mortality" since the cost to be recouped would be minimal;
- the least developed countries, specifically those in Africa, were seriously under-polluted and thus could stand to benefit from polluting trading schemes as they have air and water to spare; and that
- environmental protection for "health and aesthetic reasons" is essentially a luxury of the rich, as mortality is such a great problem in these developing countries that the relatively minimal effects of increased pollution would pale in comparison to the problems these areas already face.

(p.437-438)

Although Summers was criticized for his views and there is a history of controversy around his memo, the logic no doubt prevails in many global operations in conjunction with capitalistic and neoclassical economics. Developing nations lack large amounts of money, so even toxic waste is a good economic prospect. Here corruption appears in the form of unequal international, as well as national, socio-economic structures.

In cases of developing nations, one can expect that most, if not all, factors for corruption exist, and thus the possibility of corruption is great. When goods cross national borders, there exist just a few checkpoints to prevent illegal goods; combined cross-country efforts are necessary. These kinds of efforts are difficult to engage in, as can be seen from past and current international, UN, and NGO operations and efforts. In the case of e-waste, where the flow of waste electronics generally goes from developed nation to

developing nation, the nations that have strong governments and social enforcement mechanisms must take primary action in the issue of e-waste.

### **Corruption in the e-waste flow**

In the flow of e-waste, corruption usually first occurs in the exporting country. For countries that have signed and ratified the Basel Convention it is illegal to ship e-waste, so any shipment of e-waste already must involve corruption. It is very likely that shipping brokers intentionally mislabel and misrepresent the cargo they are shipping. For example, brokers may load e-waste into shipping containers that are meant for second-hand or used electronics donated by charity organizations (Robinson, 2009; UNEP, 2005). In some cases it may account for up to 75 percent of the shipment (Caravanos, Clark, Fuller, & Lamberston, 2011). Second-hand or used electronics are not forbidden by the ban and can be shipped to developing nations, so shipping companies utilize this loophole. Corruption may also occur in waste management and recycling companies, which sometimes do not check whether the electronics they receive are working or repairable, or they intentionally mislabel the electronics as working in order to ship them, because it is cheaper to recycle e-waste in developing nations. For example, in 2011, one of the UK's largest waste managers was found to be dealing in the underground e-waste trade after the Environmental Investigation Agency used a GPS tracker installed in a non-repairable TV and found it to be in Nigeria (Wasley, 2011). Greenpeace made a similar investigation and conclusion in 2009, also against a UK firm sending broken TVs to Nigeria (Terada, 2012).

Corruption also occurs on the side of the importing country. One US exporter said that all it takes is a \$100 bill taped to the side of a container in order to get e-waste past customs officials in China (Bodeen, 2007). Poorer individuals have a greater incentive to take bribes and permit e-waste into the country illegally. Weak accountability and enforcement of penalties allows corruption to be widespread in countries like China. Countries that have no laws regarding the import or disposal of e-waste, for obvious reasons, do not really have corruption in the legal sense within this flow. However, when these countries try to create legislature to curb e-waste, they create the conditions for corruption. For example, the informal sector is a large player, but much of the e-waste legislation does not take into account the effects on the informal sector and the society,

causing a discontinuity between theory and practice (Lundgren, 2012). In places such as Ghana, where e-waste management sustains an estimated 200,000 individuals, corruption becomes necessary for day-to-day living for those reliant on the money received from informal sector operations.

### **Possible solutions**

The most effective ways to reduce the harms caused by e-waste are to reduce the toxic materials used in production, to design products with the lifecycle in mind, to utilize methods to promote recycling of e-waste, and to strengthen policies prohibiting the illegal transportation and disposal of e-waste. Designing products with the lifecycle in mind and recycling means that less waste will be created as well (Green Electronics Council, n.d.). Effective ways to reduce corruption in regard to e-waste require legislative and enforcement actions.

In order to eliminate the conditions that allow for corruption to occur, a combination of national and international efforts are required. For example, one of Lundgren's (2012) possible solutions includes requiring both the company shipping and the facility receiving to sign a contract. In this way the movement of e-waste is recorded and accountability is established. Another solution is to impose high enough tariffs on the e-waste export so that the cost would be an incentive to recycle in the same country responsibly instead (Terada, 2012).

Corruption in e-waste revolves around the exchange of money and precious resources. In developed nations, companies seek a higher profit, and in developing nations individuals seek to earn money in any possible way. The precious metals retrieved in the recycling efforts are then used for products to be consumed all over the world, but there is a strong correlation between a country's GDP and the number of these products such as computers (Robinson, 2009). The large global demand, and specifically the developed nations' demand, drives the necessity for the precious resources retrieved from e-waste. This important relationship needs to be brought to the forefront of any corruption in e-waste conversation because developed nations remain largely the producers of e-waste and developing nations to receivers of e-waste.

There is a need for policies promoting recycling, especially in facilities within the country. Take-back policies and EPR policies require stronger enforcement provisions. Additionally, provisions for government subsidies and other incentives may prove to be helpful. In the US, the federal legislative branch needs to provide the necessary framework and policies so that the Basel Ban can be ratified. Laws promoting the accountability in the disposal of e-waste would effectively complement the international treaties.

Within developing nations, it is important for governments to recognize the social impacts of e-waste policies and legislature. One way to mitigate the high probability of corruption is to formalize the informal sector, building on its experience and practices while providing higher standards of health and safety (Lundgren, 2012). It is therefore necessary for these nations to make steps toward researching the current extent of the informal sector and the players involved. Due to a scarcity of resources, international organizations such as the UN may play a vital and important role in providing researchers and sharing information on practices and policy recommendations. China's participation in many international treaties and its production of local laws shows promise in terms of effectively working towards more comprehensive international cooperation. African nations such as Nigeria are considering and attempting to create legislation to ban illegal e-waste trade (Terada, 2012). In Nigeria specifically, Dike (2008) states that corruption is widespread because Nigerians have lived under military rule and not rule of law. In this case, the Nigerian government needs to be strengthened by introducing strict laws and creating accountability and transparency; enforcement must be predictable and forceful (Dike, 2008).

There is no one right way and no easy way to begin to shift the way e-waste is handled in the world. An important way to begin this process, though, is to make consumers of electronics aware of what e-waste is and what happens with it. It is also important for consumers, in conjunction with legislators, to put pressure on producers to make their products safer and 'greener.' In order to combat the corruption issues, producers need to be held more accountable for what happens with their products when they are discarded, and more need to provide take-back programs. Since e-waste is caught up in a complex system of exchanges and demands, the behavior of the system needs to be analyzed and criticized (Lundgren, 2012). Furthermore, in order to achieve victories in the

steps towards minimizing the harms of e-waste, the social and economic inequalities prevalent in our world need to be addressed. The rich countries must stop the exploitation of poor countries. In conclusion, the whole world needs to be made aware and actualized in order for the problems revolving around e-waste to be mitigated.

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