

Transboundary Trade of Second-hand Electrical and Electronic Equipment (EEE): Framed by the Resilience Concept

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Abstract The trade of second-hand electrical and electronic equipment (EEE) from the European Union countries to developing countries on one hand represents a threat to humans and the environment since most of the recipient countries lack an adequate system of recycling, while on the other hand it represents a considerable source of revenue to developing countries. In order to tackle the transboundary flows of e-waste, directives were implemented within the EU. This paper intends to highlight the importance of a more comprehensive approach based on a resilience framework. By framing the issue into a resilience framework, it is posited that there is a possibility to introduce alternatives that do not represent an 'either-or' solution.

Keywords Second-hand Electrical and Electronic Equipment, European Union, Resilience

The transboundary movement of second-hand EEE from EU countries to developing countries has increased remarkably in the last years. According to the United Nations Environment Programme (UNEP), some 220,000 tonnes of second-hand EEE were shipped from the EU to West Africa in 2009 (Spence, 2012). In addition to the second-hand EEE that have been exported, the domestic generation of e-waste in developing countries, as for example in China and India, will increase considerably. In order to tackle the transboundary flows of second-hand EEE and to prevent electronic waste being dumped in landfills, directives were implemented and enforced within the EU from 2006 to 2012, as the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal, 22 March 1989 (the Basel Convention). While significant progress is being made in the EU countries due to directives on Waste of Electrical and Electronic Equipment (WEEE), important challenges lie ahead. The WEEE directives are intended to decrease the export of WEEE to developing countries, although little attention is being paid regarding the responsibility of governments to allocate resources to improve the technology or capacity of countries, such as China, India and Ghana for the recycling and disposal of WEEE that have already been dumped in their landfills. In

addition, definitions related to what can be defined as re-usable, hazardous and non-hazardous waste are still ambiguous in those directives. This article presents an exploratory study on the transboundary movement of second-hand EEE from developed to developing countries and its implications. In order to capture the various dimensions of this process, qualitative secondary data were used as the main source, mainly documentation made by International Nongovernmental Organizations (INGO's) and recent studies including reports on the global route of second-hand electrical and electronic equipment. The analysis of the transboundary movement of second-hand EEE is not a straightforward one. Because it is a process, it is difficult to grasp, observe and evaluate. Therefore, this paper does not look for clear-cut answers based on quantitative measurement of outcomes. In addition to the trade flow of second-hand EEE, the article also discusses the importance of investing in a more comprehensive approach including, the allocation of resources to ensure the adequate disposal and recycling of second-hand EEE as well as the provision of modern technology to the recipient countries which could also generate revenue to the population in those countries. Furthermore, this article proposes a resilience framework that is conceptualized beyond its 'technical' role as the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner (Field C.B et al, 2012). The concept of resilience, as described herein, reflects a broader approach which has the ability, not only to adapt, but also to transform (Walker et al, 2002). Moreover, the concept of resilience might thus act as an enabler that promotes bridges and communication between the different actors involved and affected by the trade of second-hand EEE.

European Union Main Directives Concerning Export of Second-hand EEE

International environmental policies concerning the trade in hazardous waste were initiated in the early 1980s, when North-South regulations on hazardous waste trade were

viewed as necessary. There are a number of directives and regulations within the EU that have been instituted to address the transboundary movement of hazardous waste from OECD countries to Non-OECD countries. They vary through several levels, from strict measures such as a total ban on sending or receiving waste, for example, the Basel Ban Amendment (Basel Action Network, 2011), to less stringent ones, such as, requirements for notification, informed consents or guarantee of environmentally sound management, as found in the Basel Convention (Basel Convention, Text of the Convention, 2011). Moreover, as the Basel Convention, other regulations including the Organization for Economic Co-operation and Development's Waste Agreement (OECD Waste Agreement), the European Waste Shipment Regulation (WSR) and the WEEE Directive, aims to address the waste stream of both second-hand EEE and end-of-life electronics in their provisions. The Basel Convention, one of the main multilateral environmental agreements, was created to 'correct' an environmental problem the international community had 'considered unfair': the shipment of hazardous wastes from OECD to Non-OECD countries. The Basel Convention has been signed by 181 parties (Basel Convention, Parties to the Basel Convention, 2011) and it has entered into force in 1992, with later addendums in 2006 (Nairobi Declaration) and 2011 (Cartagena Decisions), after several agreements and meetings of the United Nations Environment Programme (UNEP) expert working groups. The main goal of the Basel Convention is to prevent or minimize the generation of waste at their source, to minimize the quantities of hazardous waste that are shipped across borders and to treat and dispose of wastes as close as possible to their place of generation. Moreover, in order to ship any second-hand EEE a notification document is required, specifying the details of the proposed movement to be sent to the competent authorities in the countries of export, import and transit for their authorization. The Basel Convention has clear restrictions related to the export of hazardous waste intended for disposal. The convention classifies hazardous waste in terms of substances present in the waste materials, thus depending on the chemical properties of the waste and on the threshold limit for each hazardous substance. The measure of those thresholds is quite complex and can only be efficient if there are specific guidelines and competent technical organizations involved in the process. Moreover, the definition of re-use is not always clear with respect to certain types of waste and the Convention is at times ambiguous in its use of terms with regard to the meaning of hazardous or non-hazardous waste. Furthermore, the Basel Convention 'ensures' that waste may be exported where it is intended for recycling and recovery, thus any waste exchanged across borders should be managed and disposed of in an environmentally sound manner in the importing country (Basel Convention, Text of the Convention, 2011), in addition, the Convention establishes that the wastes may only be exported if the exporting state lacks Environmentally Sound Management (ESM) capacity. In order to address

challenges with the Basel Convention, a movement towards the total banning of all transboundary hazardous waste shipments was initiated by the Danish Environment Ministry in 1993, along with Sweden, Finland and Norway, which reinforced the moral imperative to keep waste out of developing countries. They argued that the Basel Convention was not strict enough on the control of the transboundary movement of hazardous waste from OECD countries to Non-OECD countries. Furthermore, they submitted a proposal to the Basel Convention Secretariat for a complete end to disposal waste shipments between OECD and non-OECD countries, known as the Basel Ban Amendment (Decision III/1) (Basel Action Network, 1995). However, by the end of the negotiations, the compromise reached by EU countries concerning the shipments of and the prohibiting of export of wastes classified as hazardous, was less stringent. It allowed the shipment of wastes destined for recycling, as long as a bilateral agreement was in place. The reasoning in favour of that decision, may be attributed to the fact that it would involve the loss of revenue to developing countries specialized in waste handling as well as creating restrictions on the access to recyclables and raw materials in those countries. In October 2011, the 181 Parties of the Basel Convention agreed to allow an early entry into force of the BAN Amendment (Basel Convention, Text of the Convention, 2011). In 2006 a new law called the European Waste Shipment Regulation (WSR), created as a result of the transposition of the Basel Convention and the Organization for Economic Co-operation and Development (OECD) Waste Agreement (1992), came into effect in the European Union. The WSR is mainly concerned with the simplification and strengthening of waste movement systems in order to enforce the disposal of wastes in an environmentally sound manner and improve control over the type of wastes that are exported, however, as in the Basel convention, the procedures as well as the definitions related to re-usable, hazardous or non-hazardous EEE still remain complicated.

Transboundary Movement of Second-hand EEE

When the issue of the e-waste began to gain attention, it was China and India who were the main receivers (Basel Action Network, 1995). For instance, the town of Guiyu in China can probably be considered 'the largest e-waste recycling site in the world; it employs about 100,000 people, representing about 80% of the town's population' (Lundgren, 2011:16). The e-waste sent to China is also diverted to remote rural villages, Vietnam, Cambodia and other countries of South-East Asia. These types of movement aim to circumvent the stricter environmental policies being implemented by local governments in southern China (ibid: 16).

Furthermore, although re-usable second hand EEE exports are legal, exports of e-waste are not under international legislation. For instance, China signed the Basel Convention

and was one of the first global proponents of a total ban on the hazardous waste trade (ibid: 16). However, the number of continuous shipments to China has not ceased with those agreements, an indication that the issue not only concerns the lack of laws, but also the unsuccessful enforcement of the law, as pointed out by Ni & Zeng (2009). Besides the ineffective enforcement of directives by Governments, other significant drivers could be enumerated as influencing the increasing transboundary movement of second-hand EEE. The main one is that the trade is primarily driven by profit. From the perspective of non OECD countries, e-waste contains valuable components. There is a strong electronic re-use market in these countries, combined with low labour costs for reparation and scarce precious metals (such as gold) found on computers and other electronics, further, it is relatively cheap to ship and the risk of being caught is generally low (Lundgren, 2011). For OECD countries the recycling of e-waste is very costly due to the strict requirements to observe environmental and social standards (Sepulveda, 2010). Consequently, such factors intentionally or 'unintentionally' 'stimulate the export and imports of second-hand EEE' (Prakash, 2010).

As early as 2005, studies began to reveal that shipments of e-waste were being exported beyond Asia to some African countries (Basel Action Network, 2005), mainly to Ghana and Nigeria (K.Bridgen et al., 2008) Most of the second-hand EEE that are exported from developed countries to Africa arrived in an unusable condition, for example between 25% and 75% (J.Keper, J. Højsk, 2008). One important issue concerning the differentiation between second-hand EEE and WEEE is related to the difficulty in defining the boundary between waste and commodity. Furthermore, the definitions of e-waste contain nuanced differences in the EU's Waste Directive and in the Basel Convention (Secretariat of the Basel Convention, 2011), thus compromising how the e-waste shipments have been regulated.

The requirements concerning the distinction between what is defined as second-hand EEE destined for direct reuse and WEEE is unrealistic, since the tests to be applied on the item being shipped requires knowledge and expertise that is only possible to find in certain places in the world. Many products can only be properly tested in very specialized repair centres. For instance, in Nigeria estimates of the number of computer imports found to be non-functioning range from 75% to 95% of each shipment (European Union Network for the Implementation and Enforcement of Environment Law, 2009: 24-26).

Moreover, issues concerning the export of second-hand EEE to developing countries could be considered twofold. On one hand there are those in favour of the trade, who justify the transboundary shipment of secondhand EEE using economic and social arguments while on the other hand there are those in favour of the total ban of the export, including, for example, the organization Greenpeace who emphasize the damage the mechanical disassembling of e-waste can

generate to the environment and human health (Greenpeace International, 2009).

Those in favour of the trade advance the following arguments:

- There are many NGO's as well as cooperatives in developing countries engaged in second-hand EEE take-back, for example NGOs involved in projects that aim to bridge the digital divide by delivering EEE restored.
- There is potential importance in the re-use of EEE from an environmentally sustainable perspective, thus the emphasis on the re-use product stream.
- The export of second-hand EEE implies an extended life-time period, thus impacting on the environmental burden.
- Re-use may lead to a reduction in overall global recycling because producers would then be focused on ensuring their products are re-used.
- Improves the competitiveness of developing countries by providing them with access to raw materials needed by their economies.

Those against the trade advance the following arguments:

- The re-use of EEE in non-OECD countries is of serious concern, since those countries lack a system of collection with a pre-processing and end-processing infrastructure. Thus such products do not end up being recycled at the product's final end-of-life.
- Reports of NGO's have suggested that the export of e-waste to developing countries is in reality a new form of toxic waste dumping from the rich to the poor that are now paying the price for the affluent, high-tech lifestyles of the North (Bodeen, 2007).

The debate between those in favour and those against the export of second-hand EEE evokes the complexity of the transboundary movements of EEE. What should not be overlooked is the actual value of discarded electronic equipment to developing countries, the numerous stakeholders involved in that process and their influence on the increasing of exports.

Consequently, several issues arise that have not yet been addressed by EU regulations, including the Basel Convention, in their attempt to address the complexity of the transboundary waste stream. The complexity involved in achieving a systemic approach that considers both perspectives as well as the various actors involved in the transboundary waste movement will be examined in the following sections.

The Responsibility of Governments: North and South

According to a report released by The International Labour Organization (ILO) 80% of the e-waste sent by developed countries for recycling ends up being shipped

illegally to developing countries to be recycled most of the times by informal workers using rudimentary techniques. It is estimated that 70% of electronic waste discarded and exported ended up in China with further exportation to neighbouring countries such as Cambodia and Vietnam. The report highlighted that many of those countries lack adequate regulations to implement the new waste stream and lack effective enforcement of e-waste regulations (Lundgren, 2011:12). According to the study, the developing countries are dealing with the burden of a global problem, without the adequate technology to deal with it. In addition, developing countries are also generating a large amount of e-waste. "It is predicted that, by 2020, in both China and South Africa, there will be 200-400 per cent more e-waste from old computers than in 2007, and a staggering 500 per cent more in India. The volume of e-waste from mobile phones will be about seven times higher in China and 18 times higher in India" (Ibid: 55). Counting also the e-waste that is still being imported to those countries, the problem is gaining an immeasurable dimension. A major problem regarding the facilitation of the trade in e-waste also relates to the absence of regulations to ensure the safety of those who deal with the discarded waste and the lack of financial incentives to recycle the waste in an environmental manner (as highlighted in the Basel Convention). The manipulation of second-hand EEE poses several health risks due the high presence of toxic materials. One of the recommendations proposed by ILO (2013) is the adoption of appropriate legislation and enforcement mechanisms, the regularization of the informal sector that handles the recycling of e-waste and the organization of workers into cooperatives. The promotion of cooperatives should be an imperative for governments, in order to provide legal and financial support to workers that are working in the informal sector of e-waste, as ILO (2013) suggests: "A balanced society necessitates the existence of strong public and private sectors, as well as a strong cooperative, mutual and other social and non-governmental sectors. It is in this context that Governments should provide a supportive policy and legal framework consistent with the nature and function of cooperatives and guided by the cooperative values and promote the important role of cooperatives in transforming what are often marginal survival activities (sometimes referred to as the "informal economy") into legally protected work, fully integrated into main-stream economic life" (Ibid: 51). Furthermore, E-waste management involves local government actions integrated with global initiatives and community participation. It is therefore important that policies and regulations provide some sort of direction beyond traditional waste streams, in order to address the complexity in the transnational flow of EEE; this could be proposed through a comprehensive approach based on the resilience concept, which will be discussed in the following section.

Resilience Framework/Comprehensive Approach

It is considered here that the resilience framework is one that could help frame the issues under consideration through a systemic approach, bearing in mind the variety of the involved dynamics currently affecting humans and their environment due to the trade of second-hand EEE. An increasing number of academics now recognize the concept of resilience more as an 'ability to resist, recover from, or adapt to the effects of a shock or a change' (Mitchell, 2011) than as an outcome. The shift in this approach goes from a narrow focus, the attempt to control or create stability, towards a systemic perspective that embraces the capacity to adapt and transform (Cutter et al. 2008). Furthermore, resilience is conceptualized here beyond its 'technical' role as the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner (Field C.B et al., 2012:5) reflecting therefore a broader approach which has the ability, not only to adapt, but also to transform (Walker et al., 2002). Thereby, to enhance resilience is to recognize the strength of a group that goes beyond vulnerability. Although there are risk factors in situations of adversity, there are simultaneously protective factors that help the person or community to perceive the situation in a different way and overcome problems. The emphasis on protective factors can generate a positive perception of the environment and the feeling that one can take action in the situation (Amorim, 2009:220). As pointed out by P.Borbeau (2013), resilience as renewal is characterized by responses that transform basic policy assumptions and ways societies understand and interpret a particular set of issues, thus, potentially remodel social structures. Thereby, by framing the issue of second-hand EEE trade into a resilience framework, it is posited that there is a possibility to introduce alternatives that do not represent an 'either-or' solution (as the total ban of second-hand EEE export or the unrestricted transboundary movement), that ignores the interdependence that exists between the actors (Producers, manufacturers, businesses, governments, consumers, traders, exporters and importers, scrap dealers, smelters and recyclers). It is important to point out that this approach avoids the 'aggressor or victim' trap. We acknowledge the 'moral responsibility' EU member states have for the waste generated within its borders, however when considering the complexity of that trade, all actors involved herein North and South are responsible to address the problem in a more efficient way. Furthermore, a resilient systemic approach should considered regulations to ensure the safety and social security of those dealing with the discarded waste, financial incentives and provision of modern technology to cooperatives to recycle waste in an environmental manner and the enforcement of laws. Furthermore, both north and south governments and civil society are responsible to not only adapt, mitigate negative impacts caused by the

transboundary movements of e-waste, but mainly to take action to transform their situations. This transformative process would require the involvement, participation and responsibilities of the different actors involved in the second-hand EEE transboundary movement, thus requiring, a combination of technological innovations, institutional reforms, behavioural shifts and cultural changes. The integration of discourses under the banner of resilience would enable a platform of actions, where dialogue could be initiated between north and south governments promoting bridges and communication between the actors involved and affected by the trade of second-hand EEE.

Conclusion

As highlighted above, the solution to the problem of the second-hand EEE transboundary movement and its implications is not as straight forward as implementing the total ban. Second-hand EEE accounts for a significant portion of the economic revenue of developing countries. It cannot be ignored, that this informal sector employs thousands of people in developing countries, where, for a significant number, the process of dealing with e-waste is their main revenue. Hence, what appears to be required is intervention where synergy and complementarity between the involved and affected actors are fostered and not intervention where only local measures are favoured to the detriment of others. The role resilience plays in different arenas, as applied here in a systemic way, emphasizes the system components' of interdependency. Moreover, the numerous actors with different priorities (labour, technology, value and sustainable development) involved in the second-hand EEE trade should be recognized when directives are implemented since their lives are more dependent on these mechanisms. In this sense the resilience of such communities should be weighed when local and global policies are designed. It is also fundamental to propose a contextual analysis of the different receptors of e-waste in order to establish the appropriate measures in each situation. The reality of each country may vary as well as their policies and technological abilities. Moreover, it is important to comprehend each receptor country's e-waste reality and dimensions in order to develop a sound understanding of the key issues and to avoid single-sector approaches. The strengthening of dialogue and links among all actors in both north and south governments, could considerably improve the scenario under which the trade operates.

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