



Navigating uncharted waters: A multidimensional conceptualisation of exporting electronic waste



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ABSTRACT

In spite of a growing body of scholarly works on the emerging phenomenon of exporting electronic waste (e-waste), international business, e-waste management, technological forecasting and strategy scholars have remained surprisingly silent on the subject. This paper presents an integrated conceptual framework that clarifies the boundaries and dimensions of exporting e-waste. By integrating the two types of recipient countries (i.e. developed and emerging economies) with two types of originating countries (i.e. developed and emerging economies) led to the development of an integrated 2×2 matrix. The integrated framework is then utilised to illuminate how push and pull factors specific to both the originating and recipient countries interact to determine nature and directions of exporting e-waste. The study outlines directions for future research and practical implications.

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1. Introduction

Over the past few decades, a growing body of empirical work has documented the emergence of electronic-waste (e-waste) as not only an incipient policymaking issue but also a promising avenue for future research (Asante et al., 2012; Baldé et al., 2015a; UNEP, 2015). At the same time, there has been an incessant global growth of e-waste which is projected to surge to 50 million metric tonnes (Mt) by 2018 from 41.8 Mt. in 2014 (Baldé et al., 2015b). Past studies indicate that by 2020, emerging economies such as China and South Africa will have between 200 and 400% more e-waste from old computers than in 2007 and India around 500% (Lundgren, 2012).

Perhaps the most puzzling is the fact that, despite the general awareness of the hazardous effects of e-waste and the need to recycle at source, exporting of e-waste from developed to developing countries has surged exponentially (Lepawsky, 2015a; Garlapati, 2016; Orlin and Guan, 2015). The emergence and growth of e-waste exporting may appear to contradict the long-held assertion by some scholars that “exports are good, and exporters are good firms; thus helping domestic firms export is good policy” (Bernard and Jensen, 2004, p. 561).

Although exporting e-waste has emerged as one of the contemporary issues in this unique area, to date, international business and strategy scholars have surprisingly remained silent about this growing phenomenon, with notable exceptions. The issue of exporting per se is not new to international business and strategy scholars (see Cavusgil et al., 2012), nonetheless, the recent development of exporting e-waste offers the potential for cross-discipline fertilisation. Furthermore,

the accumulating body of scholarly works has also brought to the fore a need for more robust explanations and conceptualisations of the subject (Cui and Zhang, 2008; Lepawsky, 2015a).

The main purpose in this paper is to propose an integrated conceptual framework which clarifies the boundaries and directions of flow of exporting e-waste. The secondary objective is to examine the precipitating factors of exporting e-waste. In attempting to synthesise the diverse streams of research on the subject and explicate our conceptual framework, illustrative cases are employed to shed additional light on the subject.

The study makes two main contributions to waste management, international business, technological forecasting and strategy research. First, although exporting e-waste has taken a pivotal role in contemporary management discourse (Baldé et al., 2015a), our understanding of the features remains limited. Nearly all of the existing bodies of literature have examined the subject from a narrow perspective of e-waste from developed to emerging economies without accounting for the reciprocal flow and/or the precipitating factors. The study departs from the current trend to examine flows from both directions. In addition, an integrated framework of pull and push factors is developed which links the dimensions. By addressing the examining the drivers of exporting e-waste, the study offers a more complete explanation of the drivers of e-waste and goes a long way to explain the growth in many developing countries (Garlapati, 2016).

The rest of this paper is organised into three sections. In the first section, a review of studies on exporting e-waste is presented. In the second section, the pillars of the integrated conceptual framework are set out. This is accompanied by an explication of the key features of the framework. The final section discusses the implications for governments and global business.

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2. Background literature

Electronic-waste or waste electrical and electronic equipment (WEEE) refers to end-of-life electrical and electronic equipment such as computers, printers, television sets and mobile phones in one market (Garlapati, 2016; Wong et al., 2007). It is associated with the disposal of old electrical and electronic equipment which has reached an end of their lifespans. It is worth noting that such products can have their lifespan extended as second-hand goods or repair and re-use by users in the same or another country (Amoyaw-Osei et al., 2011). The waste often contains toxic or hazardous materials such as flame retardants, arsenic, cadmium and polyvinyl chloride which can cause significant harm to human life if not properly treated and disposed of (United Nations, 2014). The unprotected exposure to waste can also cause food contamination, cancer and reproductive disorders (Lepawsky, 2015a). It is worth noting that some e-wastes can be recycled, repaired and re-used, or sold in an aftermarket (Amoyaw-Osei et al., 2011).

Exporting electronic waste refers to the processes of transporting e-waste from one country to another. The process entails partners such as originating and recipient countries, multinationals, handling agents and market intermediaries. Historically, the notion that used products are exported to countries in different stages of development can be traced as far back to the emergence of colonial rule and international trade. During the colonial era, it was not uncommon for the colonial masters to export or pass on used products to their servants or “subordinates” in other countries (Amankwah-Amoah, 2015).

During the early 2000s, many countries in the developing world mainly in Africa and Asia began to experience a surge of e-waste imports. At the outset, the potential for many of the poor in Africa and elsewhere to gain access to old technologies such as computers, cassette players, mobile phones, television sets and fridges meant that there was little resistance to the inflow of e-waste. Indeed, many countries in Africa which were “hungry for information technology but with a limited capacity to manufacture it” turned to such second-hand imports (Schmidt, 2006, p. A234). There are some sectors such as the appliance repair industry and second-hand traders that have flourished on the back of the growth of such waste (see Amoyaw-Osei et al., 2011 for a detailed overview). Over time, the demands for such products coupled with a lax regulatory environment fuelled the growth of e-waste imports, thereby making sub-Saharan Africa one of the leading destinations for obsolete electronic equipment (Schmidt, 2006; Lepawsky, 2015a, 2015b). Another factor that has contributed towards the growth of e-waste is limited governments' ability to collect and recycle new waste.

In recent years, around 80% of the electronic waste generated in the US is exported to developing countries in Africa and Asia, often with lax health and safety regulatory regimes (The Economist, 2014). Since the turn of this century, the growing number of products becoming obsolete in the developed world has contributed to the growth of e-waste in many developing countries (Lundgren, 2012). At the same time, the number of un-useable second-hand products ending up being dumped has surged and countries began to question their previous assumptions that e-waste can be good. In recent years, e-waste has surged to become a major problem facing many countries in both the developed and developing world, exemplified by the quote below:

“Of the e-waste in developed countries that is sent for recycling, 80% ends up being shipped (often illegally) to developing countries such as China, India, Ghana and Nigeria for recycling. Within the informal economy of such countries, it is recycled for its many valuable materials by recyclers using rudimentary techniques” (Lundgren, 2012, p. 9).

In recent years, governments around the globe have begun to re-enact new laws aimed at closing the gap that has allowed firms to export e-waste illegally. It must be noted that e-waste treatment in the developing world largely occurs in the informal section, where

workers are often untrained to contain the harmful elements (Orlins and Guan, 2015). Consequently, many workers in this area are often exposed to toxic substances (Asante et al., 2012; Orlins and Guan, 2015). Exporting to under-developed countries where workers use sub-standard equipment can increase this particular risk (Garlapati, 2016; Orlins and Guan, 2015).

A line of research has demonstrated that e-waste exporting is partly predicated on the existence of agents or market intermediaries who collect the waste for shipment (Puckett et al., 2002). By market intermediaries we are referring to third-party firms or “middlemen” who perform the function of facilitating the movement of goods and services (Peng and York, 2001). The unscrupulous market intermediaries known as “waste tourists” (Nordbrand, 2009) who have historically collected e-waste and illegally exported it to developing countries for profit, have also begun to see their role coming under greater scrutiny (Lundgren, 2012). Indeed, the WEE supply chain entails recyclers and brokers often operating in the highly unregulated market, lacking government certification schemes (Schmidt, 2006). As Lundgren (2012, p. 9) further observed:

“Recyclers and waste brokers are taking advantage of lower recycling costs in developing economies and at the same time avoiding disposal responsibilities at home ... up to 80% of all e-waste sent for recycling in developed countries ends up in informal e-waste recycling sites.”

As can be seen from Fig. 1, the market intermediaries are positioned as links between the originating and recipient countries.

3. Push and pull factors in exporting e-waste

The review of the literature uncovered two competing theoretical perspectives on exporting of e-waste i.e. the originating country hypothesis/push factors and recipient country hypothesis/pull factors.

3.1. The originating country hypothesis

The originating country hypothesis contends that it is rather the factors rooted in the source country which create conditions that allow firms and individuals to facilitate export of e-waste. Past studies have uncovered push factors such as high labour costs, high cost of recycling and stringent regulatory frameworks that compel firms to explore opportunities beyond their national borders to recycle or discard e-waste (UNEP, 2015; Lundgren, 2012; Nnorom and Osibanjo, 2008a). Another line of argument suggests that the intense competitive pressure on developed-country firms to reduce costs has forced some firms to seek to export e-waste to low-cost locations where they can recycle more cheaply (see Slade, 2006; Nnorom and Osibanjo, 2008a). It has been suggested that unwillingness of manufacturers to treat the waste of their products and lack of will on the part of some advanced economies to force firms to recycle all their waste, have opened an avenue for market intermediaries to export e-waste to developing countries where it can be disposed of cheaply. Another recent study by UNEP (2015) identified factors such as high costs of treating and disposing hazardous, weak regulatory enforcement regime and low environmental awareness as some of the primary drivers of e-waste exports from developed countries to developing countries.

A stream of research indicates that international treaties can play an influential role in the direction of e-waste flow (see Lepawsky, 2015a, 2015b; Souza, 2013; Lundgren, 2012). One of the main treaties in this area is the 1989 Basel Convention treaty, a global treaty which controls the export of hazardous waste around the world (Lepawsky, 2015a). It seeks to ban countries from exporting useless e-waste to poor countries as well as encourage e-waste recycling (Schmidt, 2006). Unfavourable conditions and stringent regulatory frameworks in the home country can compel multinationals to export e-waste (UNEP, 2015).

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