"SINGAPORE IS A GOLD MINE": RE-ORIENTING INTERNATIONAL FLOWS OF SECONDHAND ELECTRONICS

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by

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A thesis submitted to the

School of Graduate Studies

in partial fulfillment of the

requirements for the degree of

Master of Arts

Department of Geography

Memorial University of Newfoundland

June 2012

St. John's, Newfoundland

ABSTRACT

This thesis examines the processing and trading practices within the in/formal economy surrounding secondhand electronics in Singapore and its surrounding region by asking two main questions: *first,* it asks how the international trade networks for electronic waste are formed, organized and regulated by considering who and what are the actors enabling the trade; *second,* it considers to what extent il/legality or il/licitness is or is not a characteristic of these trading practices. This thesis builds on previous work demonstrating that there are no clear boundaries between the il/legal or the in/formal and evaluates the (in)effectiveness of legislative measures employed at varying levels of jurisdiction to regulate the trade in secondhand electronics. The Basel Convention is the international treaty that supposedly regulates the international trade and traffic in hazardous (including electronic) waste, yet there are several shortcomings in the Convention which leave room for exploitation. A key finding of this thesis is Singapore's role as a global *source* of secondhand electronics to developing regions, which contradicts the logic of mainstream publications criticizing e-waste flows to the developing world, and is a pattern not accounted for in the laws of the Basel Convention.

Key words: E-waste, Singapore, Basel Convention, legal geographies, informal economies, licit/illicit trade.

ACKNOWLEDGEMENTS

I am indebted to Dr. Josh Lepawsky of Memorial University for inviting me to partake in this SSHRC funded research project on mapping the global trade and traffic of secondhand electronics, as well as guiding and mentoring me throughout my degree program, and facilitating my professional development. Other professors at Memorial have also helped shape the perspectives reflected in my work through their courses and mentoring throughout the two years of my program, in particular: Dr. Arn Keeling whose mentoring and guidance throughout my program has been extremely valuable, both in helping shape the ideas and writing in my thesis, and in developing my own teaching and mentoring skills; Dr. Sharon Roseman of the Anthropology Department for her wisdom on ethnographic methods; and Dr. Dean Bavington of the Department of Geography for his general, but enthusiastic support in the final term of my program. Many friends and colleagues have also provided both research and moral support, in particular my fellow 'e-team' members Chris McNabb, Grace Akese, and Mostaem Billah, who helped guide me through this project and were always there to bounce ideas around with. Last, but certainly not least, I would like to express my gratitude to my parents for their unwavering support, without which I could not have even begun work on this thesis.

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LIST OF ABBREVIATIONS

ANT - Actor-Network Theory

ASEAN - Association of Southeast Asian Nations

BAN - Basel Action Network

CRT - Cathode Ray Tube (computer monitor)

DOE - Department of Environment (Government of Malaysia)

FIRE - Finance, Insurance and Real Estate industries

GeBIZ - Government Electronic Business website (Government of Singapore)

GVC/GCC - Global Value/Commodity Chain Analysis

MPA - Marine Protection Agency (Government of Singapore)

NEA - National Environmental Agency (Government of Singapore)

OECD - Organization for Economic Co-operation and Development

OEM - Original Equipment Manufacturer

PAP - People's Action Party (Singapore)

PSA - Port of Singapore Authority

PSO - Public Sector Organization

R2 - Responsible Recyclers

SIJORI - Singapore - Johor - Riau Growth Triangle

SGEM - Speak Good English Movement

TEU - Twenty-Foot Equivalent Unit

TRIPS - International Property Right Agreement

WEEE - Waste Electronic and Electrical Equipment Directive

CHAPTER 1: INTRODUCTION

Electronic devices such as cellular phones, portable media players, digital cameras and personal computers were not introduced until the late 1970s and early 1980s, with the pioneer brands being Sony, Motorola, Hewlett-Packard (HP) and International Business Machines (IBM) (Heeks 2008; Haire 2009). Yet, these devices did not begin proliferating exponentially until the late 1990s and early 2000s (Kutz 2006). By 2002, it was estimated that more than 500 million personal computers were in use and an astonishing one billion personal computers had been sold worldwide since the mid-1970s (Kanellos 2002). Likewise, there were a reported 1.1 billion mobile phone subscribers around the world in 2002 (Cellular News 2005). Consumer electronics enabled those who could afford the devices to have increased productivity and efficiency, in addition to a higher quality of life, as well as other benefits such as the ability to communicate instantaneously over long distances.

Yet, an alarming aspect of these figures is the rate at which electronics are being consumed and disposed of within the Western world.[1] For example, an estimated 135 million cell phones and 31 million computers were disposed of in the United States in 2010, and this figure is rapidly growing (EPA 2011). This practice of discarding often state-of-the-art technological objects, which are composed of valuable metals and materials, needs to be learned through the 'enacting' of electronics as disposable and as waste (Mol 2002). Once disposed of, these electronics either enter the waste stream (either recycling or incineration), or are traded overseas for purposes of reuse. Though

[1] By rate, here, I mean both the *amount* of electronic devices per household (which is always growing) and the *duration* after which they are replaced (which is always decreasing).

disposal of electronic devices into landfills is of course a critical concern, this thesis is more focused on the trade of these materials overseas.

According to claims by activist groups, an estimated 50 to 80 percent of the e-waste designated for domestic recycling in Western countries exported overseas for informal processing under hazardous conditions by poor and marginalized populations in 'developing' countries, as illustrated in the map in figure 1.1, below (BAN 2002; CISC 2008; Greenpeace International 2009). In order to keep Western countries accountable for the proper disposal of the electronic (and other hazardous) waste generated within their borders, the Basel Convention (on the Control of Transboundary Movements of Hazardous Wastes and their Disposal), was implemented in 1992, and aims to ban the illegal dumping of hazardous wastes in developing nations by parties from developed countries. The Basel Convention has 175 member states to date, and seeks to create uniformity amongst these states in terms of global environmental standards (Moen 2008).

However, the nature of the trade in e-waste has shifted substantially since the Basel Convention was implemented, which presents numerous problems for its continued effectiveness. For instance, Widmer et al. (2005) have shown that the Convention has been successful in reducing the export of e-waste for final disposal, but, because of different levels of affluence within the world's developing regions, there has been an increase in the export of electronics for reuse and recycling (see Shinkuma and Huong 2009). Moreover, Yu et al. (2010a) have calculated that most of the world's e-waste will be produced in the developing world by no later than 2015 (see figure 1.2 below). As Yu et al. (and others) have observed, increasingly the rapidly developing countries like China

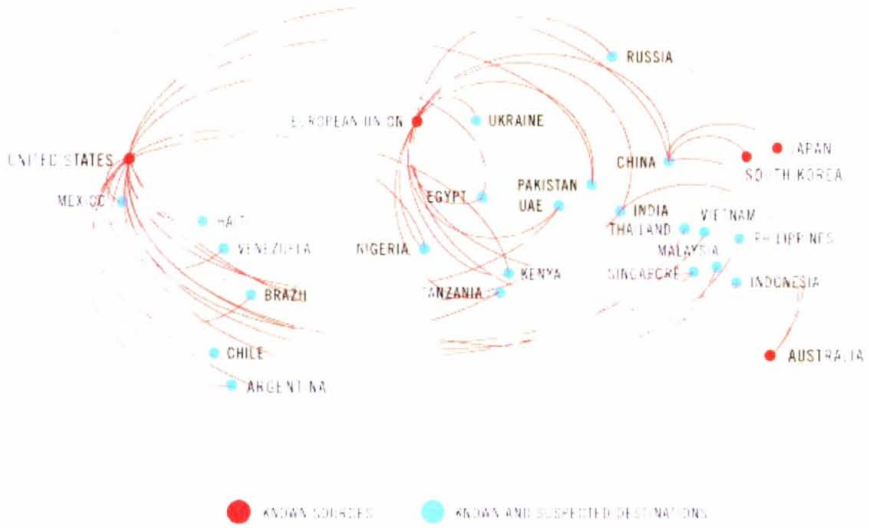

Figure 1.1 - E-waste 'sources' and 'destinations', according to popular representations. Source: GOOD Worldwide (2012).

and India now generate and trade nearly half of the world's secondhand electronics, which marks a distinct shift in the trade flows of secondhand electronics (Lepawsky and McNabb 2010; Lepawsky and Billah 2011; UNEP 2009; Williams et al. 2008; Yu et al. 2010a).

Yet, some activist non-governmental organizations (NGOs) and other interest groups, most notably the Basel Action Network (BAN) and Greenpeace, have been lobbying for the adoption of a Basel Ban Amendment, which would ban *any* exports of secondhand electronics to developing countries, even those for the purposes of refurbishing and/or reuse (which is permitted by the Basel Convention for shipments with the appropriate documentation). While this Amendment has not yet been ratified, it is considered morally binding by the governments who have agreed to it thus far, and has

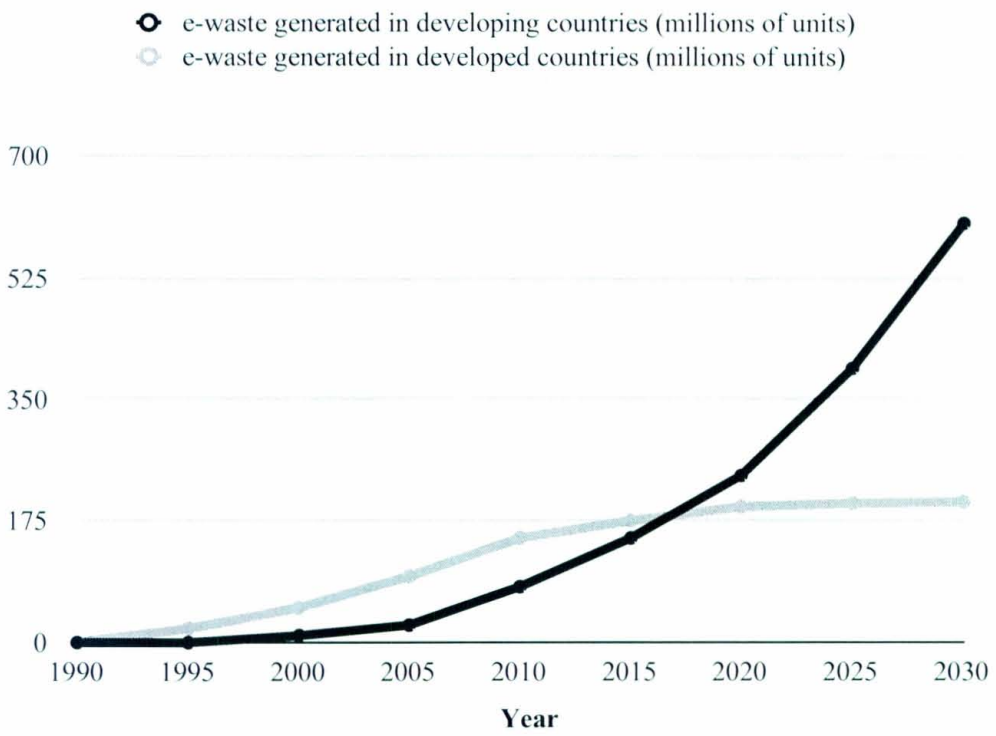

Figure 1.2 - e-waste generated in developed vs. developing countries, 1990-2030 (projected). Adapted from: *Yu et al. 2010a*

thus worked its way into the national legislation in many of these countries (Basel Secretariat 2012).[2] The assumptions driving these policies are primarily the following: that the improper disposal of electronics is an environmental hazard and should be banned; that the informal (read: 'primitive') recycling of computers and other electronics should be stopped by banning exports from the developed to the developing world (where this type of processing is thought to be more common); and that the industrial recycling of precious metals in electronics should be increased (Kahhat and Williams 20009).

[2] The countries referred to here (within the Asian region) include Bangladesh, China, Indonesia, Malaysia, and India

These assumptions are often portrayed by reports in the Western media and NGO press releases which use images like that in figure 1.3 (above) to evoke particular

Figure 1.3 - Child waste processor in Guiyu, home of China's most infamous e-waste dump. *Photo credit: BAN (2005).*

emotions in Western audiences. In 2002, the Basel Action Network (BAN) report *Exporting Harm* was among the first reports in the e-waste literature to shed light on an international division of labour in the processing of e-waste that puts people and places at high risk of contamination from the toxic substances found in E-waste. This report has been followed by a series of other NGO publications, and reports in the popular press documenting the tendency of Western corporations to dump their e-waste in developing countries (e.g. BAN 2005; Bodeen 2007; CBC 2008; CBS 2009). While these messages do have value, and have been important in reducing illegal dumping of waste in the world's developing regions, one problem with these popular accounts, is that while e-

waste may indeed be considered 'waste' in Western contexts, the same material actually comes to have considerable value in other contexts (Lepawsky and McNabb 2010; Kahhat and Williams 2010).[3] Moreover, as Shinkuma and Huong (2009) note, the reuse and recycling of materials in the worlds developing regions is essential for the effective utilization of resources. Thus by banning the trade in secondhand electronics to the developing world outright, it consequently takes away a significant source of livelihood, and affordable source of electronics for a majority of the world's population (see, e.g. Widmer et al. 2005).

1.1 - Research Questions, aims and objectives

This research project is a (necessarily) partial and situated inquiry connected to an ongoing investigation into mapping the international trade and traffic of electronic waste. Preliminary research and findings from this project suggest that jurisdiction is a key issue in the formation and organization of these trade and traffic networks (Lepawsky 2012). Furthermore, it has been shown that specific jurisdictions such as Singapore play a particularly important role in these trade and traffic networks for a variety of reasons that I will discuss in detail throughout this thesis (Lepawsky and Billah 2011). Singapore represents a crucial problem because it is not only a major trans-shipment and warehousing hub for the Asia Pacific region, but it is also generates substantial electronic waste from its domestic households and businesses. As one Bangladeshi electronics trader

[3] This point is well recognized by many of the informants that I spoke to in the field, who noted that such reports have played a key role in instigating the establishment of international recycling standards, like E-Stewards or R2 in the United States, and waste dumping laws (like the Basel Convention). See Lepawsky (2012); Kahhat and Williams (2009); and Widmer et al. (2005) for a brief description of these standards.

interviewed in a recent paper on secondhand electronics trading networks in Bangladesh put it: "Singapore is a gold mine," which refers to the large volume of secondhand electronics generated in the country (Lepawsky and Billah 2011, 129). What makes the trading practices taking place in Singapore significant is the ways in which they intersect with trans-local trade flows and practices at various connected sites. This thesis tells a story of how the trade in secondhand electronics in Singapore is formed, organized, and regulated, and what the effects of these ordering practices are (Law 1994). The attention to state, territory and jurisdiction in this thesis is due to the recognition that national regimes of regulation (such as those governing 'e-waste') continue to create a pattern of 'bounded regions', and "that there are often qualititative disjunctures between different regulatory and socio-cultural environments" (Dicken et al. 2001, 96). Moreover, Dicken et al. (ibid) point out that a post-structural, networked approach, as adopted in this thesis, should consider international governance structures and institutional frameworks.

This thesis investigates two main questions: first, what is the role of Singapore, as a jurisdiction, in the formation, organization, and regulation of international trade networks in electronic waste?; and second, what is the extent to which il/licit practices are or are not involved in these networks.[4] The first question deals with questions around networks of e-waste trade and traffic in Singapore; while the second is influenced by the substantive work on il/licit and in/formal economies which attempts to break down the artificial and seemingly arbitrary dividing lines between different forms of economic

[4] Nordstrom (2012) uses stylistics such as 'in/formal' and 'il/licit' to refer to those economic activities which do not fit neatly in to one or the other classification. Because I am trying to capture the grey areas in these practices, I have adopted Nordstrom's stylistics here. For instance, some 'ilicit' practices might include those which are either unregulated, 'under the table', or unethical.

activity. Though I will not be contributing any substantive theoretical knowledge to this wide body of scholarship on il/licit and in/formal economies, my aim is to put this literature in conversation with both scholarly and popular writing on e-waste, which seemingly overlooks the many connections between in/formal and il/licit practices amongst electronics recyclers and traders.

Because of the mobility of the materials and traders informing this thesis, I have necessarily engaged in primary data collection using multi-sited and follow-the-thing ethnographic methods,[5] in which the researcher follows the phenomena under study to wherever it goes (see Crang and Cook 2007).[6] Though my research was originally focused within Singapore's political boundaries, leads uncovered during my fieldwork lead me to the neighboring regions of Penang and Kuala Lumpur (KL), Malaysia, and the Indonesian island of Batam. Upon visiting these sites, it was learned that there are distinctive characteristics of the trade in secondhand electronics in these regions, and that they are highly connected to Singapore in the trade of secondhand electronics.

There has been some attention in the e-waste literature to the emergence of regional trading networks for secondhand electronics within the developing world, such as those between the United States and Peru (Kahhat and Williams 2009), Ghana and other parts of Africa (Nnorom and Osibanjo 2008; Grant and Oteng 2012), and China and

[5] This specific type of methodology will be elaborated on in the literature review for this thesis, which is found in chapter two.

[6] With that said, however, I also had to bound my fieldwork in a realistic and practical manner. With the nature of my fieldwork, it would be unrealistic - and perhaps impossible - for me to literally follow the objects and practices I am interested in wherever they lead me. Though I witnessed many connections to sites in several other regions during my fieldwork, such as Western Africa, and other parts of Southeast Asia, I could only travel as far as my research funds would allow.

Japan (Shinkuma and Huong 2009). There have also been studies characterizing the domestic markets for secondhand electronics in developing countries, such as Bangladesh (Lepawsky and Billah 2011), Ghana (Amoyaw-Osei 2011) Malaysia (Minter 2011a; Tengku-Hamzah 2011) and China (Minter 2011d). Yet to date, there has been no scholarly writing on the trade of secondhand electronics in Singapore, which is a gap I aim to address here

Moreover, the role of jurisdictions like Singapore manifest shortcomings in current international e-waste policy, namely the United Nations (UN) Basel Convention, which ban the export of hazardous waste from 'developed' to 'developing' countries. The Basel Convention defines 'developed countries' as Annex VII states (EU, OECD, and Liechtenstein) and 'developing' countries as non-Annex VII states (all other signatories, including Singapore). While the Basel Convention prohibits trade in hazardous waste from developed to developing countries, it permits such trade between developing countries, where there are often large disparities in income. For example, according to the International Monetary Fund (IMF), Singapore's (2011) gross domestic product (GDP) per capita is $50,714, which is the 11th highest in the world, and higher than that of the United States (IMF 2012). Yet, as a 'developing' country, Singapore is exempted from the regulations imposed on other wealthy Organization for Economic Co-operation and Developmetn (OECD) nations, and is consequently permitted to dispose much of its e-waste in the many other developing countries in its surrounding region.

Furthermore, Lepawsky and McNabb (2010) have recently argued that there is significant trade in e-waste taking place within and between the world's developing

regions, which is accounting for an increasing amount of the total trade volume of e-waste in the region. Therefore, international trade flows of secondhand electronics cannot be characterized as simply inter-regional (i.e. 'North'-'South'), as portrayed in the Basel Convention. So, what the Basel Convention imagines as 'the developing world' is actually not a monolithic bloc of countries. However, treating this diverse region as one homogeneous entity belies any efforts that could be made to improve the effectiveness of e-waste regulations there and ignores the complexity of the differing e-waste legislation amongst the different countries.

The legal geography and legal studies of jurisdiction is important for the work in this thesis because, as Valverde (2009) argues, jurisdiction distinguishes more than territories and authorities (the 'where' and the 'who' of governance), but also the 'what' and 'how' of governance. Valverde explains how an object of governance (i.e. 'e-waste') is defined in turn dictates how it will he governed. This is why the terms used to describe 'e-waste' in this thesis are so important. If defined as e-waste, then it is banned from being traded to developing countries through the Basel Convention, yet, if defined as secondhand (presumably functional) electronics, then it is allowed to be traded to developing countries for purposes of reuse.

Moreover, it has been shown by both Valverde (2009) and Lepawsky (2012), that jurisdictions are not simply homogeneous, monolithic blocks of unified laws (c.f. Ford 1999), but rather consist of a patchwork of jurisdictions taken from different locales (at different scales). For instance, as shown in chapter four, the national e-waste legislation in Indonesia and Malaysia incorporate pieces of legislation from international laws such as

the Basel Convention, other nations in the region, as well as U.S. states that have passed e-waste laws, such as California (see also Boon 2005; Drayton 2007; Konoval 2006; Maxianova 2008; Shinkuma and Huong 2009). It is because of this patchwork of laws, and the fact that Singapore represents key contradictions in the Basel Convention, in addition to the particularities of Singapore's economic, political, geographical, historical and legal environment, that it functions as a hub for the (trans)shipment of secondhand electronics between Western countries (such as the U.S. and EU member states) and other developing countries in Asia and Africa. These issues will be discussed throughout this thesis, and particularly in chapter four, where I attempt to tease out the inseparability of licit/illicit forms of trade in relation to the secondhand electronics industry.

As I argue in this thesis, the global trade in secondhand electronics is more complex than is portrayed in the Basel Convention (and the proposed Basel Ban Amendment), which does not accurately address the way that secondhand electronics flow across international borders. The Basel Convention, and national legislation governing the trade in e-waste imagines the trade to flow as is portrayed in figure 1.4,which is a map produced by several NGOs including BAN, Greenpeace, and the Silicon Valley Toxics Coalition. Interestingly for this thesis, the map identifies Singapore as an important trans-shipment hub, where 'e-waste' is received from Europe, North America, and dispatched to other countries in Asia such as China, India, and Pakistan, which are labeled as 'main e-waste recycling countries'. Though it is true that Singapore is a major trans-shipment hub, as my findings show, this is not its only role, nor does it

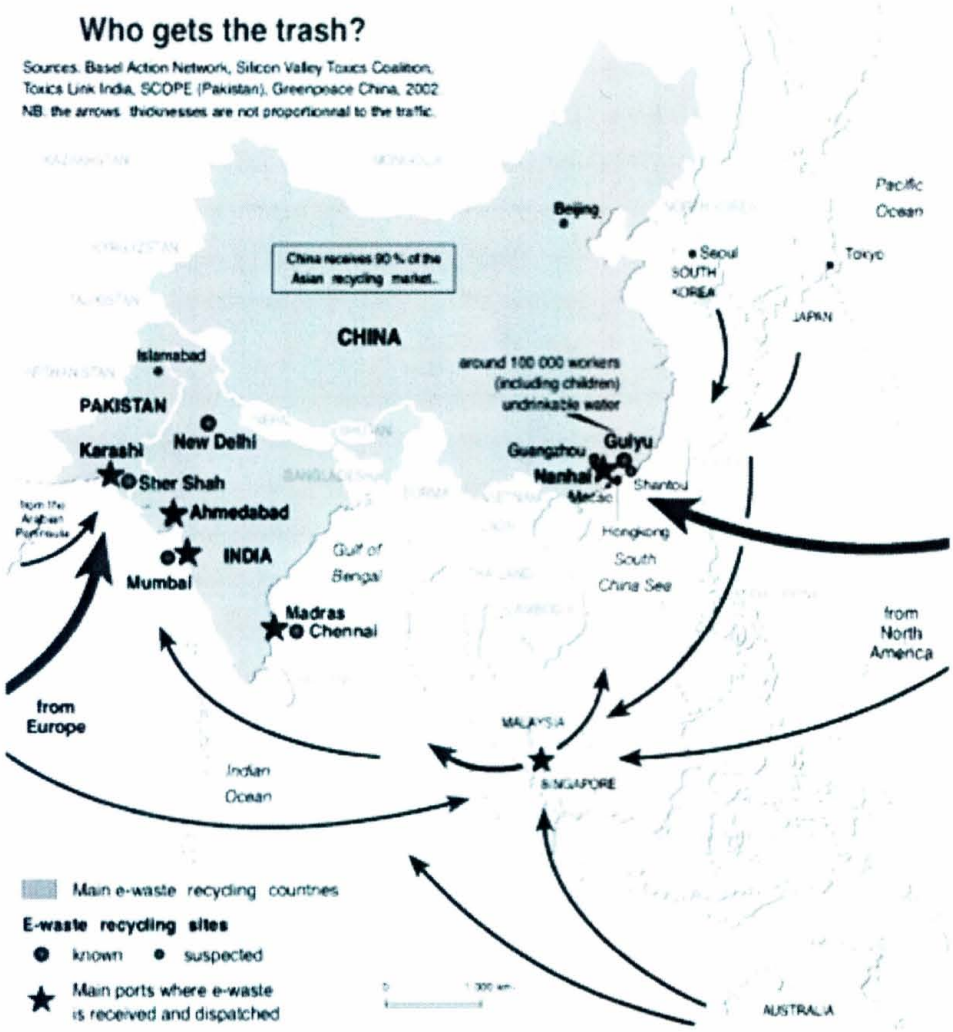

Figure 1.4 - Simplified trade diagram showing 'e-waste' flows in the Asian region. Source: Widmer (2005).

send 'e-waste' to just China, India, and Pakistan. Rather, it is a significant source on its own, and it conducts trade in secondhand electronics with most other countries in the South(east) Asian region. For instance, both Singapore and Malaysia have mobile phone penetration rates of 100% or more, and consumers replace their phones on average every 7-16 months, which means that there are an abundance of secondhand phones being

generated in the region (Ng 2010, DOWA 2007).[7] Moreover, as other writers have documented, Asian countries like India (Streicher-Porte et al. 2005), Malaysia (Minter 2011a), China (Hicks et al. 2005; Shinkuma and Huong 2009) and Thailand (Kunacheva 2006) also have thriving secondhand electronics industries and industrial recycling facilities.

In the next section, I will introduce Singapore's geographical, historical and political-economic context. The use of context to position my research sites here is in line with the unique theoretical approach that I have taken in this thesis, in which I bring together Latourian actor-network theory (ANT) with a post-structural reading of Marxism. According to Latour (2005) social context cannot *in advance* be used as a resource for explanation, nor should it be used to frame the research. But, as Dicken et al. (2001) have pointed out, economic networks must be recognized as having distinctive time-space specificities that affect their operation. In addition, other Marxist thinkers such as Ben Fine (2005, 93) have argued that it is important to pay attention to specificities that allow and justify the positing of *particular* forms of economic relationships. Moreover, as demonstrated by Marx in *The Poverty of Philosophy*, the social relations of certain economic activities cannot be described as 'natural' or 'eternal' but rather as 'historical products' that are reproduced (Marx 1979).

So, in order to determine what the relevant contextual factors are, I asked all of my respondents in the field "why have you established your business in Singapore?" and

[7] Note: any estimations of obsolescence, or 'refresh' time for electronics is highly contextual, even within the same country, so this 7-16 month figure is only a rough estimation.

"why is Singapore such a key hub for the global trade of used electronics?". One Indian electronics trader based in Little India, who I refer to here as Shaja, offered the most elaborate discussion on these issues, so his responses are summarized here in an attempt to get across the key factors positioning Singapore as a key site in the global trade and traffic of electronic waste.[8] This context is crucial for understanding how Singapore has become an important trans-shipment point for the international trade in secondhand electronics. However, in staying true to the tenets of ANT, I have not determined in advance, or in place of my interviewees, what aspects of Singapore's history are relevant, and which are not. Rather, I recognize that actors are "always engaged in the business of mapping the 'social context' in which they are placed" and can thus help researchers such as myself to interpret it (Latour 2005, 32). I have also incorporated a discussion of Penang, KL, and Batam, the two other sites visited in my fieldwork, introducing the localities, and briefly reviewing relevant aspects of their geographic, historic and political-economic background to situate them within this research, and demonstrate how they are connected to Singapore.

1.2 - Positioning Singapore, Penang, KL and Batam: Connected sites in the trade and traffic of secondhand electronics

Hail, Mother! East and West must seek my aid
Ere the spent gear may dare the ports afar.
The second doorway of the wide world's trade
Is mine to loose or bar.

[8] Note: Except in cases where individuals have explicitly requested to have their real name or company name used, the privacy of all informants that I refer to in this thesis is protected through the use of pseudonyms.

1.2.1 - *Geographical location:*

Geographically speaking, Singapore is strategically positioned on the busy Strait of Malacca, one of the busiest shipping channels in the world. Singapore is at the intersection of several sea-trade routes: from Europe and India to the West; China, Japan, Indochina and Thailand to the north; Borneo and the Moluccas to the east; and from Java and Australasia to the south.[9] Because of the historic confluence of sea-trade routes, as well as the political-economic history of the region, Singapore has become a gateway to Southeast Asia for both air and sea-based transport. This geographical importance was expressed by Rudyard Kipling in his short poem about Singapore, quoted above. The city-state is now considered to be the heart of Southeast Asia, acting as a transit city connecting smaller regional cities to cities in North America, Europe, and Africa. It is also, as a consequence, relatively cheap to ship and fly to. The Port of Singapore Authority (PSA) boasts that Singapore has direct sailings to every major port in the world, and 600 ports globally (PSA 2011). Shaja was also quick to point out that Singapore has direct air connections to all countries in East and South Asia, as well as hub cities like Dubai, Sydney, and London. "Unlike many other cities in Southeast Asia, where to get to London you have to connect in Dubai or Abu Dhabi" he told me, "Singapore Airlines flies there direct". Though he also noted that this strong

[9] To a lesser extent, Penang and Malacca benefitted from this strategic geographical positioning as well, but were disadvantaged by their location further up the Malay peninsula, which was not visited as frequently by Bugis traders from Borneo the Celebes (now Indonesia) (Chew and Lee 1991, 43).

connectedness is not new, he added "throughout history, people have been trading here because it is so centrally located".

However, these factors alone - especially Singapore's geographic location - are not entirely responsible for making the island a global hub port. After all, it would have made just as much sense geographically to make one of Singapore's neighboring islands such as Batam into a major international shipping hub. Rather, it is the many connected historical events (which are largely beyond the scope of this introduction) that have accounted for Singapore's extensive transport infrastructure. For example, in 1819, in an effort to keep the vital shipping lanes through then Dutch-controlled Southeast Asia open, British statesman Stamford Raffles, widely regarded as the founder of modern Singapore, was commissioned with the task of securing "the establishment of a station beyond Malacca, such as may command the southern entrance of those Straits" (Chew and Lee 1991, 29). Originally, Raffles and his superiors were targeting the Riau Islands, but did not find these islands - or any other in the immediate region - suitable for their needs. Raffles then landed in (what is today) Singapore and, after an assessment of the merits of the island for establishing a trading port and naval base, founded the British Settlement there. After this point, and upon securing the appropriate land rights, Singapore became a major British rival against the monopolistic Dutch trading practices in South East Asia, and eventually developed into a major center of international trade for the British Empire in Eastern Asia (Chew and Lee 1991, 371). Therefore, as Chew and Lee assert, Singapore was chosen as the focal point of the British Empire in Southeast Asia, "not by design but rather by happenstance" (1991, 29).

1.2.2 - *Singapore's business friendly environment*

Shaja attributed Singapore's success in attracting the amount of foreign traders as it does, and in the development of its port, to its 'business friendly' environment, envisioned and developed by the entrepreneurial state government, the People's Action Party (PAP). The PAP has been in power since Singapore became a self-governing territory in 1959 and which has dominated Singapore's parliament since the 1963 merger and subsequent split with the Malaysian Federation. Shaja pointed to Singapore's relative level of government stability and trustworthiness as a key factor in creating Singapore's business friendly image. He emphasized that the current government is stable, and has been for the past 45 years, in part because of the dominant PAP government, and leader Lee Kwan Yew (LKY)'s strong vision. Through Singapore's role as a strategically located and business friendly trade hub, it has become "the major distributor in the world for used electronics", Shaja asserted. He went on to say that the country's famously strict laws also make it a trustable business environment, "everything is regulated so it makes it a good environment to do business in".

Another legacy of LKY's regime is Singapore's continued status as a free port. Because of this policy, Singapore continues to be one of the busiest container ports in the world, as it is more economical to trade through the city-state than neighboring countries where duty would have to be paid on all cargo passing through. To be specific, the PSA has calculated that Singapore port terminals handled 29.37 million twenty-foot equivalent units (TEUs) of containers in 2011, which puts it second in the world in terms of volume,

close behind Shanghai, China.[10] According to Chew and Lee (1991), Singapore was historically a free port, and the first one in Asia, so Singapore's continued status as a major transshipment hub can in part be traced back to this incentive.

Singapore's trans-shipment role has also been historically important for circumventing the monopoly that the British East India Company (EIC) had on trade with China until 1833. Though the Dutch EIC had a monopoly on trade in the Southeast Asian region until the early 19th century, the British EIC controlled trade with China. Before trade with China opened up, direct trade between Britain and China could only be conducted by the EIC, but other traders could evade this regulation by using Singapore as a transshipment point (Chew and Lee 1991). The significance of this example for my research is that it shows Singapore's role in grey trading practices spans as far back as the early 19th century. As Britain extended its trading ports throughout East Asia region and worldwide in the late 19th century, Singapore became an important hub for imperial trade.

An additional factor that Shaja regards as instrumental to Singapore's role as an important trans-shipment hub is the language spoken in the country. Though Singapore has four official languages, the dominant language used for education, in business and by the government is English. The PAP recognized in the early 1970s that because of Singapore's culturally diverse population and its four official languages, the nation needed a common language to tie its citizens together (SGEM 2012). English was decided upon because it is the international language of business, and would be able to attract

[10] The TEU is a measurement of cargo capacity used to describe the capacity of container ships and port terminals. It is equivalent to 1,360 cu ft, or 38.5 m^3

foreign business to the nation, while also making Singaporeans more employable on the global market. However, by the 1990s, Singaporeans had developed a unique local dialect of English known as 'Singlish' because of the different linguistic influences in Singapore. To combat this, the government thus embarked on a rigorous 'Speak Good English Movement' in 2000, which encouraged Singaporeans to use standard English in educational and business settings (ibid). The result has been that, with a nation of people speaking fluent English, traders from across the world can go to Singapore and communicate with the locals. This makes communication easy and efficient, which is essential for the shipping industry, which is defined by its need for speed and efficiency. "This is unlike other parts of Asia, even Hong Kong, where people don't speak English as well, because they don't learn it in school" Shaja explained.[11]

The next section on Penang, KL and Batam, will demonstrate the strong integration between the population and economy of these three regions. One of my respondents from Penang offered a brief overview of the history of electronics recycling in the state, which I will share in this section to familiarize readers with the state of electronics recycling in the region. Moreover, I intend to shed some light on how Penang and the other sites included in this research have become established as important sites connected to Singapore's role as a key node in the global trade and traffic of secondhand electronics.

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[11] Though Hong Kong is a former British Colony, K-12 education in Hong Kong is in Cantonese, while most post-secondary institutions teach in English. Therefore, most highly educated Hong Kong Chinese are bilingual, but those who do not enroll in post-secondary education are typically do not develop strong English-language skills.

1.2.3 - Penang and Kuala Lumpur

Penang, 700km north of Singapore, has been dubbed 'Silicon Island', as it is the electronics center of Malaysia (Bunnell 2004, 58).[12] Historically, because of its geographic location and free port status, Penang was a dominant port in Peninsular Malaysia, and its economy was based primarily on trade (Yeang 1995, 131). However, Yeang notes that Penang began suffering from locational disadvantages after Singapore became the dominant port of the region in 1832. During the post-colonial independence period, Penang began to decline even further, especially after the Malaysian government withdrew Penang's free port status in 1969, leaving Singapore as the only remaining free port in Southeast Asia. Furthermore, Penang is located in a peripheral region with respect to Malaysia's primate and former capital city, Kuala Lumpur, as well as the current administrative regions of Putrajaya and Cyberjaya. With the development of these cities, Penang lost its status as the most important distributing center in Malaysia for imported commodities.

Over the twenty-year time span from 1970-1990, the Malaysian government actively transformed Penang into a high-tech manufacturing region, so much so that the IT sector became the main locomotive of Penang's growth (Koon 1995). Penang then developed its 'Silicon Island' reputation in the 1990s, because of the importance that the IT industry had developed in relation to Penang's economy. Fung, the director of an

[12] The name 'Penang' refers to both the Malaysian State and its constituent island of Penang, as well as the (state capital) city on Penang Island, which is also known as Georgetown. The state of Penang extends across the Strait of Melacca to Seberang Perai on Peninsular Malaysia, where the city of Butterworth is located. Butterworth is where the majority of Penang's electronics recyclers and refurbishers are located, and hence where my fieldwork took place.

electronics refurbishing company in Penang, mentioned that the first electronics firm to be established in Penang was the processor manufacturer AMD, which paved the way for dozens of other companies like Sony, Dell and Intel. She went on to tell me that this high level of electronics manufacturing in the state then prompted the need for a large electronics recycling industry there as well. In fact, the development of Penang's electronics recycling industry has been so strong that the state has now become a major center for scrap recycling in Southeast Asia (Minter 2011a).

1.2.4 Batam

Palau Batam, located 21 kilometers south of Singapore, or 30 minutes by passenger ferry, forms part of the Indonesia-Malaysia-Singapore (SIJORI) Growth Triangle, linking Singapore with Indonesia's Riau Islands and the Malaysian state of Johor. Singapore's regionalization scheme in the 1980s saw the potential for the combination of Singaporean capital and expertise with the cheap labor and land found in Johor and Batam Island. These regions could be used as Singapore's 'rural hinterland' which would provide labor to feed Singapore's emerging service economy. Batam and its neighboring island of Bintan were sparsely populated until the establishment of SIJORI in 1989, after which the islands received large influxes of migrants from other parts of Indonesia (Grundy-Warr et al. 1999). In 1979, the Batam Industrial Development Authority (BIDA), the island's planning organization led by Indonesia's then Minister of Industry, announced the government's Master Plan to transform Batam into an advanced and modern global city and trading hub to rival Singapore (Hill 1996, 156).

However, the reality of life on Batam has been quite different. By 1989, the population of Batam had actually *declined* to a mere 11,000, which sparked the partnership with Singapore, and the formation of the growth triangle (ibid). This partnership helped Batam's industrialization and development get off the ground, as the island's population reached over 460,000 just 11 years later in 2000 (BIDA 2000). This growth owed to the transformation of Batam into a trading center and port, as well as the establishment of numerous electronics manufacturing factories such as Batamindo (Grundy-Warr et al. 1999; Lindquist et al. 2005).

The past two sections, have reviewed the key factors contributing to Singapore's emergence as an important international trans-shipment hub. These points were identified by a trader involved in the trade that spoken to over the course of my fieldwork. I have also briefly discussed the political-economic backgrounds of Penang and Batam as they are relevant to this thesis, because I found them to be sites that were connected to the trade in secondhand electronics in Singapore. Singapore's role as a hub city for international trade is crucial to my thesis, because it is what enables the il/licit flows of secondhand electronics to pass through the city state and shapes the global trade in important ways. Three key aspects are important here: first, its strategic geographical location; second, the business friendly trading policies in the nation; and third, the PAP government's long term stability and strict regulation of economic activities.

The political-economic background of Penang and Batam is important because they underscore how the islands are so deeply connected to Singapore's economy, and to

the city-state's role in the global trade of secondhand electronics. However, to get a more complete picture of where Singapore's secondhand electronics go upon initial disposal, how they are traded, and how Penang and Batam fit into this, it is necessary to assemble the trade and recycling networks that handle the flows of rubbish electronics in these regions. This will be done in chapters three and four, where I will examine the relations and tensions amongst the various actors in the industry, and how they influence the trade in secondhand electronics.

1.3 Defining 'electronic waste'

Throughout the many months spent conducting fieldwork and writing this thesis, I have struggled with the use of the term 'electronic waste' as a name for the materials which I am studying. It is perhaps the most widely used term, at least within Western contexts and much academic writing on the topic (for exceptions see Lepawsky and Billah 2011, Lepawsky and Mather 2012). However, the term e-waste is very much resented by some individuals who make their livelihoods by capturing the significant value contained in secondhand electronic devices. Chris McNabb (forthcoming, n.p.) conveys this meaning when he writes "while *electronic scrap* frames waste from electronics as a source of opportunity and potential recovery of value, *electronic waste* views this same material as disposable electronic gadgetry, and this disposable gadgetry becomes problematic when it is improperly handled as waste". The problem with the term e-waste, is that it misleads people into thinking that this material is in fact a waste, when it is actually an important and sometimes (in the case of the rare earth metals contained in electronic components) strategic resource (see Kahat and Williams 2009; Lepawsky and

McNabb 2010; Lepawsky and Billah 2011; Lepawsky and Mather 2012; Minter 2011a; 2011c). For instance, one printed circuit board (PCB) might fetch about $1.53 in scrap or reuse markets (Lepawsky and Billah 2011), which can be a strong source of income for dealers of secondhand electronics. In other words, 'e-waste' is an asset that should be valued rather than wasted.

Nonetheless, these devices are often discarded as waste in Western contexts, as many people either do not understand, or lack the material resources needed to realize the significant value embedded in them. Yet, as these devices travel overseas, they are revalued and remade into commodities. This trade occurs because the value in secondhand electronics is transient, and changes from one geographic context to another (Lepawsky and McNabb 2010; Thompson 1989; Yu et al. 2010a) For example, figure 1.5 shows some used electronics for sale at a flea market on Sungei Road near Singapore's Little India. In a Western context, these particular objects would probably be considered waste, but in this context they actually have immediate, realizable value. Therefore, in what follows, I have used various terms such as used or secondhand electronics, and electronic waste differently, depending on the context in which I am using the term, and how my correspondents in the field referred to the material.

This research practice of allowing research subjects to define and conceptualize for themselves the materials being studied is an important one. If I were to define the thing being studied as 'e-waste', then that would be to enact it as waste and give it a predetermined identity (Barnes 2008). As Lepawsky and Mather point out: "rather than following things assumed to have an essential ontology as this or that type of thing, we

Figure 1.5 - Waste or value? Secondhand electronics (and other items) for sale near Singapore's Little India. *Photo by author.*

need to think in terms of distributed and transitory ontologies that are effects of intermingled material affordances and practices" (2011, 6). In other words, we need to examine how the thing that we are following changes its ontological status as it moves from place to place depending on how it is enacted into being.

1.4 Methods

Recent trade publications, activist reports, and existing academic work on e-waste has focused on quantitative approaches to studying the emerging 'e-waste crisis' (Basel Action Network 2002; Kahhat and Williams 2009; Yu et al. 2010b; Lepawsky and McNabb 2010). However, the international trade in secondhand electronics is shadowed by substantial trafficking in exports that occur in a legal grey zone where formal data gathering is limited, if it exists at all (CISC 2008; Lepawsky and McNabb 2010). Because of this lack of publicly available data existing on trading practices in the secondhand

electronics industry, quantitative studies will not be useful to answer my research questions. Therefore, I argue that a more qualitative and embodied methodological approach, such as ethnography, is needed for the study of secondhand electronics. Ethnographic methods are a powerful tool because they allow me to collect stories from those directly involved in the trade and use them to report how the secondhand electronics industry is composed in Singapore and its connected sites. Research conducted to date on the international trade and traffic of various commodities shows that, though considered to be illicit, these operations are not hidden in Southeast Asia, and are thus possible to be studied through ethnographic approaches (Scheper-Hughes 2004, Lepawsky and Billah 2011).

This thesis thus builds on existing qualitative, ethnographic studies on secondhand electronics, and adds a new geographic dimension to this small but growing body of work (Kahhat and Williams 2009; Lepawsky and Billah 2011; Tengku-Hamzah 2011) I also adopt Kristin Peterson's (2010) analytical sensibility of 'phantom epistemologies', which is a way of studying parts of the economy in which concrete data is elusive. Peterson uses the term 'phantom' here specifically because her particular ethnographic approach refers: "to empirical elusiveness, unspoken common sense, a politics of (in)commensurability, and how the presence of any "ghost" becomes viewable to those who believe" (peterson 2010, 38). As I will discuss further throughout this thesis, the data that I received from my participants was often conflicting, highly contested, pertaining to the in/formal (or

'shadow economy'), or only available 'off the record',[13] and Peterson's phantom epistemologies allowed me to better make sense of this information.[14]

Peterson's approach draws on the work of Carolyn Nordstrom (2004) and her work on 'shadow' political economies that are liminal, hidden, or unaccounted for; as well as Nancy Scheper-Hughes' 'demography without numbers', which attempts to demonstrate what gets missed or passed over in conventional quantitative research on global economic activities and trading patterns (Scheper Hughes 2004). The work of Nordstrom and Scheper-Hughes has been an inspiration for me methodologically because it involves following commodities and trading patterns that would be difficult to account for using other approaches more conventional to the social sciences. Moreover, their multi-sited ethnographic approaches have been essential to this research and have helped to theorize and make sense of the nature of the trading practices that I studied.

The ethnographic research in this thesis was conducted using non-participant observation and semi-structured interviews. Interviews were conducted with 26 different individuals involved in the management and trade of secondhand electronics in and through Singapore. Therefore, I do not claim to have representative, or comparable, data, but the nature of my ethnographic approach has provided key insights into the processes through which electronic waste moves in the region, and contributes new knowledge to how these trading networks operate in the region. This information is presented according

[13] Note: Any material in this thesis which was gleaned 'off the record' has been included without attributing the material to any identifiable individual (e.g. without the use of a name or by using pseudonyms).

[14] See the introduction to chapter four for more on phantom epistemologies and how/why they are used in this thesis.

to the experiences of key informants such as local and foreign electronics traders in Singapore, the regulatory authorities, local electronics recyclers, and others. Since this is an ethnographic account, I have focused on one key informant in each of these roles, using the individual that shared the most useful and pertinent information. I chose to focus primarily on the experiences of one actor in each role, rather than amalgamating material from several actors in order to allow the reader a glimpse of the lived experiences of each individual, and to understand the realities of their profession, as well as the connections between each of the participants interviewed for this paper[15].

The 'go along' style of interviewing used (see Kusenbach 2003) allowed the interview subjects themselves to frame the phenomena of e-waste generation and trade in his or her own terms, so that the actors themselves - not the analyst - were enabled to define the starting point of analysis, and what is (and what is not) relevant or important (Latour 2005; Ong 2011). This is different from the 'grounded theory' approach, in that I have, necessarily, defined my theoretical framework, research and interview questions in advance of the research, but simply allowed the participants to direct the course of the interview and provide the key terminology and themes that I would later use for the writing-up and analysis of my findings. I chose not to go with the grounded theory approach because I felt that it was important to make certain decisions about my research (i.e. research questions/framework/etc.) project before entering the field; yet obviously still remained quite flexible to unanticipated changes.

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[15] To be clear, I have not included the explicit narratives of all interviewees in this thesis, but information gleaned from them has been useful in my conceptualization of the issues covered in this thesis in one way or another.

In addition, I attempted to conduct my interviews with key actors in the field in a setting as close to their natural work environment as possible. For instance, when interviewing secondhand electronics processors in Little India, I met with them in their shops and sometimes interviewed them while they were actually carrying out their work. Some research participants also allowed me to walk around their work site(s), or gave me a tour, which allowed me to make observations that would not have been possible if the interview was conducted in a neutral, public meeting place.[16]

1.5 A Reflection on Methods

In preparing for my fieldwork, I had initially targeted government representatives, port officials, small and large sized electronics recycling firms, NGOs, and business persons such as secondhand electronics traders based in Singapore. I had intended to primarily target the port officials, including regulatory officials from agencies like the Marine Protection Agency (MPA), Port of Singapore Authority (PSA), and National Environmental Agency (NEA), as well as port workers such as longshoremen. However, I soon learned that these officials were not accessible and perhaps, as one PSA official told me, not as relevant as I had initially assumed. The PSA operates and regulates the port after all, but they do not necessarily know what is inside the containers. If there is an issue (i.e. smuggling), and the shipments in question are suspected or confirmed to contain environmentally sensitive or hazardous materials (such as e-waste) then the NEA will step in. But the NEA would not release any information to me that was not already publicly available, which restricted me to using information made available on their

[16] See chapter two for a more in depth discussion of my chosen interview style.

website or in press releases. One official told me that this "tight-lipped" nature of the government officials in Singapore is because they have strict confidentiality codes that they must keep in order to remain government employees. Therefore, it was not possible to gain access to the customs officers that I thought I would be able to and had to find new ways of getting the information needed for my research.

But it was not only the government officials that were difficult to get information from. It was even hard to get interviews with the larger electronics recycling companies in Singapore. Therefore, I only had interviews with representatives from two different large-scale recycling companies, as my interview requests to other companies were never responded to. Even when I was formally introduced to a representative of the company, it was still difficult, if not impossible to get an interview. Potential reasons for this are that, as one participant suggested, and as I found through experience, certain companies will be much more willing to speak to journalists than they will to academic researchers, because articles published in newspapers and magazines will get them more publicity than in academic journals. It is also possible to speculate that companies would be wary of researchers disclosing what could be competitive intelligence to other businesses. Moreover, I am not from Singapore, and had limited experience there in the past, so I had to build up networks and contacts from scratch upon arrival in the country.

Now I would like to turn, briefly, to a discussion of my own positionality, and comment on how my identity was perceived by my interlocutors in the field. This reflexivity is important, as Fife puts it, so that "readers might judge for themselves to some extent how the researcher's biases may have affected or influenced the overall

work" (2005, 149). In terms of my immersion in the field, because I was conducting a multi-sited ethnography, and due to the situational constraints of my fieldwork (i.e. living in a largely expatriate enclave in Singapore, with certain responsibilities to my host family to upkeep), I could not spend all of my time with my key informants. In regards to my personal background, I believe my background as a white, Canadian student researcher was indeed a hindrance at times (as discussed above), but also a benefit in others (i.e. because I'd traveled so far, some respondents felt obliged to at least talk to me). Moreover, because I had studied at the National University of Singapore in the past, and clearly had an interest in the place and culture, this gave me a certain level of trustworthiness amongst some respondents.[17]

My identity, and how it was perceived by my interlocutors in the field, matters because, as Emerson et al note: "the ethnographer needs to become sensitive to and perceptive of how she is seen and treated by others" (1995, 4). Indeed, my status as a university researcher seemed to bear a stigma because on two separate occasions, I was mistaken by my research participants for an electronics trader from Canada, in Singapore to buy or sell secondhand electronics, rather than a Canadian researcher studying the trade. In both situations, the interview was going extremely well, and my informants had a jovial attitude about them, as they were keen to find an entryway into what they considered to be the highly profitable Canadian market. Upon correcting them about my identity however, once I realized their mistake, their attitude suddenly shifted and the

[17] For example, Dewan, a Bangladeshi electronics trader in Singapore, took me to lunch at a Bangladeshi restaurant with some of his close friends, which increased the level of trust between us.

interview ended shortly thereafter as they no longer had any interest in sharing information about their business practices with me. I was cognizant of this in the field, and at times had to be careful about how my respondents perceived me, lest they feared I would betray them, but I also had to be wary of the ethics code binding my research, and tread as delicately as possible between the two.

To make up for the lack of government representatives and large scale recyclers willing to meet with me for an interview, I ended up interviewing a much wider range of actors in the industry than originally planned. For example, I met with consultants, overseas buyers, shipping agents, Singaporean academics, and journalists. My interviews and site visits to recycling/refurbishing facilities in the field were supplemented with the review of a large collection of newspaper articles and background literature on the topics studied. In addition to the interviews conducted, information was also collected from a number of individuals in Singapore and elsewhere who I contacted electronically concerning my research. Though it was not possible to meet with these informants in person due to logistical or time constraints, I still received useful information from them regarding my research topic. A general method of 'snowball sampling' was used, where I started with a few key informants identified by my existing contacts in Singapore, and from them learn about new potential informants to contact for my research.

Most of my interviews and non-participant observation took place in Little India, where there is a clustering of used electronics traders. I spoke with six small sized trading companies there, some of whom had warehouses in other parts of Singapore such as MacPherson or Kallang, or in the case of one company, on the peripheries of Kuala

Lumpur, Malaysia. Most of the recycling facilities in Singapore are located in Tuas on the outer western edge of the island, in the industrial sector of the city. Despite Little India's history as an ethnic Tamil neighborhood in the early 20th century, it has now diversified substantially, with immigrants from across India working there, as well as from other countries such as Bangladesh and Sri Lanka. In fact, most of the interviewees that I spoke with there were from Bangladesh. I also noticed a clustering of Chinese owned shops there, particularly on Upper Weld Road and Cuff Road, but I was not able to get an interview with any of them, despite my fluency in Mandarin.

Little India is a located in the Rochor district of central Singapore, located north of the Marina Bay central business district, and west of the Orchard Road commercial area. Though Little India is actually a mixed-heritage residential district under the PAP's policy of racial harmony, which does not allow for racial segregation in public housing estates (accounting for nearly 90% of all housing in Singapore), the district is an Indian-dominant commercial zone, containing a clustering of Indian restaurants, food stalls, and shops (Chang 2000). The neighborhood also contains several Hindu temples, mosques and other places of worship which draw Singapore's Indian community to the area. Accordingly, Little India is one of Singapore's most vibrant and colourful areas, with many shops selling (and sampling) Bollywood movies, music, incense, as well as fresh produce and spices imported from the sub-continent.

1.6 Ethical Issues

The research in this thesis was approved by Memorial University's Interdisciplinary Council for Ethics in Human Research (ICEHR),[18] and all participants in this thesis were informed upfront of the potential risks and benefits[19] of participation in this research. Once I obtained their verbal consent to participate, only then did I begin with the interview process. Though traditional forms of consent must be obtained through a signed form, my approach for this work drew on recent guidelines for ethical approval which outlines cases where traditional forms of consent may not be practical (see TCPS 2010). This verbal approach was certainly necessary for me, because, given the nature of my research, it was often either culturally or practically inappropriate to ask for signed, informed consent prior to the participation of some of my informants. Canada's ethical approval policy (TCPS) recognizes that "research that probes sensitive topics (e.g., illegal activities) generally depends on strong promises of confidentiality to establish trust with participants" (TCPS 2010, 58). Thus, I found that those participants engaged in, or having knowledge of, illicit activity related to e-waste trading/trafficking "may have little trust in the law, social agencies or institutional authorities" and would certainly be wary of any attempts to try to legalize or formalize the consent process through the use of forms, or even by recording it, seeing this as a violation of their trust and a threat to their anonymity and welfare (TCPS 2010, 137). Since most participants were not be willing to have their interviews recorded (e.g., audio taped), free and informed consent was documented in my

[18] Approval no. 2010/11-118-AR

[19] For example, many participants were quite interested in the results of my research, and asked to be updated on relevant findings while I was still in Singapore, and for a copy of my thesis upon completion - which I arranged to send to them electronically.

field notes. I also asked for oral consent in cases where I requested to take photos of my contacts' processing operations or facilities, and if I needed to audio record in cases where participants agreed to be auido-recorded during the interview(s).

1.7 Thesis outline

This thesis is organized into four subsequent chapters. Chapter two is the literature review chapter, which provides an explanation of my methodology and theoretical framework used in this thesis. In this chapter I make the argument that, for the purposes of this study, a range of relational approaches and sensibilities need to be adopted such as ANT, critical globalization studies, and post-Marxism[20] in order to best collect and analyze the material relevant for this research. I maintain that rather than being incompatible or contradictory schools of thought, ANT can actually be strengthened when applied with other post-structural strands of theoretical and methodological frameworks from political-economy, and vice versa.

Chapter three examines the role of Singapore, as a jurisdiction, in the formation, organization, and regulation of international trade networks in electronic waste. It pays particular attention to key international legislation, such as the Basel Convention, and situates Singapore as a key jurisdiction in the international trade and traffic of secondhand electronics. A key finding is that Singapore not only plays an important coordinating role in facilitating this trade (largely as a consequence of being a major port city), but that it is itself a significant source of secondhand electronics to other Asian and African destinations. In light of these findings, I argue that the dominant storyline about e-waste

[20] These theoretical approaches will be introduced in the following chapter.

(e.g. BAN 2003; 2005; CBC 2008; CBS 2009; Greenpeace 2008) offers a narrative that actually impedes a realistic understanding of the formation, organization, and regulation of the trade and traffic networks that facilitate international flows of secondhand electronics. Doing so means connecting the findings and arguments in this chapter to the detailed ethnographic work I undertook to investigate who and what the key actors are that facilitate trade and traffic of e-waste in and through Singapore. As I will discuss, the particular features of Singapore's status as a relatively wealthy 'developing' country ('developing' as defined by the UN and consequently the Basel Convention) enable it, as a legal jurisdiction, to play this role in facilitating the international trade and traffic of electronic waste.

As I will show in chapter four, many (but not all) of the actors engaged in e-waste trading through Singapore deploy heterogeneous strategies of economic survival by constantly transgressing the invisible boundaries between formality and informality, legality and illegality. I look at the national legislation on e-waste/secondhand electronics in a Singapore, Indonesia, Malaysia, and Bangladesh (the homeland of many of my research participants), and compare the differing levels of enforcement amongst these countries and their relative effectiveness. I also discuss the trading practices that have been developed to circumvent some of these regulations, and what their effects have been. A better understanding of the 'zones of ambiguity' that are at work in facilitating the global trade in secondhand electronics allows for a reconfiguration of e-waste management practices that are currently superficial, if not irrelevant (Hornsby and Hobbs 2007).

Chapter five concludes this thesis. I suggest the implications of my key findings and arguments, while situating their significance with respect to the relevant existing literature on e-waste. The key take-away points I wish to make, and which I discuss in detail in the empirical chapters, are: first, rather than merely acting as a transshipment hub facilitating the trade in secondhand electronics from 'North' to 'South', Singapore is also an important source in its own right; and second, that regulating the secondhand electronics industry necessitates a better understanding the operation of informal economies, and their complex relationships with the formal world, as well as the legal grey zones in which much of the trade takes place. Moreover, I offer some political and theoretical implications of the arguments that I make in this thesis.

CHAPTER 2

LITERATURE REVIEW

When discussing my research with others over the past two years, a common question that I received was how the work I am doing is 'geography'. Indeed, readers will notice that the literature reviewed here and influencing the work in this thesis spans the borders of many disciplines, rather than just sticking within the confines of 'human geography'. Part of the reason owes to the diversity of work carried out by geographers, but it is also due to the interdisciplinary nature of work on electronic waste. Though there are some geographers now beginning to turn their attention to e-waste (see Lepawsky and McNabb 2010; Lepawsky and Billah 2011; Lepawsky and Mather 2011; Gidwani and Reddy 2011), much work on e-waste is carried out by researchers in fields as diverse as toxicology, materials engineering, environmental science and sociology. As sociologist Andrew Sayer (2003) has argued, sticking within the rigid borders of a discipline can constrain the quality of the research that is produced. Rather, he suggests that we should follow people, things, metaphors, or conflicts as far as they go, rather than following them only as far as the discipline's borders (Marcus 1995). As Sayer notes, the phenomena that we are researching can then be studied more coherently as we are not "dividing it up and selecting out elements appropriate to a particular discipline" (Sayer 2003, 5, quoted in Cook et al. 2006, 657).

As such, this literature review is made up of three main components which cover the diverse literatures and approaches that I have used to make sense of the material which I am studying in this thesis. The first section situates my research questions within

the relevant literature on electronic waste; the second introduces literature pertaining to actor network theory, critical globalization studies and post-Marxism and argues how these approaches each offer unique strengths that can work together, perhaps not as a synthesis, but as a theoretically diverse approach to examining particular forms of economic activities, such as e-waste trading and processing;[21] while the third reviews literature on mobile and and follow-the-thing ethnographies, and argues why the theoretical framework adopted in this thesis necessitates the use of these particular methodologies.

The overall argument that I make here is that rather than being incompatible or contradictory schools of thought, ANT can actually be strengthened when applied with other theoretical and methodological approaches from political-economy, and vice versa. Many social scientists who have attempted to engage with ANT thinking have made some good strides, but have stumbled upon its treatment of power, as I will show in the following sections. By using an assemblage of critical globalization studies, post-Marxism, and actor-network theory, I assert that it is possible - and fruitful - to refrain from the use of such powerful explanations, as outlined in this literature review.

2.1 Jurisdiction, e-waste flows, and grey zones

In 2002, the Basel Action Network (BAN) report *Exporting Harm* was among the first reports in the e-waste literature to shed light on an international division of labour in the processing of e-waste that puts people and places at high risk of contamination from

[21] Post-Marxism is a post-structural reading of Marxism, which breaks with the structuralist versions of Marxism that were more common in the discipline in the 1970s and 80s (yet which still persist to a lesser extent today). See, for example Gibson-Graham (1996).

the toxic substances found in e-waste. This report has been followed by a series of other NGO publications, and reports in the popular press documenting the tendency of Western corporations to dump their e-waste in developing countries (e.g. BAN 2005, Bodeen 2007, CBC 2008, CBS 2009). While these messages do have value, and have been important in reducing illegal dumping of waste in the world's developing regions, one problem with these popular accounts, as some scholars have shown, is that while e-waste may indeed be considered 'waste' in Western contexts, the same material actually comes to have considerable value in other contexts (Lepawsky and McNabb 2010, Kahhat and Williams 2010). Moreover, as Shinkuma and Huong (2009) note, the reuse and recycling of materials in the worlds developing regions is essential for the effective utilization of resources. Thus by banning the trade in secondhand electronics to the developing world outright, it consequently takes away a significant source of livelihood, and affordable source of electronics for a majority of the world's population (see, e.g. Widmer et al. 2005).

Other writers have documented the thriving secondhand electronics markets and electronics recycling industries in Asian countries like India (Streicher-Porte et al. 2005), Malaysia (Minter 2011a), China (Hicks et al. 2005; Shinkuma and Huong 2009) and Thailand (Kunacheva 2006). Yet to date, there has been no scholarly writing on the trade of secondhand electronics in Singapore. My research in this thesis addresses this gap while taking up Widmer et al.'s (2005) call to identify current e-waste trade routes, and more specifically, the need to consider the role of Singapore in facilitating the regional

trade of secondhand electronics in the Asian region, made clear by the work of Lepawsky and McNabb (2010).

In recent years, there has been increasing attention paid to the liminality and fluid nature of some forms of trade that slips between the apparently black-or-white distinction between licit and illicit. This liminality and fluidity makes it difficult to clearly distinguish these activities from what would often be considered licit activities (Nordstrom 2007, Majid Cooke 2009, Hornsby and Hobbs 2007). There have also been questions about distinctions made between formal and informal sectors of the economy, and whether or not such distinctions can actually be said to exist in practice (Kulke and Staffeld 2009; Neuwirth 2011). One of the focal points in these writings is the prevalence and importance of such il/licit and in/formal business practices, and how they have been difficult to regulate effectively. This type of activity takes place for a number of reasons, and is often not considered to be criminal or even illicit by the customers using these services (Majid Cooke 2009). This is what Majid Cooke refers to when she speaks of the prevalence of 'licit but illegal' activities. She uses the example of taxi drivers who provide a crucial service of transporting passengers from farm to marketplace in rural Borneo. Some of the drivers have permits issued by the government, but may have acquired the funds to get these permits, or their vehicle, through illicit means.

Majid Cooke also speaks to the fact that what is often considered licit by many people can still be considered illegal by the state. Similar examples can be found in my research as well, such as the secondhand electronics dealers in Batam, Indonesia. As I discuss in chapters three and four, the foreign buyers in Singapore's Little India district,

whose trade activities are not fully documented; and especially the electronics traders in nearby Batam, Indonesia, who operate illegally, still strongly believe in their businesses because they allow lower income people in their countries access to technology that they otherwise could not afford. In other words, these traders do not consider their activities illicit because they are providing a much needed service, which is why Majid Cooke (2009) points out that some activities designated by the state as illegal are often licit at the same time. Therefore, I attempt in this thesis to move beyond merely presenting a dichotomy or dualism between licit and illicit, or legal and illegal forms of trade, as the terms are more complicated than may at first seem.

2.2 Actor-Network Theory (ANT) as a methodological framework

Instead of strictly focusing on the people involved in the secondhand electronics industry, I have also paid some attention to the roles played by non-human actants (such as legislation, documentation, etc.) that I believe demand as much analytical attention as people themselves. This symmetry between human and non-humans, and the resulting heterogeneity of elements that produce the world is a key methodological stipulation put forth by proponents of ANT, which is why I have adopted an ANT inspired framework for this research (Latour 2005, Law 2007). This is not to say that ANT gives objects agency *on their own,* which would imply a sort of ontological leveling that ANT has been (wrongly) criticized for (see Laurier and Philo 2000, Kirsch and Mitchell 2004). But rather, ANT is an approach that understands the world as a multiplicity of different connections in which non-humans have the power to affect, account for, or otherwise influence the agency of humans (cf. Bakker and Bridge 2006; Bingham 2009; Holifield

2009). This is one strength of ANT that is useful for my thesis because my field research involved following the practices of secondhand electronics trading and recycling, as well as the practices, documentation and legislation involved in facilitating, shaping and regulating this trade.

Understanding humans as being connected to other actors (human or non-human) and places elsewhere allows the analyst to develop networked accounts of heterogeneous connections, which was useful for my fieldwork as it made visible the functioning of global trading patterns in secondhand electronics as they operate in and through Singapore (Blok 2010; Chung 2009; Latour 2005; Fortun 2009). Such networked accounts rely on relational thinking, and have been useful in answering the research questions posed in this thesis. For instance, such approaches allow for a (re)consideration of what links diverse people and places together across time and space; how the flows of items such as secondhand electronics are influenced by economic, political and cultural factors; and how and why are they channeled through particular channels. Moreover, this type of networked approach views socioeconomic processes as intertwined and mutually constitutive of each other, while offering a way to conceptualize economic activities in ways that do not rely on bounded entities such as the region or nation (cf. Mitchell 2003; Ford 1999).

The ANT approach also challenges the organizing categories (i.e. power, inequality and the nation-state) and binaries (i.e. nature-culture, technology-society, non-human-human, etc.) of modernist thinking (see Law 1994), which have largely been taken for granted by traditional social scientists who have used these terms for their explanatory

power, but without fully explaining what is meant by them (Latour 2005; Castree 1999; Gibson-Graham 1996). An ANT approach thus takes issue with such modernist ways of understanding the world by not taking terms like the 'the social' at face value. Upon making this shift, we can see what is included in the social, and how it is composed, while also exploring how certain objects have the potential to make humans act in particular ways. This particular type of approach, then, has allowed me to conduct an ethnography of the secondhand electronics industry in Singapore, to explore how it is organized, and identify which actors are involved.

As David Demeritt (2002, 786-7) insightfully notes, much discussion in geography has emphasized political implications over philosophical ones, which has led to some ambiguity over what is actually being explained in their writing because of poorly defined explanatory terms such as 'power', 'inequality', 'global forces' and the like. In much academic writing within the social sciences, what should be *questions* about the local and global effects of various social processes have been mistaken for *explanations* of global change. For example, global commodity (or value) chain (GCC/ GVC) analyses, have been one common approach to studying global markets, and how they are formed and organized (Bair 2005; Gereffi and Korzeniewicz 1994; Gereffi et al. 2005). However, this approach has been critiqued recently due to: a) the use of power to explain difference, without explaining what power actually *is* or *does*; b) contradictions in

its definition of value capture and creation (Caliskan 2010; Hudson 2008; Hughes 2000).[22]

Some structuralist critiques of ANT have been overdrawn in their use of power in structural Marxism and do not give due credit to the insights of ANT. For instance, Ben Fine (2005, 92) seems miss the point of ANT's objectives when he writes: "[ANT's] breach with previous methodologies (read Marxist) for social theory borders on the anarchic as the structural and systemic are rejected as legitimate objects of study. Yet this claim is problematic because Fine exaggerates ANTs critiques of Marxism and at the same time refuses to concede any ground to ANT's objectives. Similar Marxist critiques of ANT such as that of Kirsch and Mitchell (2004) have also misread ANT's analytics by arguing that "[ANT] asserts that there are no fundamentally, irreducible, or ontological differences between, for example, a 'sociologist' and a 'computer'" (689). Geographers such as Swyngedouw and Heynen (2003) who have tried to reconcile ANT with post-Marxist approaches, have still gone awry by resorting to the use of dualisms and anthropomorphisms, such as 'socionature'. While Castree's (2002) attempt to combine ANT with post-Marxism, which has been very influential in the discipline, and contains numerous merits, still has some analytical shortcomings due to his insistence on using a 'weakened' version of ANT. This weaker version, however, has a fundamental analytic problem in that takes away from ANT some of its key insights and objectives. Therefore, I have sidestepped these analytical problems in my analysis by staying as true to the key

[22] Moreover, Lepawsky and Billah (2011) argue that the GVC/GCC approach is blind to any value capture or creation that occurs after the point of final consumption in the commodity/value chain (See also, Gregson et al. 2010; Lepawsky and Mather 2011).

tenets of ANT as possible, while tracing *how* different entities come to exert power in a particular setting, and what accounts for this power.

John Urry has provided one exemplary approach that I would like to follow in his (2003) book *Global Complexity*. In this book, he explains that ANT accounts aim to explain power by tracing networks, thus ANT theorists see 'power' as a networked effect. "The power of any network [or actant] can be said to stem from its size, as indicated by the number of nodes within it, by the density of networked connections between each node, and by the connections that the network has with other networks" (Urry 2003, 52). As Urry goes on to explain, the size of the network, and the associations it has with other networks is the most significant determinant of its power because as the number of network associations increases, so too does the strength or power of the network (Mialet 2012). This is true for individual actors as well. But Callon and Latour (1981) add that an actor also gains strength through the speed with which it can associate (or dissociate) with network elements controlled by other actors. In addition, Latour has written about how power is also a consequence of attachments and mediators: these attachments are constructed and transported by 'forms' which are one of the most important types of translations in ANT (Latour 2005). Latour's concept of *forms* allow the analyst to connect an actor to what makes it act. Network or actor strength then, to Latour, "resides in the power to break off and bind together", or in other words - to intervene in other networks (Callon and Latour 1981, 292).

Latour (2005) has also talked about the importance of 'stabilization' which allows us to reveal the multitude of conduits and connections that make up 'the social'. The

importance of ANT's attention to forms and stabilizing mechanisms rather than omnipresent structures (i.e. macro vs. micro) is cemented by Holifield (2009, 651) who points out that such stabilizing mechanisms prevent the "premature transformation of matters of concern into matters of fact"(see also, Holifield 2009). As Latour points out, a matter of fact is not a 'natural' mode of being as some scientists would like us to think, but rather an 'anthropomorphism' (Latour 2005, 255). Thus, Holifield continues, an ANT account may be able to counteract the rush to portray social forms like neoliberalism "as laws and essences to which there is no alternative" (ibid, 651).

The treatment of power by some geographers engaging with ANT (see, e.g. Fine 2005) seem to be tautological in that they use 'power' to explain social hierarchies or inequalities (which involve power relations). Callon and Latour (1981) admit that there are of course macro and micro actors in society, but that the difference in power relations between them is determined by particular networked effects which can not be determined *a priori* to analysis. Thus, by using an ANT approach in this thesis, I have been able to avoid jumping to 'powerful explanations' without fully understanding what the roles of actants included in this thesis are or how they relate to one another (Latour 2005). This does not mean that unequal power relations will not be exposed in an ANT inspired analysis like this one, but rather, power will be shown as an effect of networked relations, rather than used as an explanation in its own right.

For such reasons, ANT theorists thus attempt to stay clear (as much as possible) of using their own terms and definitions as a starting point to analyze certain phenomena. Instead, ANT-minded scholars prefer to 'follow the controversies' about what the social

world is made up of, rather than the analyst determining at the outset what is and what is not important (Latour 2005). To do this, the concepts of the actors need to be stronger than the analysts, and not downplayed by the social scientist's 'jargon' (ibid). ANT is critical of other approaches that appeal to frameworks which explain social phenomena using powerful explanations that are only known to the researcher. As Vayda and Walters (1999, 169) note, this type of critical approach "can never fail to be right", and risks presenting a set of indisputable social facts (see also, Holifield 2009). This is the reason why I have conducted semi-structured interviews, which allowed my research participants to use their own terms to explain the social phenomena that they were describing, and I have incorporated these terms as much as possible into my analysis.

ANT scholars such as John Law (1994) and Ryan Holifield (2009) have argued that ANT is better thought of as a 'sensibility', or 'orientation' to social scientific research than a theory. This is because it offers an approach to understanding how the social is composed (or assembled), while bringing the preconceptions of the analyst into conversation with the actants through the analysis. This is not to say that ANT promotes a kind of 'naive realism', where the researcher simply observes social phenomena free of positionalities towards the research in an unproblematic way, rather, it attempts to be as realistic as the interviewees themselves are - recognizing that they are both real. So, in Latour's words, ANT's main tenet is that: "actors themselves make everything, including their own frames, their own theories, their own contexts...even their own ontologies" (Latour 2005, 147). Accordingly, ANT is descriptive in a literal sense, which makes it more a way of representing the world than a theoretical foundation on which to

explain how the world operates (Law 2007). This is why I have used ANT as a methodological guide for my research, as it helps me to understand the secondhand electronics industry as my research participants themselves see it, rather than offering pre-given 'explanations'. In the next section, I will discuss my methodological framework, and how it accomplishes these theoretical objectives, without making the mistakes that have been made in other attempts to bring together ANT with various Marxist approaches. Nonetheless, because ANT is not a theoretical 'framework' or 'theory' I argue that there is room to incorporate insights from post-structural strands of Marxism and critical globalization studies in to this thesis in order to deal with other aspects of my research project, as I will outline in what follows.

2.3 Critical Globalization Studies and ANT

John Law writes that "global space is a material semiotic effect. It is something that is made" (1999, 6). In other words, what we think of as 'the global' does not just exist 'out there' in reality, but rather is performed by many individuals, objects and organizations around the world that come together in the form of networks to mobilize certain phenomena that exude a global character. This is what Castells (1997) refers to as the increasingly networked character of states. Examples of this are the many international agreements, such as the Basel Convention, that are in fact made up of an assemblage of policies constructed through the representatives of individual states meeting at conferences and negotiating how best to regulate 'the global' (Urry 2003; see chapter four this thesis). In order to investigate and trace such assemblages, I needed a theoretical framework that would best allow me to do so, which is why I have

incorporated critical globalization studies, as put forth by scholars such as Cindi Katz and Anna Tsing, into my ANT inspired approach in this thesis.

Tsing's book *Friction* is an example of this type of methodological and analytic approach, which she describes as a 'grounded', or situated, study of 'globalizations', where the term 'globalization' is used in its plural form because she is adamant to point out that there is not only one hegemonic of version of 'globalization' but rather many different and contested versions of globalization constructed by many different actors operating from different local sites. Other writers have followed in her footsteps by arguing that we need to pay attention to the 'middle range', that being the global connections inherent in the given site of research without relying on fixed categories or 'universals' (Beaulieu et al. 2007; see also Tsing 2005). Beaulieu et al argue for the need not only to make connections across different regions and scales, but also across disciplines, and for the possibility of doing this without essentializing these regions or the phenomena being studied. Donna Haraway alternatively uses the term 'attachment sites' which escapes the problem of relying on essentialist categorizations because she argues that the term 'site' does not have any inherent bounded-ness to it (Haraway 2007). As Anna Tsing (2000, 338) reminds us, "place making is always a cultural as well as a political-economic activity"; it involves looking at how specific actors have participated in positioning Singapore in national, regional, and global classifications and rankings of places. The agency of all of these actants needs to be traced in relation to their movement and interaction with each other, as well as examining competing claims about community, culture, and scale as matters of concern in order to have a holistic, ethnographic account

(Marcus 1998). As Tsing sums up: "places are made through their connections with each other, not their isolation" (2000, 330).

Cindi Katz (2001), following Tsing (2000) and Massey (1994) before her, adopts a topographical approach as a distinct research method to arrive at an understanding of grounded globalizations. She points out that a critical topographic study is one that looks at the material relationships between people and place, from local to global scales. One particular merit of this work is Katz' focus on processes and practices in place, space and time to reveal the networked relations producing social and political difference and inequalities. In her words: "producing a critical topography makes it possible to excavate the layers of *process* (including representation) that *produce* particular *places* and to see their intersections with *material social practices* at other scales of analysis" (Katz 2001, 1228; emphasis added). Katz's focus on the material and its relationship with other social processes is important because it allows her to examine 'translocal' relationships which cut "across spaces and between places" in order to understand how these relationships can produce space at various geographic scales (Katz 2001, 1229). As Adrienne Rich has put forth, it is through grounded research with a distinct focus on matter and materiality that we can encounter 'differences that make a difference', and trace social and political difference and inequalities (Rich 1986).

Katz's approach also allows us to move beyond the rigid binaries and essentialism often found in structural Marxist work, and offers us an alternative to this where entities like 'nature' and 'society' are seen as mutually constituted, enacted, produced and governed through highly regulated practices. This view of globalization gives us an

understanding of power without relying on 'powerful explanations' as many geographers and some other social scientists have done when trying to engage with actor-network theory (see, for example: Swyngedouw 1999; Thrift 1999; Swyngedouw and Heynen 2003; Urry 2003; Kirsch and Mitchell 2004). However, as noted above, any talk of the 'social' merely effacing the 'natural' will not work in a good ANT account. This is an issue that I deal with more substantially in the next sub-section, where I discuss the merits of the application of a post-structural marxist framework to the ANT inspired analysis adopted in this research.

2.4 Post-Marxism and ANT: incompatible frameworks?

There have been numerous critiques of ANT in geography and the social sciences, many of which have to do with its treatment of power relations. For example, Sarah Whatmore (2002) has asserted that one serious limitation of ANT is its tendency to be weak on ethico-political issues. As Castree (2002) explains further, some ANT approaches risk ignoring the possibility that some actants can harness the power of many others and, in so doing, bring about social inequalities in the networks being examined (see also, Gille 2010). Similarly, Ben Fine (2005, 93; original emphasis) has made the charge that ANTs methodology is "profoundly ahistorical and asocial due to its lack of regard for specificities that allow and justify the positing of *particular* forms of economic relationships". As such, ANT accounts risk simply describing how certain networks operate, without digging into the reasons why they operate in particular ways (Hudson 2001; Murdoch 1997). Moreover, Zsuzsa Gille (2010) has contended that ANT's flat

ontology does not allow for the understanding of historical processes and the nature of power, particularly for theorizations of waste.

The above critiques indicate why I have chosen to incorporate post-Marxism into my analysis - because it brings a "radical and critical edge" to social research (Hudson 2006, 388); as well as preparing us for the political task of composing a just common-world (Latour 2005). Though Bruno Latour has explicitly pushed for ANT's incompatibility with structuralist accounts (Latour 2005), and that other ANT-minded scholars in geography have at times been dismissive of political economy (and particularly Marxist) frameworks (see e.g. Amin and Thrift 2005; Barry et al. 2002; Callon 1998; Whatmore and Thorne 1997); Noel Castree has maintained that structuralist Marxism can be 'weakened' and combined with ANT in order to form a stronger, hybrid tool for conceptualizing interactions between nature and society, or for him 'socionature' (Castree 2002). However, ANT thinkers such as Latour have treated Marxist approaches unfairly by homogenizing the different strands of Marxism, thereby ignoring the post-structural traditions within Marxism (see Gareau 2005 for a review). As Sarah Whatmore (2002, 2) puts it, "accounts that get lumped together into [certain] categories are inevitably more diverse than their detractors acknowledge". For instance, Keith Bassett has pointed out that Marxism is actually subject to many interpretations, just as there has been debate around the central principles of ANT. As such, I use a post structural reading of Marxism here, which joins ANT in its rejection of essentialist categorization.

Richard Marsden has suggested that post-structuralist philosophers such as Michel Foucault and Jaques Derrida used Marx as a starting point in developing their views of society (Marsden 1999). This contradicts most conceptions of traditional structuralist thinking, but this post-structural interpretation of Marxism has seen increasing popularity in geography in recent years. Geographers like David Harvey, Neil Smith, and Erik Swyngedouw, influenced by the post-structural reading of Marx put forth by Ollman (1971, 1993) and Latour's version of ANT (see e.g. Latour 2005), have all used post-structural readings of Marxism in their recent works. This has become a dominant trend amongst Marxist-geographical work due to the recognition that Marxism, in its quest for powerful explanations, often grants 'capitalism' more power than it actually has, and that radical politics would be better pursued by disassembling the forces making up 'capitalism' and trying to explain how they operate, rather than by attempting to analyze 'capitalism' as a global totality (c.f. Gibson Graham 1996; Latour 2005). Similarly, Marxist geographer David Harvey has stated that if we do not modify the 'powerful explanations' of structuralist Marxism, "definitions could dictate conclusions and...a system of thought erected on fixed definitions and fixed categories and relationships could inhibit rather than enhance our ability to comprehend the world" (Harvey 1973, 12).

Disputing Michel Callon's (1998) dismissal of Marxism for separating nature and society into different realms, Brian Gareau has shown that versions of Marxism which draw on the spatial and post-structural aspects of Marxian analysis are well suited for use with ANT, because they conceive of 'social' and 'natural' phenomena as relational,

which actually fits well with ANT's emphasis on associations (Castree 2002; Gareau 2005; Swyngedouw 1999). Even strong proponents of ANT, such as Ryan Holifield (2009, 64) have insisted that the reason why an actor-network approach can benefit from alternative approaches such as Marxism, because they provide "a rich source of contestable narratives, hypotheses, arguments, models and explanations for the production of environmental injustices" (see also: Haraway 1997). Indeed, this aspect of Marxism has inspired the particular political and ethical approach that I have adopted in this thesis.[23] Moreover, it has been shown that a post-Marxist framework has the potential to link ANT's actor oriented approach with the relations of livelihood production in Marxist political economy, as is explored in the next two chapters; in addition to a historical-material context in which to situate studies of networked relations, as was done in the previous chapter (Gareau 2005).

As the above cited authors bring attention to, ANT can respect and preserve Marxism's 'critical impulses', while offering conceptual tools to trace their participation in the assembling of the social (e.g. Castree 2002; Holifield 2009). In addition, ANT can help offset the tendency of some Marxian approaches construct the social at the same time as they purport to only be studying it. As such, if we use post-structural versions of Marxism in our analysis, then ANT and Marxism try "to do more or less the same thing. For more or less the same reasons. But differently" (Cook 2006, 661). As Holifield (2009, 64) points out, it is not necessary to combine these two approaches into an "awkward and unwieldy theoretical synthesis", but rather to pull out critical insights from each. That is

[23] See section 5.2 for a more detailed explanation of what I mean here.

precisely what I have done in this literature review: I have found critical globalization studies useful for its approach to understanding and deconstructing social phenomena exuding a 'global' character, and analyzing how they intersect with 'the local'; while post-Marxism has been useful for its attention to historical-material dimensions of social processes in space and time (e.g. Haraway 1997; Katz 2003; Swyngedouw and Heynen 2003); and ANT has proved to be fruitful for its attention to and refusal of tautological explanations that use social phenomenon (e.g. 'neoliberalism' or 'capitalism') to explain 'the social'.

2.5 Mobile, multi-sited and 'follow-the thing' ethnographies

Where shall we draw the boundaries of regions? How are local communities composed?
(Tsing 2000, p.327)

Because of the increasing circulation of people, ideas and other objects of study, the nature of field sites has changed and in some ways has grown more complex, and less bounded (Hamilton 2009; Marcus 2009; Peterson 2009). Because of this, it is difficult for many social scientists to focus on one strict location for their field site as Malinowski did in his classical *Argonauts of the Western Pacific;* rather, multi-sited (Marcus 1995), 'mobile' (Blok 2010) or 'follow-the thing' (Crang and Cook 2007) ethnographies are now becoming much more relevant. Moreover, the Malinowskian approach to ethnographic fieldwork does not jive with the theoretical framework adopted in this research as it privileges human actors at the cost of accounting for other non-human actors which may

also exert agency. As Andrew Sayer (2003) suggests, we should follow people, things, metaphors, or conflicts (Marcus, 1995) as far as they go, so that the organizing principles for this research are the journeys of the 'thing' or practice that I am studying. In such a study, as Candea notes, "the boundaries of the study are not fixed a priori, they are discovered on the ground" (Candea 2009, 30). Indeed, this was certainly the case with my fieldwork, as discussed in the introductory chapter to this thesis.

Such multi-sited approaches are necessary, because, as Robert Neuwirth has written, 'globalization' is often imagined as a process led by 'the West', but the labor patterns that I have observed in the secondhand electronics industry in Malaysia, Singapore and Indonesia represent an alternative, 'bottom up' version of globalization (Neuwirth 2011). Roy and Ong have also called this a form of 'worlding', which denies that cities in the West are the only ones which can be considered 'global', but rather that cities in the 'Global South' also interact with 'the global' in quite tangible ways, and thus argues for a new way of accounting for this (Roy 2011; Ong 2011). Political scientist Koray Caliskan speaks to this when he writes that "global things are derivatives of their local articulations", and that sites where these articulations and encounters take place often have multiple boundaries, which are constructed and negotiated through the practices involved in the trade of particular commodities (Caliskan 2010, 18). Therefore, though the core focus of my research remains on Singapore, I have also looked at sites beyond Singapore in my fieldwork and analysis because no site can be viewed as a fixed locality, but rather is a site of connections between local and transnational discourses, institutions, actors, legislation, and practices that come together in shaping the global

trade and traffic of secondhand electronics (Massey 1993; Springer 2009; Whatmore and Thorne 1997). Mobile ethnography has been popular with practitioners of science and technology studies (STS) and Actor Network Theory (ANT), and is similar to other STS/ ANT inspired methodologies, such as ethno-social cartography (Blok 2010), and ethnomethodology (Maynard and Schaeffer 2000). What I find appealing about this type of research methodology is that it abandons the language of 'powerful global forces', as used in Burawoy's 'global ethnography', and 'global systems' as referred to in Marcus' 'multi-sited' ethnography. Advocates of mobile ethnography do not see anything inherently wrong with Marcus' multi-sited approach because it has been successful in questioning the often overlooked dualisms like local vs. global, micro vs. macro (etc.), and actually use a similar approach in their own work. However, they advocate that research design should abandon the notion of an inherent 'world system' and rather recognize that there are only individual sites with networked connections to places elsewhere (Blok 2010). Furthermore, as Bruno Latour would say, we need to 'go slow' in the analysis and not 'jump' to *a priori* decisions about who the relevant actors or research sites are, or what causes the particular phenomena that we are witnessing in our research (Latour 2005).

A major critique of this type of ethnographic work is that the fieldwork and subsequent research will become too eclectic and give the feel of being 'incomplete' (Teaiwa 2004; Candea 2009; Marcus 2009). This is a serious concern, and while Marcus does not provide much of a solution to it, Candea is quite right to suggest that ethnographic fieldwork can never be complete. As he laments, "13 months went by

with a constant sense of incompleteness and arbitrariness, the obsessive feeling of missing out" (Candea 2009, 35). Thus, researchers should not seek for the end of a particular research project, but rather try to reach the 'edge' of it, and stop the analysis there.

In a multi-sited research project, it is necessary to frame field-sites in a way that does not decide in advance what the boundaries and edges of our research should be. Rather, as Lepawsky and Mather (2011, 7) note in their paper, 'From Beginnings and Endings to Boundaries and Edges,' we should "follow the action without presupposing inherent directionality", and stop wherever the action (or thing) being followed ceases to have relevance to our research practices. With such an approach, rather than following the tenets set out by Malinowski and other classical ethnographers, the organizing principles for any research project would be the thing (or practice) that is being examined or followed. As Crang (2005, 49) succinctly puts it: "we would get inside [their] networks, go with the flows, and look to connect". Thus, the goal is not a holistic representation of the entire world system, but rather an ethnography of the particular, localized networks we are studying (Marcus, 1995). As Cook showed so well with his study of the papaya commodity chain for the UK market, for example, it is possible to take an object of analysis, and trace the connections that assemble it as a global thing. This is what I have done with in this thesis - by following the connections associated with secondhand electronics in Singapore, I have been able to trace the trading and business networks in Singapore that facilitate the trade in and through the region.

In thinking about how I would actually go about doing such an ethnography, I found it useful to start with Tsing's introductory question in her (2005) book *Friction*: "Where would one locate the global in order to study it?" (5). As Tsing suggests in her book, a useful starting point to do this is to weave together narratives from diverse actors interviewed in my fieldwork. This offers a useful alternative to focusing on the concrete 'facts' which are often elusive in this type of research. This is why I have necessarily included the specific accounts of a variety of different actors in the following two empirical chapters on my findings in Singapore, rather than constructing a narrative 'from above', which would exclude the voices of those actually involved in the trading networks being investigated. By doing this, I was able to follow stories and tease out connections which allowed me to create a story illustrating the global connections implicated in Singapore's evolution into an important international trans-shipment hub.

Following things (or practices) in this way recognizes that the sites in which I have conducted research are in constant (re)formation due to the heterogeneous connections and relations shaping them. As such, Foucault (2009, 21) sees the locality as "a field of intervention" in which individuals, populations and groups are integrated with a conjunction of elements and events that circulate beyond the local site itself. Said differently: "social order in one society always depends upon its multiple connections with emergent transnational relations" (Urry 2003, 106). This accords well with Aihwa Ong (2011, 10), who has established that globalized spaces are made up of spatializing practices - or the gathering and dispersal of circulating discourses, performances and actions. Thus, what I have done here is an analysis of the secondhand electronics markets

in Singapore, where I have tracked the practices making up this trade, and the relevant actants to wherever they led me. Such a study could have led me to an indefinite number of sites, but I had to bound my study in a realistic manner. To do so, I stopped 'following the thing' or practices wherever they ceased to fit within the scope of my research questions.

Though it is obvious that port cities like Singapore are "well connected to closer and more distant market fields via polymorphous links" (Caliskan and Callon 2010, 15); recognizing such links allows the analyst to break down the out-dated distinction between the 'local' and 'global' which leads to an understanding of the field site(s), conceived in relational and mobile terms, through which the analyst moves by following the actions and the things under study (Blok 2010). Therefore, both the global and the local must be analyzed together, because they are defined in relation to one another and are tangled together as a heterogeneous assemblage, made up of a series of connections and interdependencies. Likewise, Deleuze and Guattari ask: "how could movements of deterritorialization and processes of reterritorialization not be relative, always connected, caught up in one another?" (1986, 10). Used electronic devices, upon being disposed of in one geographic context, change jurisdictional regulation, by moving to a new user in a different location, and even while on route to this site. This physical displacement of secondhand electronics is also a process of reterritorialization in a relational sense in that it is a form of 'action at a distance' (Brenner 1999; Latour 2005). In other words, the actors and places connected through the movement of secondhand electronics have real effects on one another.

Because of the interplay of diverse actors in the field sites that I have visited, I decided to use the 'montage' strategy for introducing my field material, as seen in the following two empirical chapters (see Crang and Cook 2006, Chapter 8). The ANT literature points out that all knowledge is an assemblage of claims made about how 'the social' operates, and the montage method of presenting information stays true to this acknowledgement as it puts different stories together back to back, and allows the reader to make sense of them on their own terms. This is important because of Annemarie Mol's (2002) recognition that reality (or ontology) is always enacted in to being, and that these realities are always multiple due to the multiplicity of actors involved in constructing the social. So, it is important to assemble these realities by bringing them together and exploring their differences, as well as their overlaps, to explore the multiple realities of discourses under study, rather than just one reality.

The montage approach used here also follows Peterson's (2011, 40) recognition that the contours of reality are not always traceable, and that knowing can only ever be achieved in parts. Thus, as George Marcus (1995, 102) writes, "in multi-sited ethnography, comparison emerges from putting questions to an emergent object of study whose contours, sites, and relationships are not known beforehand, but are themselves a contribution of making an account that has different, complexly connected real-world sites of investigation". In this sentence, Marcus astutely explains the importance of the methodological framework and style of analysis that I have used in this thesis. Without such a juxtaposition of narratives, certain knowledge practices could claim hegemony by

taking on the 'explanatory burden' and tuning out differing claims to knowledge (Law 2011).

This chapter has contributed to the recent debates within geography regarding ANT's (in)compatibility with other methodological and theoretical approaches (Castree 2002; Gareau 2005; Holifield 2009; Kirsch and Mitchell 2004; Swyngedouw 1999; Swyngedouw and Heynen 2004). As Castree (2002, 116) has noted, "[so] arrsting are many of its key tenets that...ANT is today vying for paradigmatic status in [human] geography". This has happened at the same time that Marxist approaches have been decreasing in popularity in the discipline, as scholars have been branching out into various post-structural inspired approaches, like STS and ANT. However, some geographers like Castree, Erik Swyngedouw, Brian Gareau and others have sought to retain their Marxist sensibilities while simultaneously engaging with other strands of thought. While these approaches are on the right track, there is still much room for bridging these two diverse theoretical traditions, evidenced by the growing tension between the two that is becoming increasingly difficult to reconcile. Therefore, these debates are still going on within the discipline, as evidenced by Sheppard's (2012) recent attempt to broaden approaches to geographical political economy. As such, I maintain that by incorporating ANT's main principles with diverse strands of approaches to geographical political economy, we can reach a more fruitful and holistic analysis of economic activities.

I now turn to the empirical chapters of this thesis, beginning with chapter three which concerns Singapore's role as a global source of secondhand electronics. My main argument in this chapter is that Singapore is not merely a trans-shipment hub or destination for flows of secondhand electronics from the developed world, rather that it is a significant source in its own right. In order to do so, I will trace the conduits through which secondhand electronics pass in Singapore upon being initially discarded by their initial owner. As I will demonstrate, secondhand electronics disposed of in the country are either: traded overseas via local and foreign traders operating in Singapore; recycled for material or asset recovery; or incinerated and land-filled offshore. The aim is to present a holistic picture of how the trade in secondhand electronics is facilitated in Singapore, and the actants involved.

CHAPTER 3

SINGAPORE: AN IMPORTANT GLOBAL SOURCE OF SECONDHAND ELECTRONICS

The purpose of this chapter is to answer my research question concerning how international trade networks for secondhand electronics are formed and organized, as well as who and what the relevant actors are that enable this trade. It is an account of how networks for the trade and processing of secondhand electronics are made in and through Singapore. It is not a linear account, which assumes a neat starting and end-point, but rather, it looks at forms of trade and commodification from the middle of things. The approach in this thesis thus takes up the recent call of geographers such as Ray Hudson (2008) and Neil Coe et al.(2008) to embed economic activities in their social, spatial and embodied contexts, rather than seeing them as "overly economistic, linear and unidirectional" (Lepawsky and Mather 2011, 2; see also Leslie and Reimer 1999; Hughes 2000). This approach challenges the logic of previous work in economic geography due to its conceptualization of economic processes and exchanges in space and time as more or less linear relationships. As sociologist John Law notes, "matters grow from the middle, and from many places" (2002, 1). This chapter thus traces the nonlinear and unpredictable proliferations that bind together forms of trade which blur the boundaries between the legal and illegal. The aim is to allow the reader to see the connections between all of the actors interviewed here, and how these connections are responsible for shaping the trade in secondhand electronics in and through Singapore (Nordstrom 2007, xix).

Of course, the material in this chapter focuses on how the trade is formed and organized in Singapore, as that was my core research site, and this will differ from trading practices at play in different parts of the world. Nonetheless, it is important to understand how the trade operates here, because Singapore is an important site in the global trade of secondhand electronics, and influences the industry worldwide in quite tangible ways. This is because of my primary finding that Singapore is, in itself, a significant source of secondhand electronics traded to the developing world, which goes against the logic in the Basel Convention and other legislation governing the flow of these devices. This is problematic because, as a developing country (according to the UN's definition), the significant flows of e-waste passing through Singapore is not accounted for by the Basel Convention, which only regulates the trade from developed to developing countries. In addition, the case of Singapore makes a useful contribution to the growing body of literature examining how trading networks for secondhand electronics are formed and organized in different parts of the world.

The opening section of this chapter is based on my field interviews with various actors in the secondhand electronics industry in Singapore. I asked all of my respondents in the field why they have established their business in Singapore, with the aim of learning empirically why Singapore has become such a key hub city in the global trade of secondhand electronics traders. I will summarize their responses here in an attempt to get across the key factors positioning Singapore as a key site in the global trade and traffic of

secondhand electronics. But first, I will begin by summarizing all key informants referred to in this study, and their inter-relationships.

Most actors that I spoke with operate in Singapore and Malaysia, and are either directly involved in the secondhand electronics industry, or the shipping industry. Many of the actors that I interviewed were not directly linked to one another, but often knew of each other, due to past interactions, or because their shops were based in the same area. For instance, Dewan is the first trader that I spoke with in Little India, who then referred me to Fisu's father (not quoted from in the thesis), who then introduced me to his son, because he wanted to study in Canada the following year. Therefore, Fisu and I met several times over the summer, mostly to share information. Fisu then introduced me to his father's friend, Derrick, the shipping agent specializing in trade to Bangladesh. Derrick and Fisu's father once had a business together, selling new electronics. Dewan also introduced me to some of his buyers who came into his shop while I was there, including T-Ray, who later, upon my request (through Dewan, and somewhat hesitantly), introduced me to his shipping forwarder, Jason. Finally, I was introduced to Fung through a refurbisher based in the United States that I knew prior to arrival in Singapore, and she later introduced me to Mr. Kumar who (again, very reluctantly) agreed to speak with us.

Mr. Verhagen was the first non-trader that I spoke with in Singapore. He had been in the industry for a while, and new the names of many actors, mostly based in the electronics recycling industry, whom he could share with me. Unfortunately, the only one of those who agreed to my interview requests was Mr. Ravi. In addition, I had met a Singaporean reporter, who had written some articles on e-waste, and she introduced me to

two useful contacts: Justin Phan, an environmental activist; and Adam Ong, of APX IT services. Adam then introduced me to Mr. Shim in Malaysia, when I requested to visit his warehousing and refurbishing facilities.

Now that I have summarized the main actors referred to in this chapter, I will start by discussing how and through what conduits individuals or other (public or private) entities in Singapore discard their 'retired' IT assets. I then discuss the different conduits that these electronics can take post-disposal, namely, export for reuse overseas, material recovery (or electronics recycling) and incineration. In the second part of this chapter, I introduce the key actors involved in the trade of secondhand electronics in Singapore and its surrounding region. The actors covered here are the local (Little India) trader, the foreign buyer, the local regulatory bodies, as well as recycling and refurbishing companies of various sizes. As I will show, electronics are typically collected by traders in Little India, private companies, or through the government electronic business website (GeBIZ), before being sent overseas for refurbishment and/or resale. The aim here is not to reproduce a sort of 'commodity chain' analysis of how the secondhand trade in electronics works in Singapore, but rather to illustrate the passage of used electronics though this system, while emphasizing the many connection points amongst the actors and the sites in which they work.

As noted in the introductory chapter, I have also included material from neighboring Malaysia and Indonesia, as these nations are highly connected to Singapore, and allow it to assume the role that it does in facilitating the global trade of secondhand electronics. Since this is an ethnographic account, I have focused on one key informant in

each of these roles, while also bringing in the experiences of others in the same role to support their claims when needed. The stories of individuals are useful evidence for social scientific research; as George Marcus (2009, 9) writes, "fieldwork...provides in almost every case a personal, even intimate constitution, carrying in an embodied way [information derived from research]". Individual's accounts point not in the direction of concrete 'facts', but can rather provide an empirical opening to something just as revealing and informative as traditional empirical data (Peterson 2010).

In addition, and in staying true to the insights of ANT, the relevant actors here are not just humans, but there are non-human actants as well, which do have some effect on the actions of other agents within the network. Those in particular are objects used by people, supporting infrastructure(s), and regulatory frameworks, as detailed in table 3.1, below.

Table 3.1 - the array of actants involved in the trade of secondhand electronics in and through Singapore.

People	traders, shippers, recyclers, regulatory officers, journalists, consultants, activists
Objects used by people	electronics, electronic scrap/parts, media
Supporting infrastructure	industrial shredders, containers, ships, vehicles, GeBiz database
Legislation, regulatory bodies	Basel convention, NGOs, Electronics manufacturers (OEMs), government agencies

Finally, and related, there is a question of how far to extend the network of actors included in this study when some relevant actors are not based in Singapore. This is a question addressed in the previous chapter, but I think it could use some elucidation here as well. For instance, the NGOs, meetings of the Basel Convention, and the member states, as well as the electronics manufacturers (OEMs), whom also have a stake in how the secondhand electronics industry is composed, all play some part in the construction of a trade and regulatory environment that support some trade policies and not others. As discussed in more depth in the concluding chapter, the OEMs influence the NGOs like Greenpeace and BAN through financial support, whom in turn support and influence the Basel Convention and the policies composing it, which in turn affect how individual nation states regulate trade through their borders. The individual sections of this chapter will discuss the roles of these actants in more detail, and chapter five will reflect on the political significance of these roles.

3.1 Electronics trading and recycling in Singapore

As Justin Phan, an environmental activist and secondhand electronics collector based in Singapore put it, Singapore is a "waste society" and while there are collection points for electronics around the country, they typically do not receive as much equipment as intended. Electronic take-back programs in European and North American countries tend to happen frequently year round (Carbajosa 2011; Watt 2012); but in Singapore, they occur infrequently, and very much at random. For example, according to Mathew Phan in a *Business Times* article, Singapore's collection drives generate less than

10% of similar programs in the U.S. and Europe.

These low collection rates are so problematic in Singapore because of the high rates of ownership and use of electronic devices in Singapore. For instance, the percentage of Singaporeans with mobile phones is 140.7 per cent, while 98% own televisions, and 74% have a personal computers (Ng 2010). This latter figure puts Singapore amongst the top 12 countries worldwide in terms of personal computers per capita (NationMaster 2010). So, If we consider Singapore's population of roughly 5 million, and assume that mobile phones are replaced every 2 years, PCs every 4 years, and TVs every 5 years on average, that means Singaporeans dispose of 3.5 million phones per year, and almost 1 million each of PCs and TVs annually.[24] Thus, it is clear that Singapore generates at least as much, if not more secondhand electronics per capita than many European and North American countries. According to one electronics recycler and refurbisher in Singapore, "in a per capita sense, [Singapore's] e-waste output is very high, very very high. Within Asia I think Singapore is actually number one, on a per capita basis. For a small country, it generates a lot of e-waste".

As my contact went on to say, Singapore generates so many used electronics because, as mentioned in the introductory chapter, the city-state has a large and varied base of MNCs, about 6,000 in total, corporate headquarters and Finance, Insurance and Real Estate (FIRE) firms comparable to other second-tier global cities worldwide such as

[24] It is impossible to know exactly how much e-waste is generated in Singapore each year, as these figures are unavailable. Even this estimation may not reveal even close to the true amount because obsolescence times of different electronic devices are highly contextual, even within the same country.

Sydney, Paris, and Chicago (Chia and Lim 2003).[25] The number of these firms has increased rapidly over the past 20-30 years as Singapore's economy has continued developing, and this has brought about a high level of affluence in the nation. The dependence of firms and individuals on electronic devices has increased as the need for international telecommunication and efficiency of work has increased, and this need has been met by more and more sophisticated electronic devices being consumed. However, these devices are only used on a temporary basis before being discarded, resulting in a considerable amount of high quality, secondhand electronics being generated in the country.[26]

The low collection rate for secondhand electronics, despite the high number of electronics disposed of in Singapore, begs the question of where all the used electronics in Singapore are going. From my field observations, the bulk of these items are not being given away at collection drives, because as Mr. Verhagen pointed out, most Singaporeans (and Asians in general) expect to be paid for recycling, as opposed to their counterparts in European and American contexts. Singaporeans recognize that e-waste is not simply 'waste', but that it has considerable value. So, used electronics in the country, if they have 'market value' are typically sold to informal waste collectors (*karung guni* or 'rag-and-

[25] By 'second-tier' here, I refer to the Globalization and World Cities Research Network (GaWC)'s classification of world cities into alpha, beta and gamma tiers, based upon their level of international connectedness (GaWC 2012). The apha tier is divided into the sub-tiers A++, A+, A and A-. According to this classification, Singapore is an alpha+ tier world city, behind the A++ cities of London and New York, with over 6000 MNCs based in the country.

[26] Despite asking several sources, I was never able to get any figures on how much second hand electronics are generated in the country - hence my ambiguity here.

bone' men) in Singapore, to GeBiz, or to secondhand electronics shops in Little India.[27]

In addition, little of the e-waste that is collected in Singapore is actually remanufactured or refurbished domestically. Rather, as some Little India traders and electronics recyclers in Singapore told me, the bulk of Singapore's secondhand electronics are sent abroad, where it then goes through the process of remanufacturing and resale. The fact that these electronics are sent overseas to be refurbished demonstrates that there is little demand for refurbishing and resale within Singapore. There are some shops at Sim Lim Square, near Little India, which do refurbishing and resale on a relatively small scale, but most sell both new and used computers. One shop keeper that I interviewed there sells both new and used equipment, which is the case for most outlets in the department store. He revealed that though he sells used products, he makes most of his money on the new ones because the profit margins are higher, and there is higher turnover on the products. In contrast, the used electronics mostly come in from suppliers on an irregular basis, and do not have as much demand.

3.2 Procurement of secondhand electronics in Singapore

Many of the local traders based in Singapore use the government electronic business (GeBIZ) website (http://www.gebiz.gov.sg) to purchase the IT assets that they then either refurbish and resell, or simply scrap for the raw materials. This electronic database was set up by the Singapore government in June 2000, as part of the e-Government Action Plan (e-GAP I) to improve the efficiency of procurement of

[27] See Neo (2010) for more on the role of *karung guni* in Singapore.

electronics in the city-state (CSC Singapore 2010). The bulk of Government Procurement (GP) activities in Singapore conducted through this website are decentralized to public sector organizations (PSOs) such as individual ministries, departments, organs of state and statutory boards, which can post invitations for quotations and tenders to sell off their retired electronic assets. However, they must adhere to central procurement guidelines issued by the central government's Ministry of Finance. Local traders in Singapore can then register their business as GeBIZ trading partners (GTPs) online, and make bids on the equipment electronically.

The GeBIZ program has been lauded for increased efficiency, transparency (all tenders are recorded and publicly availably), and 'value for money' (CSC Singapore 2010), yet all of the Little India traders that I spoke to use this service, but many lamented to me that they are often out-bid. I asked Adam Ong, the Singapore head of a regional electronics refurbishing company, APX, if his company participates in the GeBIZ program, and what their experience has been like, he responded by telling me that: "Everyone is a part of it, but I can assure you right now on the record there are no environmental considerations for GeBIZ". Adam went on to tell me that, essentially, GeBIZ is concerned with two things, 1) the price, because it is a bidding process where you buy equipment from the government, and 2) is the track record of the company. As far as he understands it, both of these two factors are supposedly weighted equally in the allocation of equipment to companies who bid on them. But in practice, Adam led on that

GeBIZ is concerned 90% with price, and only 10% with the track record of the company.[28]

I asked Adam's Malaysian partner, Mr. Shaji, how the companies that bid the highest on the GeBIZ website are able to offer that high a price, when their competitors cannot.

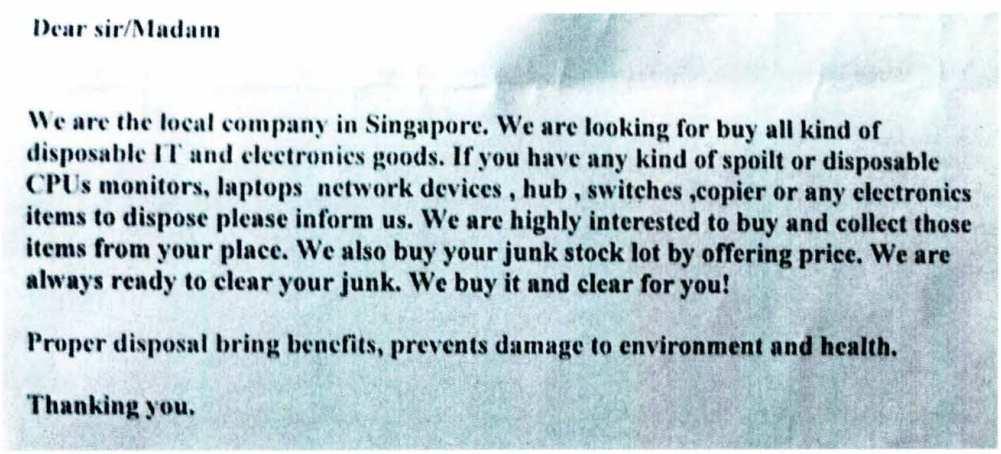
"Well there are a lot of fly-by-night businesses...newcomers to the industry...They think they can make a quick buck and get more than it's worth. But they don't know that most of the stuff that's coming out of the GeBIZ site isn't worth that much on the markets. So they start up buying a lot but then eventually can't keep up. The players like us who have been in the industry for a while all offer around the same price for the various goods".

These small 'fly by night' companies tend not to last very long in the industry because of unsustainable business practices, or lack of experience in or understanding of the market, he explained. Adam said their business model is to purchase used electronics for whatever the going rate is, and resell the valuable hardware components on the 'black markets' in China, Hong Kong or Taiwan. He went on to say that brand new start-up companies can offer very good prices for the equipment, and therefore frequently win tenders for secondhand electronics on the GeBIZ website. Mr. Ravi, he head of a large-scale electronics processor in Singapore also commented on these businesses during my interview with him, saying the Singapore government needs to do a better job at regulating them by, for example, restricting the number of new business licenses issued each year. The existence of these fly-by-night firms makes it difficult for established and

[28] Though Adam told me this, I could find no such description in any public records about the program issued by the Singapore government, in fact, according to information on the website, the bids are accepted if they offer the highest price *and* meet all of the PSO's requirements as laid out in the invitation for tender.

reputable companies to compete on the marketplace, and environmental issues are typically not considered in the business models, Ravi lamented. However, according to Mr. Ravi, not much had been done to improve the situation at the time of our meeting.

Another source for Singaporean based traders to acquire secondhand electronics is individual households or companies, in addition to the door to door electronics collectors (*karung guni* men) who will in turn sell the goods that they collect to the shops in Little India. The Little India-based electronics traders are listed on a publicly available database, so that representatives of local companies and individuals can contact them to collect their unwanted electronics. Another strategy used by some Singaporean electronics traders, like Dewan, a Little India based trader that I will introduce in section 3.4, is to issue letters, like the one shown in figure 3.1 to various households if his shop gets low on goods. I was not able to determine from Dewan which source (i.e. private or public) he buys from the most, how many households he targets, or how many solicitations he will send out. Though it was clear to me that some traders definitely have


Dear sir/Madam

We are the local company in Singapore. We are looking for buy all kind of disposable IT and electronics goods. If you have any kind of spoilt or disposable CPUs monitors, laptops network devices , hub , switches ,copier or any electronics items to dispose please inform us. We are highly interested to buy and collect those items from your place. We also buy your junk stock lot by offering price. We are always ready to clear your junk. We buy it and clear for you!

Proper disposal bring benefits, prevents damage to environment and health.

Thanking you.

Figure 3.1 - A sample solicitation letter used for the procurement of secondhand electronics by traders based in Little India.

their preferences. For example, Adam Ong from APX mentioned that his firm does not post tenders for equipment on the GeBiz website, as they prefer to collect from larger corporations which he said tend to retire better quality equipment, and it is often in better condition.

3.3 Conduits of disposal for secondhand electronics in Singapore

3.3.1 Overseas re-use markets

The newest electronics that are discarded in Singapore, and are determined to have market value (generally considered to be Pentium 4 or higher, for computers) will be exported to neighboring regions such as the Indonesian island Batam, just thirty kilometers across the Singapore Strait. However, many of these exported secondhand electronic devices will be traded further away to countries like Ghana, Nigeria or the Maldives. Many of these electronics are sold in Singapore's Little India district (where I conducted a majority of my fieldwork) to foreign traders coming in from elsewhere who buy in bulk to ship home with them for resale. Local Singaporeans make up a very small percentage of customers at the shops in Little India, because they can generally afford brand new products, and will thus not buy secondhand items.

Foreign traders are attracted to Singapore because of the high quality of electronics disposed of there. The quick turnover time for electronic devices in Singapore means that electronics consumed in Singapore generally have a long lifespan after being initially discarded. Likewise, cell phones and tablet PCs are only used for one or two years before they are replaced, at which point they are still quite often state of the art

technologies. The Little India based trader, Shaja (introduced in chapter one), told me that other countries in Asia like China and Korea also export second-hand electronics, but the quality is not as good because traders often take out the valuable components for domestic re-sale, while this is not a common practice in Singapore. Other affluent countries like Canada the United States, and European Union nations also have high quality secondhand electronics, but it is much harder for traders to get visas to go there, and there are not many secondhand markets catering to foreign buyers.

3.3.2 Electronics recycling

The electronics recycling industry in Singapore dates back to 1998. That is when the first companies began their operations in the city-state. Many of the recycling companies in Singapore were established because of the number of manufacturers that used to exist there before manufacturing got relocated to places like Batam. Technological upgrading , or 'tinkering' was an initial economic industrialization strategy for Singapore (and later, for Malaysia), and was seen as a way to carve a niche in the global(izing) economy (Bunnell 2004; Klischewski 2011; Wong 1997). As Bunnell (ibid, 57) notes, "high- and information-technology sectors has been widely recognized as a vital factor in the economic success of Eastern countries". Chris Verhagen, an independent e-waste consultant in Singapore, told me that there was substantial hard drive, integrated circuit (IC) chip and wafer-board production in Singapore, which generated a large amount of defective components and manufacturing scrap that needed to be dealt with locally. However, there was also demand from the multinational corporation (MNC)s headquartered in Singapore to recover the precious metals in the

electronics they were disposing of. The need for local processing of electronic equipment in Singapore led to the founding of Citiraya, the first electronics recycling company opened in Singapore, which was later dissolved in 2005.[29]

In an interview with Mr. Ravi, a founder of Citiraya, he told me that they chose Singapore as a home not only because of the growing need for a domestic electronics recycler in the country, but also because of the business friendly environment there. Three of my main informants working in Singapore stated explicitly that the Singapore government actively supports and encourages their business. Ravi put it like this:

"If you set up in a country like India, then you'd need to spend 70-80% of your time lobbying the relevant authorities for a permit, and it may or may not happen. We wouldn't be sure that our investment would generate any returns there, but in Singapore, once the government approves, they will endorse the company to help bring it forward".

After Citiraya opened, many competitors like TES-AMM and Centillion started their operations as well. According to representatives from Cimelia and TES-AMM, Singapore is more attractive than neighboring countries like Malaysia and Indonesia because of their prohibitive laws towards imports and exports of secondhand electronics, while in Singapore such imports are allowed as long as they do not violate any other laws, such as those on hazardous waste. Shaja also pointed to the stable and trustworthy government in justifying his decision to establish his business in Singapore. The country's famously strict laws make it a trustworthy business environment. As Shaja told me, "everything is regulated so it makes it a good environment to do business in".

3.3.3 Incineration

[29] see section 4.1 for more on Citiraya's legal difficulties.

Because of the sensitivity of corporate data stored on hard drives and other electronic storage devices, most electronics from the FIRE and government sectors in Singapore are either sent for recycling and asset destruction or incineration, rather than refurbishment and resale. As one electronics processor based in Singapore attested, data held on used electronics from firms in the FIRE economy are so sensitive that some firms would rather be 100 percent safe with their disposal than leave any chance of sensitive information leaking out. As a result, even though there are many ways of securely sanitizing IT assets, significant numbers of hard disks and servers end up being destroyed or incinerated.[30] This incineration takes place at waste-energy incineration plants on Singapore's outer edges, and the ashes are subsequently dumped at the landfill in Palau Semakau (see figure 3.2).[31]

Discarded electronic equipment, or scrap components, will also be incinerated if they have no market value and contain no valuable components. Outdated electronic equipment that has little or no 'market value', but has valuable components inside (i.e. gold, copper and other precious metals) will be bought by recyclers seeking to reclaim the value of those components. There are several large-scale recyclers based in Singapore,

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[30] Though I asked numerous sources, I was not able to get any concrete figures or even estimations on how much e-waste is incinerated in Singapore. One colleague in Singapore advised me, however, that the government actually has figures on this, but will not release them because the number is very high, which would detract from Singapore's global reputation as a clean, green, island nation.

[31] Since Singapore has a severe shortage of land, all of the country's waste is incinerated in one of four waste-energy plants on the island, and then shipped to the off-shore landfill of Palau Semakau, constructed from two small natural islands to be dumped. Interestingly, since the landfill receives only incinerated ash, the island doubles as a tourist attraction and site of leisure for the general public. Among the promoted activities on the island are inter-tidal walks, bird watching and catch-release fishing (NEA 2011).

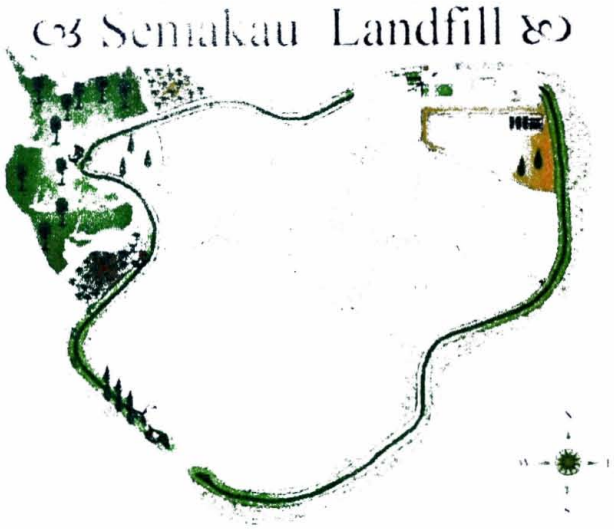

Figure 3.2 - Semakau Landfill - the "final resting place" for secondhand electronics disposed of in Singapore that stay in the country. *Photo taken by author from an information post on the island.*

like HTS- AMM, Centillion, and Cimelia who purchase their materials directly from their MNC suppliers and shred them before processing them for the raw materials.

3.4 The Little India trader

People in this business are billionaires!
-Ahmoud, interview, Singapore, 7 21 2011

Dewan, a native Bangladeshi, began working in the secondhand electronics industry in Singapore in 2004. By 2008, he had raised enough money to start his own company, which has been growing steadily since then. His main business is collecting electronics and electronic scrap from local Singaporean companies, government ministries, schools, etcetera. Dewan either refurbishes this equipment for sale to foreign buyers, or sells it directly to electronics recyclers or scrap collectors if it is faulty. Dewan's foreign buyers all come from developing countries such as China and India, who ship the equipment overseas themselves. Usually he exports either full computers or working accessories like

printers, as opposed to smaller scrap parts, due to the more limited market (and prices) for scrap items.

Dewan's regular overseas buyers come from Nigeria, Sri Lanka, India, Bangladesh, Kenya, China, the Philippines, Vietnam and Indonesia. Every month he receives about 10-20 buyers; most are return customers, who have been coming for the past three years. The number of buyers coming to shops like Dewan's confirms my initial assertion that Singapore acts as a regional hub for the trade in secondhand electronics, and that inter-regional trade accounts for a great deal of such flows. The Indonesian buyers mostly come from Batam, and come once a week. Malaysian buyers also come quite frequently, often from Johor Bahru.[32] As little as five years ago, a majority of the foreign buyers coming to Little India were African, but their numbers have declined recently for two main reasons. One is because of changes to the Singapore immigration laws. The main driver of these law changes, as Shaja told me, was the negative press that Africans received in Singapore due to their alleged involvement in crimes in the country. Whether these reports were accurate or not, the government introduced policy changes to make it tougher for Africans to visit Singapore. Any African nationals visiting Singapore now need to apply for a visa in advance, rather than simply getting a tourist visa or stamp in their passport upon arrival in Singapore. Second, recent currency fluctuations between several African currencies (especially the Nigerian naira) and the Singapore dollar have reduced the purchasing power (and profitability) of the African traders. However, because

[32] It is interesting to note that both of these regions are part of the Singapore - Johor - Riau Island (SIJORI) Growth Triangle, which links the economies of these regions together, and explains their close ties in the trade of secondhand electronics. This is a point expanded upon further in my thesis.

Singapore is part of the Association of Southeast Asian Nations (ASEAN), it is relatively easy for nationals of Southeast Asian states to visit Singapore. So nationals of these countries now compose at least an equal proportion of the foreign buyers of secondhand electronics in Little India, based on estimations by my field correspondents and my own observations.

Dewan has 5 employees, but only one of them works full time, and I never saw them at Dewan's shop during all of my visits there (about 8 in total). The one full time employee, an apprentice by the name of Ahmoud, assists Dewan with whatever he needs, whether that is looking after the shop when Dewan has to go out for meetings or other business, repairing equipment prior to resale, or by preparing drinks for clients or other visitors. By doing so, he will acquire all of the fundamental knowledge and skills that will be required for him to start his own business one day.[33] However, Ahmoud is not 'just' an assistant - in fact, he is quite central to Dewan's business, and in maintaining trust relations with clients. This is because Dewan and Ahmoud work together while they are both present at the shop, and many clients deal directly with Ahmoud when Dewan is away or looking after the business matters of the shop. Moreover, Ahmoud has more technical knowledge about the equipment than Dewan does, due to his role as a technician, thus making him an extremely valuable employee.

[33] This sort of apprentice system is a common practice in (in)formal industries across the world, as has been discussed in other works (see Lepawsky and Billah 2011; Neuwirth 2011).

3.5 The foreign buyer

T-ray is from eastern Nigeria, but runs his business from the southwest, just outside Lagos. I first met him inside Dewan's shop, where he was passing time until his container was ready for shipment back to Nigeria. "I only come here for business. I am a business man. I come, I buy what I need to fill my container, load the container and then go, nothing else". This takes on average, two weeks. I asked T-Ray why he chose Singapore to purchase his stocks, but his only response is that he goes where the business is. T-Ray said that he has been in the business for about 13 years, and got into it after he graduated from his secondary education. His parents did not have a lot of money, and he needed to go into business so that he could support himself, and make a life for himself. Upon his graduation from secondary school, he bought a plane ticket to Singapore to start making connections and buying products for his business.

T-Ray initially came to Singapore on a tourist visa that entitled him to stay thirty days (as did I), but he obviously did not come as a tourist (again, nor did I). However, he left unclear how he got the capital up front to come to Singapore, and why he chose Singapore as a destination in the first place. Upon arrival in Singapore, he did not know anyone, so he stayed in a hotel room nearby Little India and taught himself how to succeed in the business by just immersing himself into it. For instance, he started out by going around to the clusters of secondhand electronics shops in Little India and asked people how much they were selling their computers for. After having gone around to all of the shops, and building up trust with the traders there, he started asking why some computers would cost more than others. He was told that Dell or HP are the most

reputable brands, and cost more, especially if they have the 'Intel inside' logo on the CPU box.

For the first 7 years doing business in Singapore, T-Ray would always buy from different shops, but upon receiving his shipment in Nigeria, he would find that roughly 50% of the electronics he just shipped back would be "junk" - electronics that were either beyond repair, or non-marketable, even in Nigeria.[34] This 50% figure might be familiar because it accords with the oft-cited statistic from the Basel Action Network (BAN) that 50-80% of the developed world's e-waste is shipped overseas for informal 'dumping' (Basel Action Network 2002; CISC 2008; Greenpeace International 2009). This is true for some (typically 'fly-by-night') companies who ship non-functional electronics overseas in an attempt to make a quick profit. However, these companies do not stay in business long because they do not gain the trust of return buyers like T-Ray, and could face harsh government sanctions in Singapore if caught. For other businesses like Dewan's, however, both T-Ray and Ahmoud estimated that less than 10% of the electronics shipped would be non-functional. This figure is so low because Ahmoud checks all of the electronics that Dewan sells. So, when T-Ray would unload his stocks in Lagos, most of his 'new' equipment would be working, and could thus make decent profits.

"Of course" Ahmoud told me, "maybe one or two pieces will get spoiled during transport. They are collected by our drivers, from offices, brought to our shop, unloaded, stored here, bought by T-Ray, loaded in to his containers, sent by his driver to the port, loaded on to the ship, transported all the way to Nigeria, with stops along the way. Unloaded from the ship at the port in Lagos, collected by his driver, taken to his

[34] Unfortunately, he did not specify to me what he did with this faulty equipment

warehouse outside Lagos, unloaded from the containers, and there, one or two may have been jostled during the trip, and spoiled. But that is a very small percentage of the total".

On his buying trip that coincided with my field season in Singapore, T-Ray was shipping back one forty-foot container, which he says will fit up to 2300 CPU towers, and one twenty-foot container will fit around 850-1000 CPU towers. The forty-foot container costs about US$4,750 to ship, whereas a twenty-foot container will cost half that amount. This is in addition to the cost of the flight, about $2,000 on Air Emirates, plus the hotel or hostel costs. The used computers are bought in Singapore for $20 each, and sold 'new again' for the equivalent of $40 dollars in Nigeria - a markup of 100%. Yet with a national poverty rate of 70% in Nigeria, people are more likely to choose secondhand electronics over new ones, which can cost 5 times as much (Osinubi 2003). Small scale, secondhand businesses like T-Ray's thrive in African cities like Lagos, because, as Neuwirth (2011, 25) notes, larger companies do not find enough profit in bringing state of the art products to 'third world' cities for sale.

These secondhand computers will probably work for another 5 years, T-Ray estimates, and as such they are certainly not 'end of life', either in Singapore or Nigeria. This time T-Ray bought about 750 computers from Dewan's shop, but also ordered a large quantity of peripherals, such as printers, scanners, copiers and laptops that he will be sending back. However, due to the limited size of Dewan's shop, only about 100 CPU towers and 70 laptops came directly from Dewan's stocks, while the others he ordered from other traders in the area to fill T-Ray's order.[35]

[35] Though these items are technically sold by Dewan's shop, it is not his responsibility to test the electronics to ensure that they are working properly. Though, to uphold his own reputation with clients, he told me that the generally only buys from dealers that he trusts.

T-Ray tells me that Dewan is his main supplier, and prefers to deal mostly with him because he has built up a substantial amount of trust with him over his last five visits to Singapore. This level of trust is important because he knows he goods he purchases will be mostly functional, and that he will get them for a reasonable price. Ahmoud, in turn, told me that T-Ray is their biggest buyer, so they give him 'credit'.

Creighton: *what do you mean by 'credit'?*

Ahmoud: *Well, last time he was here, he didn't have enough cash to pay for all of the computers that he bought, so he owes us S$17,000 (US$13,500). But he can send us money, and he has an order in for 2000 computers, so we are not worried that he will pay us. He just bought 750 computers the last time he was in here.*

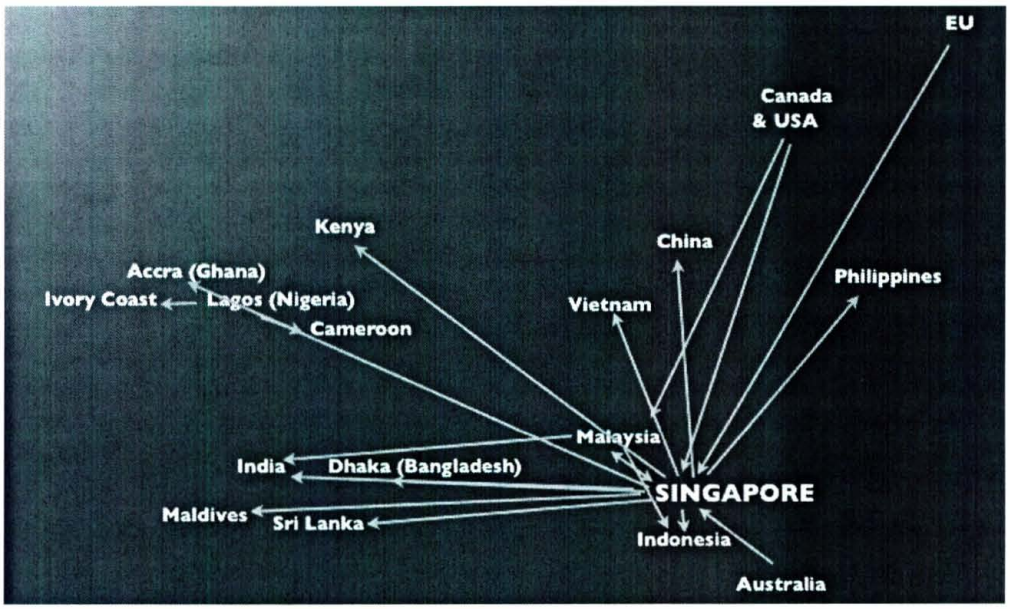

Figure 3.3 - Trader networks, showing flows of secondhand electronics passing through Singapore, based on information from my interviewees.

As can be seen, this exchange indicates a significant amount of trust because, lacking a formal written agreement, Dewan and Ahmoud's business has no protection if

T-Ray were to not follow through on his commitment to send the rest of the money he owes. However, T-Ray would also be affected as he would then have to find another reliable business partner in Singapore, or elsewhere.

T-Ray sells the items that he buys either in bulk or individually. If he sells them in bulk then it is usually to companies or traders who take his products and sell them in other parts of Nigeria. This finding confirms Oteng and Grant's (2012) assertion that Lagos serves as a African hub for the trade in secondhand electronics for other buyers in Western Africa, like Cameroon or the Ivory Coast. It also confirms Nigeria's identity as both a source and a destination of secondhand electronics, contrasting against the current orthodoxy which suggests that Nigeria, along with all other African countries, is simply a destination (c.f. figures 1.1 vs. 3.3). In addition to selling, T-Ray also rents out certain computers for a few months at a time to companies, and his technicians will go to service the computers if they have any problems. Last year, T-Ray was renting out a majority of his computers, which meant that he did not need to take as many buying trips to Singapore to replenish his stocks. But his reduced number of buying trips also stemmed from the fluctuations on the exchange market between the Naira and the Singapore dollar, which had reduced his purchasing power, and hurt his business, so that he could not afford to travel to Singapore as often. Therefore, he attempted to minimize his losses by focusing on the rental side of his business.

As pointed out by Neuwirth (2011), even the informal economy depends on the formal system of national currencies, and most business is done in the local currency of the country in which the transactions are being made. But it is not possible to buy or sell

all national currencies in every country around the world. So, to buy electronics in Singapore, T-Ray must first convert his naria to U.S. dollars in Nigeria, then convert this amount to Singapore dollars on arrival in Singapore. Since the naira had fallen substantially against the U.S. Dollar in 2010, and the Singapore dollar had risen relative to the US dollar, he would lose a substantial amount of money in each transaction[36]. However, the currency markets had stabilized somewhat by the time I arrived in Singapore, and T-Ray was back to buying in Singapore three times a year.

It is important to note, also, that this vignette about T-Ray and his dependence upon formal systems of currency exchange illustrates clearly the intricate connections and inseparability between the in/formal. Even though the majority of T-Ray's transactions in Singapore are 'off the books', his dependence on the formal economy in other ways, imposes certain restrictions on his business activities, so they are not completely 'unregulated' as is often believed of the 'informal' economy. Moreover, it confirms Latour's assertion of why it is important to pay attention to non-human actants when studying the economy. Though this particular case may seem trivial, it shows that non-humans do have significant potential to modify the practices of humans, and deserve equal attention in analysis. Furthermore, fluctuations in international standards, like currency exchange rates, also has the power to regulate the ways in which even in/formal trade is conducted.

3.6 - The Refurbisher

[36] To be precise, in January 2010, one US dollar was equivalent to 148 Naira, but this figure rose to nearly 153 Naira by August that year. On the other hand, the Naira fell from 106 to the Singapore dollar to almost 116 from January to October the same year. That's a loss of about 100 US dollars for every 1,000 USD traded (OANDA 2012).

Fung is a contact that I was introduced to in Penang, Malaysia, who runs a refurbishing and recycling company called Net Peripheral, in the outskirts of Penang's capital Georgetown. Upon my visit to her warehouse, I was given a brief tour of the different sections of her warehouse, which is ISO 14001 certified, and the types of activities that take place there.[37] The company imports, refurbishes, repairs and resells used computer monitors (CRT and flat-screen) domestically within Malaysia, as well as to other developing regions of Asia. Fung's company buys the used monitors that they receive domestically, as well as receiving imported ones from a supplier in the United States. In terms of volume, the company has received about 300,000 monitors from the U.S. in the past four years. However, due to the increasing 'obsolescence' of CRT monitors in most parts of the world, Net Peripheral has recently started expanding into laptop and computer refurbishing as well, in order to maintain business. Yet, Fung even expressed concerns to me about the potential obsolescence of laptops in the near future as well, due to the increased use of tablet PCs. Clearly, any company involved in the IT business must be very dynamic and adaptable to change.

As I learn from Fung and other contacts during my research, the ISO status is an important one for businesses because it is an international standard which appeals to clients seeking a 'certified' company to work with. As such, it is also an international standard which circulates globally, and has the effect of ordering the secondhand electronics industry around the world. Therefore, many of my informants found this certification valuable, because it increases their level of competitiveness on the market.

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[37] See chapter two for a brief description of the relevant historical, geographic and economic context of Penang.

As Alex Ng informed me, it is also useful for increasing the internal organization and efficiency of a company, because of the different standards that they have to meet in order to get certified. Yet, he also related that it is quite a costly certification to get, and quite time consuming. From Alex's experience, he had been attempting to get the ISO designation for his company for over a year, and still hadn't received it.

At the front of Fung's facility, visitors are met by a display of 'like new' computer monitors for sale with the prices displayed in Malaysian ringgit (RM). Most of them ranged between 125-200 RM ($40-65). These monitors also come with warranties of up to one year. If the consumer finds them to be faulty during that period, they may be returned and replaced by Fung's company. In the back of her facility, I witnessed how these monitors were assembled: There was a team of technicians, working at different stations to prepare the monitors for their second life; There were sanding and polishing stations to remedy cosmetic defects such as scratches or marks on the glass screen, or on the plastic shell; another station where each monitor was being tested for white balance and sharpness; and yet another where the electronic components were tested and subsequently repaired or replaced if deemed faulty (see figure 3.4). The replacements either come from other monitors that were beyond repair, or imported new from Taiwan. I also saw huge bins full of sorted scrap material, such as plastics or metals, which were waiting to be passed along to Net Peripheral's partners downstream who specialize in recycling those materials. In a corner of the warehouse is a whiteboard upon which each imported monitor is classified by its size, brand, repairability, colour as well as the condition of the case and screen. Each monitor is then given a grade - A or B - which

determines the monitor's value on the marketplace. More reputable brands like Sony or Dell are given higher grades, as well as those in better physical condition. But the colour matters, too (i.e. black ones are more valuable than white, because they are deemed to be more aesthetically appealing).

The workers and technicians at Net Peripheral are mostly migrant laborers from poorer countries in the region like Indonesia or Bangladesh, in search of a better life in Malaysia. The technicians were all trained directly by Net Peripheral's staff, and some

Figure 3.4 - A technician at work in Fung's refurbishment warehouse in Butterworth, Penang. *Photo by author.*

have been at the company for ten years.[38] Migrant workers are common in Southeast Asia, and Fung told me that they also hire migrant laborers at Net Peripheral because they tend to be more reliable than local Malaysian workers, stay longer, and are harder working. Without really getting into the literature on migrant geographies here, I would like to make one point related to one of the overall themes of this thesis. That is, that, just as the Net Peripheral facility does not fit the stereotypical milieu of 'e-waste recycling in the Third World' portrayed in the Western media; neither do the migrant workers at Net Peripheral fit the types of people imagined in these reports to be doing doing e-waste recycling in the 'Third World'. That is - impoverished men, women, and especially children pictured with minimal protective wear or equipment physically dismantling secondhand electronics (BAN 2002; 2005; CBC 2008; CBS 2009; Greenpeace 2008; 2009). Yet they also do not fit with the images of impoverished migrant laborers have traditionally been theorized in human geography as innocent victims of globalization who are "appropriate for some of the lowest status jobs in the global economy" (McDowell 2008, 495; see also Mitchell 1996; Sassen 2000). These are well trained, and respected workers who make enough for a comfortable living, and therefore choose to stay with the company.

Above Fung's facility is a series of offices where the company keeps records of all of the monitors that they have imported and exported, bought and sold for the year. This record keeping is an important and necessary (but painstaking) part of Fung's business,

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[38] Fung told me that migrant workers in Malaysia are permitted to stay with a company as long as they remain full time employees, but must renew their work permits on an annual basis. Therefore, some of them will settle in Penang and become *immigrant* laborers.

but one that she is quite proud of. These documents provide transparency into the company's business practices, and are required by the Malaysian Department of Environment (DOE), which issued Net Peripheral's permit to import secondhand electronics. These documents are so important to Fang because they act as evidence that can be used by the DOE to adjudicate whether or not Fung's company is doing business 'by the books'. Because Malaysia sets strict standards regulating the import of secondhand electronics from overseas, she must show where each shipment came from, what is contained in the shipment, and details about the equipment included. Including, often, documents which certify that the shipments contain only functional or repairable electronics.

It is also significant to note here also that Fung is the only actor in the secondhand electronics industry that I met in Singapore or Malaysia who is a woman, which suggests a clear gender bias in the industry. Fung imparted to me that in the scrap business, men tend to dominate because of the nature of the industry in that it requires more capital for plant and machinery investments as well as strong technical capabilities. She added that men also tend to have "wide[r] vision and bigger ambition in the field" which makes them more successful in the scrap industry than women. Fung also told me that sometimes men have to be "sneaky" in order to maximize profits and save on business costs, and this is something she is not willing to do because of her own morals[39]. Though it is important to note that these qualities are not universal to all women, as there may be

[39] See the section 'Grey electronics' in the next chapter for examples of what Fung means by this. It should also be pointed out here that Fung's case can not represent all women working in the industry, nor should her generalizing the typical male in the industry be seen as universal either. Rather, I have included her comments here to illustrate how she sees her role as a woman working in the industry.

some women who are capable of deceptive business practices, or those who have weaker moral and ethical standards. Nonetheless, Fung asserted that *she* got involved in the refurbishing and reuse side of the industry because as a mother, she always thinks of how best to educate her children on social issues, and since they are with her at her office after school, experiencing the industry first hand, she wants them to see the benefits stemming from the reuse of electronic equipment, and to internalize these values.

3.7 The small-medium sized recycler

APX IT Enterprises is a regional actor in the secondhand electronics trade and refurbishing sector in Singapore, with partners in Malaysia and Australia. They buy much of their material in Australia, where they have a sales office and small storage warehouse, and ship the goods to their regional refurbishing warehouse located in Data Industrial Park, outside Kuala Lumpur. The head of their Malaysian operations, Mr. Shim, showed me around their facilities there. During our tour, he told me that APX only deals with large corporate clients because their "refresh" cycles are typically between 16-18 months. The companies that APX buy from all have regional headquarters located in Singapore or Australia, which is why APX locates their sales offices there. "We don't buy as much from Malaysia", he added, because the local companies there only refresh every 5-10 years. Therefore, their IT assets are relatively low quality, with low profit margins. "Even the government and schools here have lower quality equipment", he said, "which would require a lot of servicing and upgrading and we don't make a lot of money from them, so it's not worth our time...[The ministries] just don't take care of their IT equipment, like the big companies do". "We go for the high quality stuff, with the high profit margins".

Mr. Shim said, proudly. "Sometimes we will work with the more high profile government offices like the President's office, and the Prime Minister's office, we've collected from them before", he added.

Mr. Shim's comments about the drastically different obsolescence times in different (geographical) settings underscores a point made by Lepawsky and Billah (2011) that obsolescence time for electronics is deeply contextual, and not a function of a device's true technical (in)ability to work. For instance, Lepawsky and Billah attest to using a ten year old computer while doing fieldwork in Bangladesh to check email and carry out their daily work activities while away. These examples point out a flaw in e-waste studies that attempt to calculate obsolescence time, or to estimate the amount of e-waste generated in a region by using statistical models (e.g. Streicher-Porte et al. 2005; Yu et al. 2010a). Moreover, even the duration for which electronics are used for within one small geographical region can vary depending on the income level of those who are using them - as Mr. Shim's statement attests to as well.

Inside the APX sorting warehouse, I saw three workers, sitting at benches manually dismantling and sorting the secondhand electronics that APX had bought that week. Everything is done manually, because APX currently does not have the space for any of the machine sorters. The workers weren't wearing much in the way of safety gear, but that is not really needed for the work they are doing, since it does not involve contact with the toxic components of the materials. But Mr. Shim told me they are currently in the process of getting a bigger warehouse outside of KL, so they will buy the equipment to do the sorting and asset destruction for them. All over the room we were in there were

large gaylord boxes of sorted materials, separating plastics from metals, and CRT monitors from ink cartridges. Many of these items are sold for material (precious metal) recovery, but this does not contribute a lot to their monthly turnover, Mr. Shim told me. Rather, it is the resale of refurbished products, and especially data sanitization services that keep them in business.

In terms of APX's business model, they do all the data destruction and de-branding of their clients' IT assets. "We test all of the assets here and then determine whether or not they can be resold or whether they will be scrapped", said Mr. Shim. Mr. Shim and his co-workers determine the value of a component based on whether or not they think the equipment has any reuse value.[40] Another important part of their business model is asset destruction. "Security is a large concern for us, and we try to ensure that the data is destroyed safely and securely" said Mr. Shim. To sanitize the data, they use a method of digital sanitization, which is the more sustainable method because it means that the hard drive can still be resold, and reused. This is more preferable for APX than the alternate form of data destruction (physical destruction), because they do not have the capacity for precious metal recovery.

Though assuring me the software that they use to do the sanitization is the best out there in terms of security, Mr. Shim admitted that some clients are so concerned about data security that they insist on their assets being incinerated. "It's not very much, maybe about one [metric] ton per month. It all depends on the client, it depends on the contract

[40] I wasn't able to learn his precise method of determining value of secondhand products. Mr. Shim (and others) simply explained that their in depth experience and knowledge of the market allowed them to determine this. Also, they added that it is generally based on the age and brand of the items.

we have with them, it's up to them". Adam Ong, the head of APX's Singapore sales office explained this logic to me in my interview with him in this way: "when you're dealing with banks, they don't really care-or, not that they don't care, but they'd rather be safe...environmental issues are not part of their concern, it's mostly data security". But Mr. Shim went on to say that many of their clients trust them to make sure that the data is destroyed securely, and do not really care what method they use. Like the other large-scale recyclers I visited in Penang and Singapore, their warehouse (though it did not look like much), was definitely secure. Someone is always there during the day, everyday, and CCTV cameras are left running 24/7 to make sure that nothing happens to their IT assets before they are completely wiped of sensitive data. Moreover, APX does not just destroy the data on the assets they receive, they also prepare a document for the client that shows exactly how many assets they collected from the client, what happened to each one, and how much money was made from each item. "We also give them the details of the data sanitization, including the method, the date/time, etc. It's then all signed and sent in. We give them these details so that if something should happen then they have proof that we handled the materials properly", said Mr. Shim.

APX believes that their high level of service and security sets them apart from their competitors in Malaysia. "They are mostly just retail", Mr. Shim said, referring to his competitors, and highlighting the range of services (like data destruction) that APX offers their clients. This level of service is central to the business models of many electronics recyclers, because it is where they actually derive a substantial portion of their revenue from, rather than the recovery of precious metals. Moreover, it is important to

make a note here regarding the importance of documents which can attest to the legality of companies involved in the trade or management of secondhand electronics, like these examples from Fung and Mr. Shim attest to. Without these documents, both individuals and their companies could be plunged in to a very murky legal grey area, and their reputation as legitimate businesses would be affected.

Lepawsky and Mather have commented on this service driven business model in relation to the electronics recycling industry in recent work on electronics recyclers in Ontario (see Lepawsky and Mather 2011). They note that though these companies are in a highly industrialized business of crushing, recycling and processing of tons of secondhand electronic material, electronics recyclers are also involved in the business of generating information about the destruction of materials. This information is then used for corporate liability issues - to guarantee their clients that the potentially sensitive information on the IT assets being recycled will not get into the wrong hands. As Lepawsky and Mather note, the company they spoke with in Ontario makes most of their profits this way, not from the (volatile and unstable) commodity value of metals such as gold, platinum and copper recovered from recycling the electronics. These examples go to show that though the e-waste industry is often talked about in terms of dematerializiation (destruction of materials) and 'informationality' (the production of information) as being separate issues; Lepawsky and Mather (2011) argue that materiality and informationality are actually deeply interlinked, and value can thus be captured and created from both.

This chapter has provided insight into how the domestic market for secondhand electronics is organized in Singapore, as well as how the city-state (and particular actors in it) are responsible for shaping the regional and global trade more broadly. I have shown how factors such as the high MNC concentration in the city, its high level of affluence; programs such as the GeBIZ website; as well as the clustering of secondhand electronics shops firms within Little India, all shape the nation's role as a global source of secondhand electronics. Moreover, I have pointed to the roles of non-human agents, such as Singapore's GeBIZ program, which works by extending the agency of humans through the use of technology and information systems, in order to create a relatively efficient system for the procurement of secondhand electronics in Singapore. In addition, the importance of documentation, as attested to by Mr. Shim and Fung, demonstrates the agency of such documents in certifying a companies operations as completely legitimate and secure.

My above findings also confirm that Singapore is not just a trans-shipment hub for the trade of secondhand electronics in Asia, but in fact a significant source in itself, which demands a reconsideration of how the trade in secondhand electronics is conceptualized in popular discourses, and how this trade is in turn regulated (inter)nationally. Moreover, the size of Singapore's GeBIZ procurement program ($8 billion annually), and its uniqueness in the Asian region (Singapore is the only country in the region to develop such a system for electronics), in particular demonstrates the centrality of Singapore as an economic center for trade and recycling of secondhand electronics and electronic scrap (e-scrap) in Asia.

It is important to note too that Singapore's role as a hub for the trade in secondhand electronics is dependent upon foreign traders coming in to Singapore to redistribute these devices to different parts of the world. My example of the Nigerian trader in Singapore, and his description of the trade networks in Western Africa, has documented the importance of trade within and between developing regions, and the crucial role of hub cities like Singapore in facilitating this trade. Thus, future research could look into the roles of hub cities in other regions of the developing world to help illustrate a more complete picture of the geographies of the trade in secondhand electronics within developing regions.

This chapter has also documented how the practices involved in constructing this trade blur the boundaries between the legal and illegal. For instance, Dewan's shop (and other traders that I spoke with) is a legitimate, tax-paying company registered with and licensed by the Singapore Government. However, he has no problem conducting business with traders who are in the country on tourist visas, conducting undocumented trade and shipping their equipment overseas for resale. They recognize that it is the traders' business, and they are not responsible for it. So, here we have legal stores, collecting their materials (predominantly) from legal sources such as the government procurement program, or GeBIZ, but supplying the in/formal economy.

However, it is important to note here that even businesses like T-Ray's can not be clearly demarcated as formal/informal or legal/illegal. Rather, traders like himself operate partly in the legal world, and partly in the informal economy. For instance, he is an unregistered trader in Singapore, but as far as I could tell, may have been shipping his

goods legally into Nigeria, and probably has a formal business license there. Moreover, he must interact with the formal economy in several ways, such as flying with commercial airlines, using commercial shipping companies, and storing his money in banks.[41] This finding fits with Robert Neuwirth's understanding of the informal economy as "a massive in-between space, strikingly independent, yet deeply enmeshed in the legal world" (Neuwirth 2011, 28). In this light, the trade in secondhand electronics can be seen as a grey-market industry that involves small, medium, and even large-sized businesses, registered domestically in one country, but linked to unregistered global trading circuits of undocumented commodities. This ambiguity between the formal/informal and licit/illicit will be the focus of the next chapter, where I will attempt to show that ostensibly formalized trading practices are the exception, rather than the norm.

[41] Thanks to Josh Lepawsky and Arn Keeling for stressing this point in an earlier version of this thesis.

CHAPTER 4

GREY ZONES: IL/LICIT FLOWS AND IL/LEGALITY IN A GLOBAL HUB CITY

In researching practices that fit somewhere between what is often considered either legitimate or illegitimate, I found it difficult to find concrete data in either published statistics or information that I was getting from my contacts in the field. Rather, much of the information related to me has been speculative in nature, and this is especially the case for the material that I am drawing on in this chapter. Therefore, I had to determine a style of analysis and writing that would be able to make reliable conclusions based on this data. For instance, when Adam Ong told me that 100 tons of 'e-waste' is dumped at the Port of Singapore every year, it was not a matter of believing or refuting the figure. Many of the figures related to me by participants in the field do not exist as formal data that has been documented by official agencies or institutions, or if they do, they differ considerably amongst different sources who have some particular interest in them.

Kirsten Peterson's approach of 'phantom epistemologies' (introduced in chapter one), is a useful one here as it recognizes that realities and elusiveness exist in the same space. Likewise, Luise White argues that rumours need to be taken at "face value, as everyday descriptions or ordinary occurrences" (2000, 5). Because this is an ethnographic approach in which some information has been derived from one main informant, I have reported the information related to me as 'facts', unless I came across extremely

contradictory evidence.[42] Moreover, I had difficulties gaining access to some key informants, as described in chapter two, yet I often gleaned information about the practices conducted by those informants through other sources during interviews, and Peterson's approach helped me to make sense of these reports. Therefore, due to the sensitive nature of this topic, and the difficulty in gleaning concrete information about it, the 'phantom epistemologies' approach allowed me to describe the networks formed around the secondhand electronics industry in Singapore in what (I think) has been quite a reliable manner.

I demonstrate here how my observations of the secondhand electronics industry in Singapore defy the simplistic categorization of actors and practices into categories of 'formal' and 'informal'. Using one or the other term would constitute a form of essentialist categorization, and would do little to allow for an appreciation of the complexity found within this industry as it is organized in Singapore. Moreover, it would be to disregard the various relationships that exist between the two traditionally distinct economic classifications.

Similarly, Robert Neuwirth in a recent book documenting the informal economy has underscored the need to consider and recognize the wide range of activities that goes on within this sector of the economy. Without proper business permits, or the documentation of their trade in formalized trade data, these traders have created a 'bootstrap' circuit of global trade which is "unrecognized by governments and

[42] For this research, I have regarded all statements coming from informants as valid information. Whether or not it is entirely true (one can never be certain in qualitative research of this nature), it still constitutes a viable narrative which allows me to piece together different versions of how the trade of secondhand electronics is formed and organized.

uncelebrated by economists" (Neuwirth 2011, 70). Moreover, as Kulke and Staffeld (2009) attest, the informal economy includes not only 'survival' activities, but also stable enterprises and dynamic, growing businesses. Kulke and Steffeld's observation is one that has been echoed by writers such as Nordstrom (2007) and Neuwirth (2011), who argue that the informal sector is actually a large provider of employment, goods and services for not only lower income groups, but everyone in society. Though informal businesses are more common in the developing world, they are highly connected to formal businesses around the world, as this thesis demonstrates. For this reason, informal business and trade practices thus account for a significant part of the world's economy.

I begin this chapter by discussing the e-waste legislation in Singapore, Malaysia and Indonesia, the regulatory measures in place, and how effective these have been at controlling the trade. Moreover, I attempt to demonstrate how this legislation acts as circulating forms and standards which then have the potential to create technological injustices (i.e. uneven access to technology) through their policing of imports and exports of secondhand electronics. To do so, I ask what this legislation does, and how it is influenced by legislation and standards set by other organizations in jurisdictions elsewhere. Moreover, I look at how this legislation gathers, associates and circulates various actors involved in managing the international flow of secondhand electronics and electronic scrap.

However, as noted in chapter one, this information on how flows of secondhand electronics are regulated in Indonesia and Malaysia does not come directly from the

enforcement officers themselves, as all of the officials that I contacted repeatedly declined my requests for an interview. Rather, the information presented in this section comes from other actors in the field who are knowledgeable about the regulatory policies in these countries. I was at first disappointed by not having direct access to this information, but the case is made here that I was able to get an equally strong picture from those who have directly experienced the effects of the legislative and regulatory measures in the countries in question. These actors include individual traders, heads of refurbishing or recycling companies, consultants or journalists that have years of experience in the industry, in addition to significant previous contact with the regulatory agencies in Singapore, Malaysia and Indonesia. As I have learned from these contacts, it is possible to gain first hand knowledge about how the trade in secondhand electronics or e-scrap is facilitated in Singapore just by shipping goods in and out of the port, and through 'market talk' - the stories and rumours heard from others in the business.

Following the section on legislation ('The local regulatory body'), I will discuss the shipping practices used to get secondhand electronics into and out of Singapore, as well as Singapore's role as a transshipment hub. This material mostly comes from shipping agents responsible for getting the containers from 'point A' to 'point B', who highlighted the grey aspects of these practices in my interviews with them (largely unprompted). This section is placed immediately following the previous one on legislative and regulatory measures to contrast how these efforts are often circumvented through 'licit but illegal' trading practices, and through the exploitation of loopholes in the e-waste legislation. I will then move on to a discussion of the electronics recycling

industry in Singapore, as told by an independent e-waste consultant in Singapore who has had direct experience working with many of the recyclers in the country. Finally, I will discuss the prevalence of *shan zhai* (knockoff) electronics, which proliferate in the city-state due to the intermingling of grey practices involving various actors in the secondhand electronics industry, such as equipment manufacturers (OEMs), electronics recyclers, refurbishers, and entrepreneurs. In both of these sections on recycling and *shan zhai* electronics, my aim is to demonstrate the complexities of the legal, moral and ethical grey zones that are embedded in the practices surrounding them.

4.1 The local regulatory body

So you understand the whole picture? The Basel Convention evolved and the whole world changed!

- Interview with Fung, Butterworth, Penang, July 2011.

Because it is such a small country geographically, Singapore has a natural advantage compared to most other nations in terms of the regulation of its ports. Regarding e-waste regulations and the flow of secondhand electronics, the government has been actively working with the domestic electronics recyclers to improve the effectiveness of their policies. Even along Singapore's beaches there are signs reminding people to be aware of any suspicious boats arriving on shore, unloading people or cargo. According to Adam Ong, the representative of a medium sized recycling company that I spoke to in Singapore, his company gets inspected on nearly every container they bring into Singapore. So Adam suggested that clearly Singapore's National Environmental

Agency (NEA) is experiencing some problems with illegal shipments, otherwise they would not be doing inspections so often.

Yet I received many competing claims on how well shipments into the port of Singapore are enforced. For instance, one of my contacts from the field admitted to me that e-waste is not a priority for the Singapore government right now, because it is a relatively small issue compared to their other environmental concerns such as the supply of clean drinking water and other vital resources.[43] Moreover, the literature on the global shipping industry suggests that perhaps as much as 95% of the trade through large ports like Singapore is not able to be monitored, and may thus result in illegal shipments slipping through (Environmental News Service 2011; Nordstrom 2007). Yet I also had Adam tell me that *all* of his companies shipments into Singapore get physically inspected. This is why I found Peterson's approach of 'phantom epistemologies' useful for my analysis in this thesis, because it allows me to make sense of such seemingly contradictory data without forcing me to decide which information is 'right'. Rather, all competing claims to knowledge or controversies that I came across in Singapore are useful in their own right, and are worth following (c.f. Latour 2005).

Another issue concerning the regulation of e-waste coming into the port of Singapore is that of 'orphaned shipments' of secondhand electronics (and/or electronic scrap) arriving at the port. Adam told me about these cases of 'orphaned shipments' being dumped in Singapore, and I have decided to discuss this issue here because it illuminates how illicit shipments of faulty electronics or electronic scrap are handled by the

[43] This statement is validated by looking through the NEA's Annual Report (NEA 2011), which contains no mention of e-waste.

government upon arrival in the country. According to Adam, the sender will simply send a container full of unwanted 'e-waste' to the port, and not arrange for anyone to receive it. He explained it to me like this:

> *"Because they have so many containers here - I'm sure they have like a few million - you really can't track them, and you won't know what the container is until you open it up and you see it's all e-waste. I'm sure the bigger shipping guys don't do this, but for the smaller guys it's really hard to account for them. It's the same way as when an old tanker is just abandoned at a port, because it's cheaper than properly disposing of it. Usually the container is haphazardly piled with as much e-waste as they can fit in".*

Adam went on to tell me about the protocol for dealing with such shipments in Singapore. The port authorities (i.e. the PSA) will notify the NEA, which will then have to dispose of the contents. Adam ventured that the NEA may have in place a standing agreement with the bigger recycling companies to dispose of these shipments. The shipment is picked up by the port authorities or NEA and sent to either TES-AMM, Cimelia, or SembWaste. In terms of the prevalence of these 'orphaned shipments', Adam said that it is not a lot, perhaps 100 tons a year, or 10-15 containers maximum. However, he was not able to tell me how common this is in Singapore in comparison to other ports in the region. But he did say that in addition to its status as a free port, Singapore may also attract these shipments because of the sheer volume of containers coming into the port.

Adam added that a lot of these illegal shipments come out from the port of Rotterdam, which is one of the busiest in the world, "so it is very hard to police these

things".[44] He added, "It is possible [to police the flows], but with a few million containers going through the port, it's really hard to do so. As far as port authorities go, they're more concerned about bombs and drugs and everything, they don't pay special attention to goods like used electronics, just because it's not such a security issue". Yet, as Hornsby and Hobbs (2007) point out, these relatively 'low-risk' options represent a viable alternative to more high-risk pursuits for organized crime groups and other individuals. Moreover, the highly publicized or "sexy" goods such as drugs and weapons actually make up a very small percentage of all illicitly traded goods (Nordstrom 2007). Nor is it the highly publicized organized crime groups or 'criminals' that are responsible for most of the trafficking of illegal goods going on in the world (ibid). Rather, it is corporations of various sizes that are guilty of trading undocumented or improperly documented goods in order to maximize profits.

During my field season in Singapore, I heard a lot about violations of e-waste laws in the country, some of which were caught by the authorities, some of which were not. One of the largest publicly investigated cases to date in the country is the role of former electronics recycler Citiraya's chief executive officer (CEO) Ng Teck Lee and assistant general manager Ng Teck Boon in selling rejected microprocessor chips to black markets in Hong Kong and Taiwan. The case came to light in January 2005, and an investigation was conducted into the management and staff of Citiraya and their partners from other companies who were also involved in the scam. Their partners, Johnny Seow and Chan Kwok Pew of Advanced Micro Devices Pte. Ltd., were offered bribes from the

[44] In fact, Indonesian authorities recently seized 24 containers of hazardous waste, shipped from Rotterdam (Environmental News 2012).

Ng brothers of $8,000-$24,000 per week in exchange for not crushing the microchips being supplied to Citiraya, so that they could be sold through the grey channels in Hong Kong and Taiwan. Wong Chin Fan of ST Microelectronics Asia was also found to be involved in the case by ensuring that the chips were delivered to Citiraya uncrushed. Wong was reportedly paid $5 per kilogram of uncrushed chips, and received over $30,000 between September and December 2004 (Government of Singapore 2006). In all, Ng Teck Lee received over 51 million US Dollars as payment for the 62 shipments of computer chips.

The NEA cracked down quite hard on the individuals involved in this case in order to send a message to other companies and individuals involved in the same sorts of activities. Ng Teck Boon received 6 years' imprisonment; Seow and Chan received 3 years' imprisonment each; and Wong received one years' imprisonment. All had their bribe monies confiscated in the form of penalties. Citiraya has since been dissolved, however, CEO Ng Teck Lee managed to leave the country, and is now a wanted fugitive. Nonetheless, in September 2011, the Singapore High Court issued a decision to confiscate all of Ng Teck Lee's assets in Singapore, including property and bank accounts, as well as those in the name of his wife, Gan Chin Chin.

Thus, we can see through this example that despite the existence of some trafficking through Singapore, the harsh penalties and ramifications for potential traffickers imposed by the government encourages traffickers to think twice before attempting to traffic goods in or out of Singapore. On the other hand, these penalties are actually quite light in comparison to the mandatory death-sentence that drug traffickers

receive in Singapore and Malaysia, which makes secondhand electronics a more viable and lower risk opportunity for smugglers. Moreover, as my informants told me, it is quite easy for a company's shipments to slip through such sanctions, because of the inability of the regulatory authorities to inspect all of the shipments coming into, or going out of the port.

The scenario is slightly different in Malaysia, which is more exposed to the smuggling of secondhand electronics than Singapore due to its much longer coastline and its location on the busy Strait of Malacca trade route (Tengku-Hamzah 2011). But the legislative and regulatory practices in the country are quite different from Singapore as well. From what I found during my fieldwork, Malaysia is quite unique within Asia in that it is not very strict on inspecting shipments, despite having stringent legislation, especially concerning electronics recyclers in the country. Indeed, the Malaysian Department of Environment (DOE) actually has very strict standards regulating the handling of electronic waste within the country, and used electronics of up to five years of age are allowed to be imported to the country.

According to Kelly Keogh, a founding partner of Greeneye Partners, an auditing company for electronics recyclers worldwide, Malaysia's regulatory standards are better and more stringent than those in the United States and Canada, countries that lack a national e-waste law. Fung told me that Mrs. Keogh had audited NetPeripheral in 2006, and told me to follow up with her about her experiences auditing companies in Malaysia. I then caught up with Mrs. Keogh during the annual E-Scrap Conference in Orlando, Florida in October, 2011. Because of these strict regulations, Fung needs to keep very

detailed data on her sales, import and export data, and report it to the government every month. "And people are saying 'don't ship to Malaysia!'?! exclaimed Mrs. Keogh, "I just don't get it". Indeed, during my visit to Fung's facility outside of Butterworth, she showed me the thick handbook listing the DOE's regulations imposed on electronics recyclers and refurbishers in the country. These standards are set by the Malaysian DOE to comply with (or rather, exceed) the international standards on trade in secondhand electronics, and act by demarcating exactly which items are and which are not permitted to enter the country.

However, Fung tells me that despite the tough laws on paper, the ports are, in reality, not regulated as strictly, so it is possible to declare electronic scrap as 'scrap metal' and the Malaysian Port Authority likely will not do a physical inspection. "In Malaysia the government thinks that the businessmen won't be able to make money off selling older products, so they think they won't be so stupid as to import it. So they don't check!" asserted Fung. "They trust the importers to do the right thing". She added that the Malaysian Department of Environment (DOE) is new at regulating imports of used electronics, as the legislation was only put in place ten years ago. Therefore, the state still has a lack of manpower needed to train officers, meaning there is not enough regulation in place at the port, so Fung's (legal) imports from the United States are never inspected.

Indonesia, as we will see below, as well as China, Singapore, and others, are all quite strict on imports of secondhand electronics, and are frequently in the news for confiscating contraband shipments of electronic scrap coming into their ports (Ingenthron 2011; Leineweber 2011; Environmental News 2012). These legal challenges are the

reason Fung and her partner Allan Liu moved Net Peripheral from its original location in Indonesia to Malaysia in 2001. Actually, she told me, the Indonesian legislation has just changed so that now it is legal to import computers that are up to three years old in to the country. This change in legislation is a success, she said, but the 'three year policy' is still problematic, as a majority of people still do not have access to used products that are three years old because typical corporate 'refresh' periods are at least three year cycles. Moreover, used electronics under three years old are still quite expensive, sometimes not much less than the price of brand new products, so they are either not affordable or not worth buying. Another problematic aspect of this policy is that it is often difficult to determine precisely what is three years old and what is not.

Fung recalled for me a meeting that she had with a customs officer in Indonesia just a few weeks prior to our interview, and she summarized for me the logic in Indonesia's policies on importing secondhand electronics: first, Malaysia banned imports of used electronics, so they did the same. Then, Malaysia loosened the legislation and changed it to allow imports of secondhand electronics up to three years old. So Indonesia again followed suit. Indonesia recognizes that Malaysia is a more economically developed and progressive country, so they attempt to implement policies that Malaysia has, to bring their nation up to the same level. However, the problem here, as Fung explained to me, is that due to income disparities between the two countries, Malaysians accordingly have different requirements for the electronics that they need and they also have different budgets to spend on those electronics. In addition, Malaysia does not impose a tax on imported used electronics, so they are still affordable to the populace. But since Indonesia

does impose this tax, the three year old electronics would be completely unaffordable. A useful analogy that she used to help me understand the problem with this logic was "Malaysia has this apple, so Indonesia also wants to have this apple, so that they can be the same. But the problem is that the people in Indonesia might not want the apple, it is very expensive, so they want to buy some local mango or durian. That is the point". But, Fung told me that in her meeting with the customs officer, she reached an agreement with him to lobby the Indonesian government to amend the policy from three to five years. Basically, she simply got him to understand that Malaysia and Indonesia are not the same, so they require different policies.

In fact, just a week before my meeting with Fung, she received an informal notice from the Indonesian government notifying her that the revised law was approved and would be implemented later in 2011. I asked how she could have so much influence in the Indonesian government, and she told me that she used to live and work outside the capital city of Jakarta for ten years, during which time she built up considerable relations with representatives from the government. "Actually, because my Indonesian is so fluent, and I look like a Chinese-Indonesian, they still do not know that I am Malaysian". This comment of Fung's speaks to the ways in which even 'formal' systems of regulatory practices are tangled up with 'informal' social relations and identities, particularly those of race and language. Moreover, it shows how national legislation can be very much impacted by individual people, organizations, or events, as has been demonstrated by examples in other parts of this thesis.

For instance, Robin Ingenthron, has written extensively on his blog: *Good Point: Ethical E-Waste Recycling* about how BAN's actions have influenced several countries in Asia to modify their legislation and enforcement practices for imports of secondhand electronics (Ingenthron 2011). Ingenthron is an industry professional in the United States, who has been involved in the refurbishment and trade of secondhand electronics in a number of different countries for over 15 years. Ingenthron reported that BAN launched a lawsuit against PT Imtech of Semarang, Indonesia, which was based on weak evidence and at the end of the day "ruined hundreds of people's lives and destroyed Indonesia's first refurbishing and CRT glass processing investment" (Ingenthron 2010). Ingenthron also notes that BAN has established such a name for itself around the world that "the Indonesian authorities didn't open the containers allegedly 'containing hazardous waste', they took BAN's word for it and sent them back" (ibid).

Fung agreed with Ingenthron's claims as to how NGOs like BAN can influence national legislation on e-waste, and what her experience has been with these bans. As Fung told me, the implementation of the Basel Ban Amendment, which was inspired in large part by BAN and Greenpeace, has been problematic, because it has triggered countries like Malaysia to impose a total ban on imports of used electronics, regardless of where it comes from and regardless of whether the materials are meant for reuse or recycling.[45] "BAN actually screwed up the whole thing" Fung told me. What she was

[45] The Basel Ban Ammendment was a motion lobbied for at the 1995 Basel conference by NGOs like Greenpeace, and some national governments like Denmark, which proposed to prohibit the export of hazardous wastes (including e-waste) from developed to developing countries for any reason *including recycling and reuse*. This legislation is not in force, but considered morally binding by signatory states.

referring to is the wave of changes in national legislation regulating the import of secondhand electronics in several Asian countries. At the end of the day, she told me, even though there has been some reduction in 'digital dumping' to the 'Third World', all Indonesian companies are now banned from importing affordable used computers or their components, and especially scrap parts. This, she lamented, makes it difficult for refurbishing companies in Indonesia to sell affordable secondhand computers on the domestic reuse market.

These examples go to show that the Basel Convention alone is not responsible for the ineffective regulation of internationally. Rather, it is the environmental NGOs that are partly at fault as well, due to their ability to influence individual national legislation. This claim is justified by Valverde's (2009, 144) work on legal jurisdiction which demonstrates empirically that authorities such as BAN can spark a "chain reaction" in turn determine the objects (i.e. e-waste) that are to be governed, in addition to how it will be governed (i.e. banning the trade from developed to developing countries). Or in Valverdes' words, "the 'who', then, ends up determining much of the 'how'" (ibid).

Moreover, this account of e-waste legislation (and its enforcement) in Malaysia and Indonesia demonstrates how the Basel Convention has acted as an (im)mutible mobile, through which the UN has set out the guidelines for the international regulation of secondhand electronics (c.f. Latour 2005). I put 'im' in brackets here because of the fact that certain states and organizations like BAN have, in practice, modified the legislative standards on e-waste, through the adoption of such forms as the Basel Ban Amendment. These legislative forms and standards act as *mediators* that then circulate internationally

to mobilize particular types of legislation governing the import and export of secondhand electronics in different countries(Latour 2005; Holifield 2009). However, it is clear that neither BAN, nor any other institution, have acted alone here. Rather, it has been through a variety of reports in the media, which have influenced the decision of various national legislative authorities, such as the DOE, on how best to regulate flows of secondhand electronics and e-scrap into the country. Moreover, different nation states, like Malaysia and Indonesia have also influenced each others regulatory schemes, even if this relationship has been rather one way. In addition, I have shown how industry representatives like Fang, can also have an important say in such negotiations.

4.2 Shipping Secondhand Electronics

Officially, you're not allowed to bring electronic scrap into Singapore. But really, how difficult is it to, instead of putting electronic scrap you put 'scrap metal'. Effectively, it is scrap metal.

-Interview with Mr. Chris Verhagen, Singapore, 19 May 2011,.

In my interview with Mr. Verhagen in a downtown Singapore coffee shop in June, 2011, he told me about the process of 'port hopping: "If you can't get it out of 'Port A', then you get it out of 'Port B'". Even in Europe, he said, if you cannot ship to Singapore from Europe, then ship to Hong Kong, and it is no problem. "If there's a will - there's a way". He justified this logic by explaining that the fines and regulations policing this type of practice are limited. $100,000 is the fine in Singapore for shipping undocumented or illegal goods. But it is estimated that many illegal shipments go under the radar of the

Singapore port authorities (Environmental News 2012; Nordstrom 2007; Neuwirth 2011). With the large volumes coming into and out of the port, it is simply impossible to check all of the containers.

Moreover, a lot of illegal shipments are simply labeled as used equipment that is meant for re-use, which is legal according to the Basel Convention. However, the convention leaves it up to the individual member states to define what is and what is not considered reuse. Consider the ambiguity present in this line of the Convention, which outlines which types of wastes are not governed by the laws of the convention: "[w]astes contained in the Annex will not be wastes covered by Article 1, paragraph 1 (a), of this Convention unless they contain Annex I Material to an extent causing them to exhibit an Annex III characteristic (Basel Secretariat 2005, Annex IX, List B)". Here, it is left up to the member state interpreting the rules of the Convention to determine what exactly the 'extent' is that causes the materials outlined in this list to 'exhibit an Annex III' (i.e. hazardous) characteristic. However, as can be imagined, there is no clear line that distinguishes between what is and is not hazardous.

To further illustrate the ambiguity at play in the Basel Convention, a computer tower could be five years old, but the components inside could be brand new. Or it could be in between - some new parts and some parts that are older than three years. In this way, the computer and other types of consumer electronics are assemblages of components that make it impossible to determine an absolute age or lifespan. Because of these ambiguities, Mr. Verhagen told me, some countries are starting to draft legislation defining what is and what is not considered re-used equipment, with Australia being one

of the forerunners. In Australia, to be considered as equipment meant for re-use, each item has to be certified and tested that it is working, and have the appropriate documentation. Thus, these examples of how the Basel Convention operates as a circulating standard governing international flows of secondhand electronics cements my above point about how the Convention is not an immutable mobile in Latour's sense of the term. Rather, it is much more flexible and open to interpretation by different traders, organizations or companies with varying stakes in the trade and management of secondhand electronics.

4.2.1 Circumventing port regulation and national legislation

Not all used electronics leave Singapore by boat - some might go by air, in the briefcase of a businessman traveling back to Bangladesh. In fact, this form of trade is actually quite common, I was told. Because individuals are allowed to bring one or two computers into the country for 'personal use', many people will be solicited by agents in Singapore to transport goods to Bangladesh for them, for a fee. One day I went into Dewan's shop and saw Ahmoud working by himself, wrapping up CPU towers and keyboards in huge sheets of clear plastic. He was getting the shrink wrap from what looked like an oversized Saran wrap dispenser. He would put the dispenser down at his feet and pull out one long sheet of plastic, lay it on the floor, then place one CPU tower on top - a turquoise and silver Power Macintosh G3, circa 1999. Then he would pick the heavy dispenser up, pull it over the computer, and tear the sheet off with his teeth. Then he would tuck in the edges, turn the computer the other way and repeat the same process once over. Next, Ahmoud pulled out a smaller sheet of plastic, put a matching keyboard

on top, wrapped it up, and placed it on top of the computer. Finally, he tore off another sheet of plastic and wrapped the two together. He did this with two computer and Keyboard sets. I asked him what he was doing:

Ahmoud: "Packaging them so they don't spoil. They get rain...they get scratched...they spoil...this saves them".
Creighton: "what are you doing with them?"
Ahmoud: "today one buyer come. From Bangladesh. He goes back to Bangladesh tomorrow, so he'll bring these with him".
Creighton: "But I thought Bangladesh doesn't allow imports of used computers?"
Ahmoud: "Yes, but personal use is OK. One, two pieces. He take one, give one to a friend, then he sells them in Dhaka".

This is one way secondhand computers are able to penetrate the borders of countries where they are not permitted: they are shipped undocumented by air, for 'personal use'. Another way is to send them by boat, to illegal ports. I learned this when I took a ferry to the Indonesian island of Batam, Indonesia, just a mere 20 kilometers off of Singapore's southern coast. Importing and selling second-hand electronics, especially electronic scrap, in Batam is illegal, because, like in Bangladesh, the government wants to support Indonesian-made products and brands. However, all new electronics brought into the country must go through Jakarta, even though many of them are produced domestically in large electronic industrial parks in Batam, such as Batamindo. But these electronics are manufactured for export only, and shipped to Singapore for assembly, before going onwards to Japan for retail. Finally, they might be redistributed from Japan to Jakarta, and from Jakarta to Batam, which makes the products quite expensive in Batam, even though many are produced there. "Indonesia has decided to open only 5 doors, not including Batam, so now products from abroad go to Jakarta first, not to Batam" (Lagat Siadari, quoted in Kampung Halaman 2010). However, there are ways

around this. On my visit to Batam, I found that electronic products from Singapore or Malaysia, are actually proliferating in Batam, despite their illegality.

According to Fung, the director of a medium-sized refurbishing operation based outside of Butterworth, Malaysia, "the [Indonesian] government closes the window and opens the backdoor, this is a very common practice, there is lots of corruption". While in Batam investigating this, I hired a local guide to take me around some of the areas where secondhand electronics are sold. During our walk through the area, he told me that some of the goods are brought in by agents who smuggle the goods in through Ajy Port, in Batu Ampar, on the northern tip of Batam. Ajy is an illegal port that runs mostly at nights, and is controlled by Indonesian mafia groups - so,I was not able to visit there. My guide told me that if police come to the port, or the second hand electronics shops in Batam, they are simply paid off, under the table, and the trade is allowed to continue. Because of their illegality, these shops are only located in the suburban areas of Batam, like Batu Ampar, not in the central city area. The sellers there have close ties to the mafia groups, too, I was told. Accordingly, they would not answer many of my questions, but they did say that they became involved in the trade because it helps the Indonesian people who cannot afford to buy the new products, and this is also a reason why police are so easily paid off. Though they pointed out that the shipping agent and police fees, in addition to the original cost of the electronics, add up to make second hand electronics quite expensive in Batam. For this reason, the number of shops specializing in secondhand electronics have dropped in the last ten years (since the implementation of the import ban), as it is almost cheaper to buy brand new electronics from legal shops in Batam City. Of course it is possible to

buy a secondhand television for $30-40, but the quality is much lower, as these are the goods that would not sell in Singapore's secondhand electronic markets. Many of them are poor quality, and some broken.

"It is like gambling. At times one day of use and it is broken. Other times we can get a very good quality at a very cheap price. Perhaps, Singapore people don't understand their things are still good. So, it really is a gamble...To me, if we are not able to buy the new thing because it is expensive, second hand goods should be legalized. Therefore, there is good stuff in the market. Unlike today, good stuff is kept in the customs office. Maybe it's just the sellers' excuse, we never know".

(Batam local interviewed in Kampung Halliman, 2010).

Adam Ong, from Singapore's APX office, understood the patchwork of legislation between states in Southeast Asia, and was very concerned about the grey areas that are produced by these different laws and means of enforcements: "the concern for us is that, because e-waste isn't strictly monitored, you have a lot of other states that, because there are not enough customs controls, it's easy to circumvent sanctions. We have big manufacturers (OEMs) who have contacted us to help them circumvent sanctions against certain states. Basically for market penetration". This logic on the part of the OEMs may seem to make little sense, yet as Adam suggested, they will often implicitly support the importation of contraband goods into different countries (like Iran or Afghanistan) because it may lead to an increase in their market share in those countries. A useful anecdote here, as used by Neuwirth (2011) is music artists who provide free downloads of their songs, in order for their music to reach a larger audience, which will in turn increase their profits at concerts. This is also true for IT manufacturers, as they benefit in the long run from having their products used by having a greater number of consumers using their products.

Adam obviously could not tell me where these clients were from, but he did stress that they were *big*. It may not be the actual client itself, but sometimes the different partners that they have. These partners are looking to break into certain countries with weaker regulatory systems in place, say Iran, North Korea, Afghanistan. By using covert means of trading, such as those described in this chapter, companies can actually circumvent quite a few of these national sanctions, and in turn increase their market share.

4.3 The Shipping Forwarder

Towards the end of my field season in Singapore, I wanted to follow up on the ambiguity in global shipping practices, especially concerning the documentation of goods. I was lucky enough to get an interview with a shipping forwarder whom I refer to here as Derrick. Derrick is from Bangladesh, and runs a shipping forwarding agency out of Singapore for mostly Bangladeshi clients shipping to and from Bangladesh. I was introduced to him by Fisu, the son of a used electronics trader in Little India that I had spoken to a couple of months before. Derrick and Fisu's father used to work together when they first came to Singapore, importing and selling new electronics, but this business was not as profitable for them. However, Derrick was careful to tell me that he is no longer involved in the trade of used electronics since Bangladesh banned the import of used electronics several years ago. Now he mostly deals with importers and exporters of new electronics only to avoid the legal grey areas, but he has still heard the market talk from those in the business.

"Is there contraband cargo going to Bangladesh?" Derrick asked rhetorically, "yes, definitely there is" he said, answering his own question. "If a customer tells me they

are sending secondhand items, I will avoid it, because I know the Bangladesh government doesn't allow for secondhand goods to be imported". The government's position is that if the secondhand goods are allowed to be imported, people will buy them over the newer products because of the difference in relative affordability, so the locals importing and selling new products will be affected, and will lose business. It is also likely that there is pressure put on Bangladesh from environmental groups like the Basel Action Network and Greenpeace to ban imports of secondhand electronics or electronic scrap from other countries.[46] Yet this is a short sighted policy because, as Derrick pointed out jokingly: "So, Bangladesh is a third world country, but they are using all the new products!"

"Now another scenario", Derrick admitted, "I just prepare the documents based on what my clients tell me to declare...I get the money, I will send the cargo". Derrick just forwards the documents to the shipping line upon departure, and they clear Singapore customs. But he is only responsible for the documentation as far as Dhaka. Then his client will hire a local clearing agent to get their goods through Bangladeshi customs. "Whatever, it is their headache". Derrick says this process is quite bothersome due to corruption in Dhaka, and it leaves a large grey area for smuggling, so he does not like to be involved with it. This type of shipping procedure is the same for Jason, T-Ray's shipping forwarder who specializes in shipping secondhand electronics to Western Africa. It Is the same everywhere, it seems. Jason told me that many of the goods that arrive in Apapa, the main port of Lagos, would cost thousands of dollars just to clear

[46] Indeed, this pressure is what sparked the Bangladesh High Court to ban the import of ships for breaking in the country in 2009 (The Ecologist 2010). However, in early 2011 the Court then ruled to allow shipbreakers to continue importing ships for breaking in response to pressure from the government and domestic shipbreakers (Hassan 2011).

customs. Therefore, the trader will hire a local shipping agent based there to negotiate with customs officials to cut the stated value of goods in a container, thus reducing the amount of duty needed to clear them (see also Neuwirth 2011, ch. 4).

However, Derrick was also sure to tell me that he will always clarify with his clients whether or not they are shipping used electronics. If they are secondhand, and the container gets held up at customs, then the shipping line gets held up, and, "the shipping line doesn't know the client, they know me", Derrick said. Then they are chasing him, and it becomes his problem. "I just try to avoid it", he told me.

Jason told me that in countries where imports of used electronics are banned, such as China, Bangladesh, Indonesia and Malaysia, traders can simply change the documentation to make their shipments seem legal. For example, he said, in one case he heard of, the trader declared that his shipment was "used busses" on the documentation, but the busses were actually filled with secondhand electronics. Another alternative that he thought of is that traders can declare their shipment as entirely 'new electronics' because even if they are used, packaging is often not necessary since the packaging will not show up in the x-ray when customs scan the containers anyways. If the trader is worried that their container may be physically inspected, there are ways around this too. For instance, as Dewan's technician, Ahmoud, told me, many secondhand electronics dealers in Singapore, like his business, are able to provide packaging for their clients upon request.[47] The packaging is made in Singapore, and easily accessible. However, this requires precious time that traders do not always have, and containers are not often

[47] This phenomenon occurs in secondhand electronics shops in Bangladesh, too, as attested to by Lepawsky and Billah, 2011.

physically inspected, so it is not a very common practice. Perhaps it is because, as Jason told me, in his 10 years of his experience in the shipping industry only once has his company dealt with a case of a shipment being physically searched and rejected - for a shipment being sent to Hong Kong. The container was searched and sent back to Singapore, at which point the customs were notified, the NEA got involved (because it was classified as an environmentally sensitive shipment) and they made it very difficult for the shipping lines and traders involved to carry out business through the port of Singapore afterwards.

Because of the grey zones built into the global shipping industry, there are certain government regulations and customs duties that can be avoided by using Singapore as a trans-shipment point. One of these is called the 'switch b/l', which refers to changing the bill of lading. With all of a trader's containers at the port, he/she can change the documentation, or the bill of lading so that the shipment looks like 'A' when it is leaving Singapore, and it suddenly becomes 'B' when it arrives at the destination port. Another common reason to change the bill of lading on arrival at a port is to hide the identity of the original shipper, which I was told is especially common in Singapore[48]. The switch b/l is so common in the city-state because the customs officials accept faxed shipping documents, so traders can change their documents very urgently. In contrast, some other countries do not trust faxed shipments and require the original documents, but sending the originals takes time as they must be couriered. For such reasons, some people find it more convenient to trade through Singapore. For instance, if a company in the U.S. is buying

[48] Emirates Shipping line even has a five page document available outlining the process (see Emirates Shipping Line 2010).

something from China, it will all go through Singapore anyways. According to Mr. Verhagen, the e-waste consultant that I spoke with in Singapore, some companies around the world still have the model that everything goes through Singapore. As he told me repeatedly, "if there's money to be made, people will find a way to do it". This is one of the consequences of having a 'business friendly' trade environment - it is easier and more convenient to ship through Singapore but it is this convenience that also makes it easier to traffic goods through Singapore.

"Does any of this come back to Singapore, after it's exported, or trans-shipped?" I asked Mr. Verhagen. "Well, the African stuff – I don't think that's coming back here, The Asian stuff – it's not coming back through Singapore – it's just going straight to Hong Kong. It doesn't make much sense for Malaysia and Thailand to send through Singapore. Depending on which coast you're on in those countries". But there are a lot of creative ways to ship secondhand electronics illicitly, Mr. Verhagen told me. By way of example, he related a vignette from a conversation he had with an individual involved in trading electronics to China. In order to avoid China's strict import laws banning the import of electronic scrap, he would ship his containers to Vietnam instead: "I said 'well how do you get it from Vietnam to China?' and [my contact] says 'the ant trail' and I go 'excuse me, the ant trail?' and he goes 'yeah, the ant trail: truck it as close to the border as possible, and walk it across. The ant trail. People walking with electronic scrap on their backs into China".

Because of the tough import laws, Mr. Verhagen estimates that most of the secondhand electronics going into China might be smuggled. "What's in the front of the

container might be different than what's in the back of the container", he added. These types of 'bootlegging' strategies are so attractive to criminal entrepreneurs because of the difference in value of electronics in different countries around the world (Hornsby and Hobbs 2007; Neuwirth 2011). Thus, as Nordstrom (2007) and Neuwirth (2011) attest, where there are borders, there is smuggling. The same product will have much more value on the grey market in Bangladesh than it will in Canada or Singapore, because of market regulations and controls in those countries, in addition to the differing levels of affluence - which in turn affects the relative value of secondhand items (Neuwirth 2011). Therefore highly mobile traffickers will be able to make large profits by collecting used electronic devices at very low prices in one jurisdiction, selling at a much higher price elsewhere, and paying minimal tariffs or duties on the goods by modifying the documentation.

According to Mr. Verhagen, 50-60% of the secondhand electronics leaving the Port of Singapore come in from outside. Most of the shipments coming in through Singapore are from Europe and the United States. In South America, the industry is developing right now and there is a reluctance to ship to Asia. "I don't know what's causing it" noted Mr. Verhagen, "but there is a distinct reluctance to send it here". Other than that, Mr. Verhagen told me, it all comes from the Western world - Either Europe or the US. Of everything that is shipped to Singapore, he said, a smaller percentage stays there. This is because the majority of Singaporean's do not use secondhand electronics as the level of affluence is so high that most people can afford the new products, so the used goods arriving in Singapore are: "trans-shipped elsewhere, either to other ASEAN nations, or African countries like Ghana or Nigeria", said Mr. Verhagen.

In my interview with Derrick, I asked where most of the used products are going, once they leave Singapore, and he responded by saying "if you ask me what I heard in the market, there are a lot of used products that is going to China, but I didn't send it, CRT monitors and all these things... But mostly now I think 60% goes to African countries" Derrick told me, "besides that a few go to China, but they are quite strict on that now, but still they are going there, still people are sending". Indeed, most of the secondhand electronics or e-scrap that are supposed to go through Singapore ends up filtering into China through Hong Kong. It just goes through Singapore because it happens to be such a big and efficient port. "But the legislation is going to get more and more," Mr. Verhagen told me. "[The Chinese Authorities] are going to try to curtail the amount of electronics that are shipped there from around the globe. But on the other hand, as soon as China cleans up their act, as soon as they regulate their electronics recycling and open the door, it's a huge threat to companies around the world. When it becomes legal to ship to China - and that discussion is going on".

In fact, just 8 months after my conversation with Mr. Verhagen, IBM opened the first *licensed* facility in China to refurbish and resell old computer servers, and the company expects that market to grow to $2 billion by 2014 (Woody 2012). This development further underscores the global e-waste trading patterns that this thesis traces. China is no longer a site where electronics from other countries are sent to be dismantled cheaply in the absence of formal government regulations, but rather is becoming a significant source of e-waste in its own right, which is an issue that needs to be addressed. It also supports Mr. Verhagen's statement that China is now emerging as one of the

leaders in electronics recycling and remanufacturing, and could eventually dominate the global market. As such, this is clearly an avenue for future research, and it will be particularly interesting to see what the effect that the development of licensed electronics recycling and remanufacturing in China has on the large in/formal recycling and remanufacturing businesses in the country, and the relations that develop between them.

4.4 Grey Recycling

"I think this industry is going to see a lot of grey, grey activity for a very very long time. And that's just because of the difference in value between [recycling and reselling]. Eventually people get quite creative, in the sense of the counterfeit components or just putting used components back into production. So there are a lot of grey areas in this industry"

-Interview with Mr. Chris Verhagen, May 19, 2011, Singapore.

The first individual that I met with upon arrival in Singapore was Mr. Chris Verhagen, an independent e-waste consultant in Singapore. He previously worked with an electronics recycler in Singapore, but just before I met him, he had resigned from that position to focus on his own e-waste consulting business. "I became very fed-up with [the electronics recycling] industry, and got out" he explained, "everyone says they do one thing, but actually do something else". He told me this is the frustrating part of the industry, because, "even if you want to do it right, your competition is not doing it right, so it becomes very difficult to compete on a level playing ground". Though his company does not own any recycling facilities in Singapore, Mr. Verhagen's job was to find reputable recycling companies for them to partner up with locally. Many of his company's clients are based in the Southeast Asian region, so to avoid the high costs associated with shipping their secondhand electronics back to Canada to be recycled, it made more economic sense for them to establish partners in Singapore to sell the

secondhand electronics to for recycling. However, it was very hard for Mr. Verhagen to find recyclers that would measure up to his company's high standards. "I'd say 9 out of 10 wouldn't measure up...there would be some grey areas, or questionable areas that weren't acceptable...You've seen [our facilities] right? the amount of storage space and the amount of processing is about equal, but if you look at most of the Singaporean recyclers, their storage area is always substantially bigger than their processing, which doesn't add up for me".

Yet, Mr. Verhagen made sure to point out that it was not just Singaporean recyclers who were guilty of selling the electronics that they receive out the back door. "It is everywhere", he said, especially in Asia, where there are no voluntary certification labels or standards for electronics recyclers. Ravi, the head of a large industrial electronics recycler in Singapore, told me that there are many ways to recycle electronics, and it is often hard to differentiate between competing recyclers because they all are simply called 'recyclers'. In addition, Ravi added, the government authorities in Asia typically do not know what the basic standards are that constitute a responsible recycler. Unfortunately, there are no international standards or benchmarks for recycling companies, though some are currently being developed, such as the R2 and E-Stewards programs based in the United States.[49] According to Ravi, in Asia, it essentially comes

[49] These two competing electronics recycler certification systems, which are both supported by the Environmental Protection Agency, are the primary certification bodies in the US. the R2 ('Responsible Recycling) system is supported by a US based trade association known as ISRI (the Institute for Scrap Recycling Industries). The "e-Stewards" system was developed by the Basel Action Network (BAN). For a review of these systems, see Lepawsky (2012).

down to how good a company is at convincing the authorities to grant them a license to operate.

Another issue complicating the electronics recycling practices in Asia has to do with cost. Most people in Asia expect to be paid for recycling, whereas in North America it is free, and in Europe people often expect to pay to recycle. Therefore, Asian consumers tend to want a higher return on their discarded IT assets than their Western counterparts. "Green electronics recyclers try to do things the right way, but it pretty much stops with [questions of], 'what does it cost?' or 'What's my return?', Mr. Verhagen asked rhetorically. Most companies want maximum return on their equipment, and I can't blame them", he said. Mr. Verhagen added that this desire for the highest monetary return explains why some Singaporean recyclers will be tempted to ship the materials that they receive abroad, to places like China or India if they can make a higher profit on it than by recycling it. For instance, it is often cheaper for e-scrap to be processed in informal conditions, in countries where there are little regulatory requirements in place, as opposed to industrial processing in developed countries which uses capital intensive electronic shredders and other dismantling devices.

Mr. Verhagen imparted that because clients in Asia who use electronics recycling services do not tend to question the process, so things are not likely to change in the near future. For example, he told me, "Most clients have the mandate that [their IT assets] have to be recycled, but they still want the maximum return, so...they will typically go for the company that says they will recycle it, but still gives them the highest return - even though this high return might mean that the goods aren't actually being recycled

properly". Because of these financial reasons, electronics in Singapore (and other countries) tend to bypass legitimate recyclers and end up in the hands of exporters who send them into the grey markets of in/formal electronics recycling in less developed countries.

Fung commented on the reasoning behind why some electronics recyclers get involved in such practices, especially when the market value of precious metals is so high: "If the commodity market is so good", she said, "then why do people still send to China? I'll tell you that Belgium pays $1 for each circuit board, but China pays $1.20 but how do they pay more? The Belgium facilities are top of the line!". Fung told me that China currently has the highest demand world-wide for copper, which explains the high prices for copper-laden e-waste and e-scrap in the country, as it is needed to fuel the nation's rapid economic growth. Though Fung suggested that the number of companies sending electronic scrap to China is decreasing due to environmental concerns there; Shanghai-based journalist Adam Minter noted that this trade will likely be allowed to continue because, "The Chinese Communist Party (CPC) is very concerned about raw materials shortages" (Minter 2011). This need thus reduces the government's incentive to impede imports of copper that could be used to fuel economic growth.

Mr. Verhagen described the recycling companies that he has audited in the past as being very "creative" in the way that they market their services. What he meant by this is that, "they can package [their recycling services] in such a way that it looks like it's being done properly, but the fact of the matter is that it's not". Mr. Verhagen told me that another factor causing this behavior is the value of the material that is being discarded. He

used my iPhone as an example, "if it's a recycled phone that's still working, if I just recycle it for the components, it's maybe 50 cents or a dollar, but if I resell the phone on the secondhand market, it's worth several hundred dollars. So that's where the problem lies. How do you get a company to keep working for that 20% of one dollar, versus occasionally taking one of them and selling them out the back door". In the cases where companies have been found guilty of exporting their e-waste overseas, Mr. Verhagen went on, "it's not the issue that it cannot be done properly, it's just easier to stick it in a container and send it to somebody. That's all it boils down to. It's purely the desire to not do it correctly. Everything out there is recyclable, some of it will cost money, some of it will give you some money for a return. But the mindset is just get as much as you can".

Mr. Verhagen told me that even in Europe, which is considered to be the most advanced in its e-waste legislation worldwide, they too have been grappling with substantial "leakage".[50] In fact, an estimated 54%, or 4.5 million tons of the secondhand electronics generated in the EU goes to informal scrap dealers or collectors, where the ultimate fate of these devices is unknown (Carbajosa 2011). But Mr. Verhagen suspects that most of this leakage ends up in Asia, shipped via Hong Kong or Singapore. He also pointed out that despite of all this leakage from the European Union (EU)'s Waste Electronic and Electrical Equipment (WEEE) system, the whole world is still behind Europe in their legislation.[51] "The US is definitely behind, the African nations, South America and Asia as a whole are all very far behind the EU" he concluded.

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[50] See, for example, Lepawsky 2012; Maxianova 2008; Widmer et al. 2002 for a review.

[51] WEEE is a EU directive which sets collection, recovery and recycling standards for all electronic goods in the union. See Widmer et al 2005 for a review.

What Mr. Verhagen is describing in the above paragraphs is the prevalence of electronics recycling companies, which also do re-sale of the working secondhand electronics that they receive. This practice is certainly illegal in most developed countries with industrial electronics recycling facilities, and is the reason why certification bodies for electronics recyclers have emerged in the US (such as R2 and e-Stewards, see footnote 39, above). However, the practice of recyclers re-selling reusable electronics that are mandated for recycling highlights the complexity of the grey zones in the e-waste management industry that have been discussing in this thesis. For instance, it is easy for ethically-minded consumers in developed countries to vilify recycling companies who send their electronics overseas markets for in/formal refurbishment or resale, as they may not want their electronics to end up harming the people or environments of developing countries. This sort of il/licit trade is frequently documented in the media and NGO reports, and has become a major corporate liability issue for companies in developed countries. Yet at the same time, not all secondhand electronics that are resold are refurbished in an in/formal manner, but may instead be refurbished in facilities like NetPeripheral or APX IT, and contribute to lessening the 'digital divide' in developing countries. Therefore, it can be clearly seen that 'grey' electronics recycling practices are also bound up with complex moral and ethical issues, and are not be easily classified as either licit or illicit.[52]

During my visit to Penang, Fung took me on a tour of the large-scale electronics recyclers based in the Georgetown area, in order to paint a picture of how the electronics

[52] Thanks to Josh Lepawsky for emphasizing this point on a previous draft.

recycling industry is in Malaysia. On our tour of these expansive full-recovery facilities, Fung said that she is not sure what they are all doing to stay in business.[53] "All of these are multi-million [facilities], but I don't know what they are doing, as I've never been invited inside". We saw large burlap sacks of scraps inside their gate, but the rest of their premises was walled, so we could not see through. It was interesting to see that these recyclers had such large facilities, because in my interview with Mr. Kumar, head of one of the full-recovery recyclers in Malaysia, says that their plant as well as the scale of their operations there are quite small compared to their facilities in other countries, due to strict Malaysian customs laws which only allow them to processes materials generated within the country.

But on our driving tour around the other recycling plants, Fung told me that they are all doing quite well, based on the business reports that she has seen. Though the amount of locally generated secondhand electronics in Malaysia is rising, Fung said, the fact of the matter is that there is not enough domestic business for all of these companies to get by, so they must be bringing materials in through illicit means. Therefore, Fung believes that there are loopholes at the port in Penang for secondhand electronics to trickle into the country. Like, for example, the methods discussed in the last section on 'Shipping secondhand electronics'. Mr. Kumar agreed with this possibility in our

[53] The Malaysian state divides recyclers into two categories: full-recovery and partial recovery. 'Partial recovery' refers to the process of collecting, segregating, dismantling and crushing of the equipment. 'Full recovery' facilities can perform the entire spectrum of processes from dismantling of secondhand electronics and recovery of precious metals, to the final disposal and treatment of hazardous wastes. Fung's facility is partial recovery.

interview with him because he said bringing in electronic scrap (illegally) is not especially hard to do in Malaysia:

"Take a look at the way the countries themselves are approaching it, Singapore is business friendly, okay so fine, we shall allow you to import... as long as you handle your output and sludge you do what you have to do..except that the Singapore government and the NEA are all business friendly. They allow the same people because it's trade, there's money for the ports, port handling charges, shipping...Where as the Malaysian angle is, I'm speaking for myself, I'm not speaking for them, they look at it as 'yes, we can follow the Singapore style, but it's going to mean a lot more enforcement duties required for us, we have to monitor the ports etc., so it's easier for us to just say: NO!'. So [Singapore] says, 'I let you go, but if I catch you, you are going to be in hell',[54] [Malaysia] says 'I've got a stick, but I don't want to catch you with it, so I won't let you do it at all'. Same law, same problems, but different ways of approaching it...so [for Malaysia] it's a lot easier to keep [the trade] under control if it's [kept] within the country".

-Mr. Kumar, interview - Penang, July 2011

These comments by Mr. Kumar accord with Boon (2005) who noted that "if the state does not care enough to enforce the law, no one should be surprised if some manufacturers do not care enough to follow the law". Moreover, Boon adds, this situation can create tension for some producers who are intent on following the law are penalized on the marketplace for doing so.

Fung also told me that if she wanted to get involved in such grey business practices, it would be easy for her to do that. "To be honest", she said, "many [electronics recyclers] have contacted me and asked if I want to partner with them to bring in scrap [illegally] and recycle it". For example, just last year, a major U.S. based telecom company contacted Fung and said they had 20,000 mobile phones that needed to be liquidated, but they wanted to get a better price than just the scrap (recycling) price, so

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[54] Indeed, under Singapore law, penalties for illegal importers/exporters can be up to S$300,000 ($238,000) for large businesses and up to S$100,000 ($80,000) and/or 2 years jail for individuals.

they asked her what other price she could get. Fung told them that in China 20,000 used handphones would go for about $50,000 because they would be easily processed into *shan zhai* handphones .[55][56] The *shan zhai* processors could just change the casing, rewrite the program, and come out with a new *shan zhai* branded handphone. However, Fung is not interested in getting involved in such business, because it would plunge her company into grey legal territory. "I told them 'no'...I don't want to do that. I know there is a lot of money in that, but it is not my business model". Echoing Mr. Verhagen, she told me many companies that advertise themselves as responsible electronics refurbishers or recyclers are actually just exporting scrap to Hong Kong to cash in on the high prices offered by traders there. "They just follow the grey channels that exist" affirmed Mr. Kumar.

The above vignette from Fang clearly captures the interconnected nature of il/licit practices in the e-scrap industry, and speaks to the grey zones that I have been describing throughout this thesis. For instance, fully registered companies are dependent on and interact with in/formal companies to conduct business transactions that would not be possible if a company were to just stay completely within the formal world. Moreover, it shows that it is not only in/formal companies that are involved in il/licit business practices, but can also be the big name, fully registered corporations. This also supports Nordstrom's (2007) finding that the top smugglers world wide are not smaller criminal

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[55] The telecom company Fung is referring to was likely obligated (either ethically or legally) to recycle the phones, but was not losing anything by selling them to China because they were not the original manufacturer of the phones, so it would not hurt their brand performance (as long as it was not discovered and publicized that they engaged in this illicit practice).

[56] These are knock-off electronic goods that *look like* an iPod or Nokia handphone, but have a different, though similar, brand name (e.g. Nakia); or in some cases no brand name at all.

organizations transporting contraband goods like drugs or weapons, but rather big name corporations smuggling daily commodities to reduce customs fees. Finally, it comes back to a question that I raised earlier in this chapter regarding the complicated ethical and moral grey zones involved in the global trade in secondhand electronics, and the transient, contextual nature of the terms 'licit' and 'illicit'.

4.5 *Shan Zhai* Electronics

One phenomenon that I was surprised to see in Singaporean electronics markets was the amount and prevalence of *shan zhai* electronics. Though I had seen these sort of devices in other countries like China, I did not expect to see them in Singapore because I thought that the government would not allow these sorts of knock-off electronics to be sold in the country, due to the countries famously strict laws and market regulation.[57] Nonetheless, they were readily available in Singapore, especially in the less-touristy areas of central Singapore like Toa Payoh and Bishan. What surprised me even more is that they were not being sold discreetly, but rather had huge signs like the one in figure 4.1 advertising 'MP3 1GB - $9.99'. They looked just like the real thing, and came in all the classic colour varieties, but the labels 'iPod' or the famous Apple logo were nowhere to be found on the devices.

Fung was familiar with these sorts of goods, and told me that the name '*shan zhai*' literally means, 'king of the mountain' in English, and refers to the mountain hideouts

[57] See Neuwirth 2011 for an account of shan zhai electronics (and other knock-off goods) sold in China.

Figure 4.1 - *Shan zhai* MP3 Players, on sale outside an electronics market near Singapore's Little India. *Photo by author.*

used by regional bandits to escape the reach of state control. These electronics are not secondhand but are made 'new' from materials pulled from faulty or secondhand electronics, like in the case of the *shan zhai* MP3s mentioned in the last paragraph.[58] Though *shan zhai* electronics are now mostly manufactured in China, Fung said that this whole "copycat" behavior actually originated in Taiwan. In the very early stages, before Taiwan developed a large electronics manufacturing center, small firms would start up that specialized in repairing or remaking household appliances out of old, broken down ones. They would dismantle the old units, and make new ones out of the parts, which made it very affordable for many Taiwanese to gain access to household appliances for the first time. But once Taiwan had developed, most of these business practices moved over to China. Now, according to Richard Wageman, a lawyer based in Beijing, China, the number of *shan zhai* companies in China is in the tens of thousands.

[58] I put 'new' in scare quotes here because, though these electronics have not been used before, and are in that sense 'new', they are made up of an assemblage of dysfunctional and secondhand components and hence do not have the same operational lifespan of new electronic goods.

I asked Fung about the *shan zhai* MP3 players that I saw in Singapore, and she told me that she had actually come across MP3 players like these before. "Anything happens like this in Asia, the model may be from the OEM manufacture, and they just have overstock, or maybe their design has been stolen, or maybe somebody [bought] the new iPod in China, and they've just stolen the whole thing". Fung told me that she has a contact in San Diego who once contacted her to see if she could sell these contraband MP3 players. The contact said that the players originally came from China, and were going to an African country via Mexico. However, the customs in Mexico inspected them and found that they were faked, so they sent them back to the port of export. Somehow, Fung said, her contact ended up with this shipment of *shan zhai* MP3 players, but could not sell them in the United States. Of course Fung was not interested in selling them either, but she said the market for them must be large in the developing world, because they are so cheap.

A personal contact of mine, Mr. Wageman, who works in the intellectual property and information technology department at an international law firm in Beijing, was in Singapore on business at the time of my field season, and agreed to discuss the issue of *shan zhai* electronics with me in an interview. He commented on the grey areas in the laws on intellectual property (IP) rights which allows the *shan zhai* brands to proliferate. That is the amount of ambiguity at play in how 'uniqueness' is determined. As Mr. Wageman explained to me, there is no quantitative, concrete standard by which something can be considered 'original', so it is often up to judges and juries. "As for the

MP3's" Mr. Wageman told me, " you can't patent a whole product, it has to be a unique thing, or a specific type of that product, to be more specific...For example, you couldn't just get a patent on 'the computer' or 'the MP3 player'" (see also Neuwirth 2011, ch. 5). Thus, we can see the complexity and indeterminacy involved in determining whether or not *shan zhai* electronics are legal or illegal.

Fung told me that many companies have tried to sue Chinese firms over alleged copyright infringements, yet they have not been successful in court. For example, Fung informed me that Apple tried suing a Chinese electronics company by the name of Golden Apple. However, she said that Golden Apple actually won. Mr. Wageman told me that there is legal ambiguity here because of the specificity of international trademark law. Because of this specificity, Apple only has a claim to the name Apple, but 'apple' is a common word, so you cannot get a trademark on every use of the word apple. So, a company can have a similar name as long as the design is different (even slightly), thus making it legal, which underscores the fine line separating the legal from the illegal. Furthermore, Mr. Wageman added that in order to claim rights over a name or product, one would need to prove that their company has the right to that particular name or product, and that you should maintain these rights. But, as can be imagined, it is often difficult to prove that a company has these rights to a certain product, and doing so requires a large input of resources.

I do not introduce these points here to make an argument about the legal technicalities governing IP right issues, which would be outside of the scope of this

thesis, but rather because it is another excellent example demonstrating the legal grey zones at play in the secondhand electronics industry, and the way in which legality and illegality are closely intertwined. Moreover, it demonstrates the often tedious and complex nature of 'formal' legal requirements which need to be met in order for a company to operate fully in the realm legality. Furthermore, their status of being il/licit goods, made up of an assemblage of secondhand parts, pulled from used electronics made by different manufacturers, but marketed as a new product under a different brand name raises a host of questions about their legality. *Shan zhai* electronics instead fit into a grey zone between the licit and illicit, and make it difficult for states to regulate their trade and sale (i.e. are they counterfeit goods, or are they unique electronic devices?).

A final point that can be drawn from this discussion of shanzhai electronics concerns the shifting categories of waste and value. For instance, it is deeply ironic that these 'grey electronics' are marketed as new products, yet they often have very short operational life spans. Dewan explained this by noting that the China brands use "shortcuts", meaning either less material or poorer components. Thus, the products may even feel lighter than they should be, simply because they are of poor quality. Dewan noted that sometimes the mother boards will have problems, and will only run for a short time before they become faulty. "We buy these things, but not too much because they are not frequently used in Singapore. If we do buy them, we buy them cheap, cheap, and sell cheap, or sell for scrap parts". He lamented that the Chinese *shan zhai* brands are hard to sell, because buyers do not trust them, so if Dewan is to buy them, he will buy for very

cheap. But the value of *shan zhai* electronics is liminal and contextual in another sense as well, in that they are not in high demand in Singapore due to the high level of income. On the other hand, in places like Indonesia, the relative affordability of the shan zhai brands make them quite desirable for a majority of the population.

4.6 Characterizing il/licit trade flows

In this chapter, I have discussed the various forms and standards through which legislation on the trade in secondhand electronics or e-waste works to associate different entities such as traders, organizations or corporations in regulating the social. I have emphasized the ways in which this legislation is established by one actor, and how it then influences legislation in other jurisdictions by various means. This discussion has attempted to show how particular methods of legislating flows of secondhand electronics through international standards such as the Basel Convention, have been given shape and made hegemonic.

Following my discussion of e-waste legislation, I turned to the various practices by which traders can exploit such governance by manipulating the loopholes created by the patchwork of legislative policies operating in various jurisdictions. Though some writers have argued for more consistency in legislation from jurisdiction to jurisdiction in order to combat this il/licit trade in e-waste (e.g. Boon 2005; Drayton 2007; Herat 2009; Maxianova 2008); it is in fact not quite so simple.[59] Standardizing the laws and regulatory measures amongst different national jurisdictions is not the answer, because as I have

[59] I am indebted to Arn Keeling for raising this point in response to an earlier draft of this chapter.

shown, each country in the Southeast Asian region has different levels of development, and therefore different levels of market demand for secondhand electronics. So, deciding on how flows of secondhand electronics into a country will be governed necessitates paying attention to these contextual factors.

However, there are no ready answers for how the laws governing the international trade and traffic of secondhand electronics can be reassembled in more technologically just ways. As can be gleaned from this thesis, there are many different interests involved in regulating flows of secondhand electronics, so the decision on how to govern such flows will necessarily favor one (more powerful) party's interests over another. As such, simply suggesting that the laws amongst different jurisdictions needs to be consistent misses the point of the empirical evidence documented in this thesis.

To further illustrate the complexity of different interests at stake in governing flows of secondhand electronics, I will share an example from a recent case in Bangladesh. As Hassan (2011) noted, the Bangladesh High Court's current ban on imports of secondhand electronics was made primarily in response to pressure from environmental groups and the Basel Convention. However, the effect of this policy has been that the lower classes of Bangladeshi society are barred access to affordable technology, hence the need for importing secondhand computers from Singapore. Therefore, I would argue that the environmental groups advocating the ban of such trade (out of concern for the environment) need to reconsider their stance based on the economics of such forms of trade. For instance, why would it make economic sense for a Bangladeshi or Nigerian

trader to travel to Singapore multiple times a year to buy used electronics for shipment back to their home country for burning dumping? The profits made from this type of activity would not be enough to support the logistic costs involved. Rather, it is the 100% profits made from the resale of each computer.that make this type of business possible.

Another important point arising from this chapter is the difficulty in clearly demarcating much economic activities as either legal or illegal or licit or illicit. Rather, there are often 'licit and illegal' trading practices that negotiate the borders of these categories (Majid-Cooke 2009). This was demonstrated by the example of the electronics traders in Batam who operate illegally but perform a much needed service in their community. By contrasting the il/licit trading and recycling practices that I came across in my research with the legislation in the Southeast Asian region, I have sought to highlight how formal legislation, enacted differing scales of jurisdiction, both restricts and enables an array of complex grey market practices. Relatedly, the way this legislation is enacted impacts everything from shipping practices, to the location of electronics recycling facilities, or even the jurisdiction in which companies register their firms. Moreover, I have stressed how questions of il/licit practices are negotiated by actors in relation to the law and to the social needs that they are addressing by conducting such il/licit business practices. For instance, it is notable how all of my informants do not deny that they engage in illicit activities, nor is it an industry secret that these sorts of practices go on - rather, it is the norm. This point makes clear the need to reconsider what is really meant

when a certain form of economic activity is demarcated as ether il/licit or il/legal, and what the implications of this designation are.

Finally, this chapter brings in additional examples to build on the idea developed in chapter three, which documents the extensive complicity between various actors operating in the formal economy with those operating without government assistance. An example of this includes the US telecom company that sought to partner with a small-scale electronics refurbisher in Malaysia to sell off stocks of used mobile phones to be remanufactured into *shan zhai* phones in China's grey market economy. This example supports Nordstrom (2007) and Neuwirth's (2011) assertion that it is not only small sized firms that deal with 'informal' actors, but the large MNCs who also take advantage of such partnerships to engage in activities that can neither be classified clearly as licit or illicit, but rather fit within the grey zones of economic activity that I have discussed in this chapter. Thus, an important question from these examples is how to distinguish between 'formal' and 'informal' practices, or if this is distinction is even possible given that the practices of both 'types' of actors are often the same. In addition, and perhaps more importantly, one could ask why it is necessary to distinguish between the licit and illicit in the first place.[60]

[60] Thanks to Josh Lepawsky for raising this latter question on an earlier draft.

CHAPTER 5

CONCLUSIONS

This thesis has been an attempt at tracing the elusive trade in secondhand electronics, and the practices of the actors involved. Ethnography was chosen as my central methodological approach due to the difficulty of collecting data on in/formal or il/licit forms of economic activity, which are not easily documented in formal trade data (Grant 2003). Though there have been numerous attempts at empirically accounting for the trade in secondhand electronics, or e-waste (Lepawsky and McNabb 2010; Williams et al. 2008; Yu et al. 2010a, 2010b), it was not possible for me to get reliable quantitative data on the information needed for this thesis. Yet, my experience of not being able to rely on quantitative 'facts' actually served as a way of entry into the type of ethnographic fieldwork conducted here. Rather, the elusiveness, rumours and stories, or 'phantom epistemologies' that I investigated in this thesis allowed for a reconsideration of what is possible within a multi-sited ethnography of global connections (Cook 2006; Peterson 2010; Tsing 2005). Thus, this thesis attests to the important role that ethnographic research can play in investigating social and economic relations.

In recent decades, these tensions have been heightened by the fact that solid waste, and especially waste from electronics, has become more valuable (monetarily and otherwise) than ever before (Lepawsky and McNabb 2010; Lepawsky and Billah 2011; Gille 2009; Godden-Bryson 2011; Moore 2012). No longer is it strictly 'developed' countries that are generating large amounts of secondhand electronics, but 'developing' regions throughout Asia (and increasingly Africa and South America), are also generating

large amounts of secondhand electronics as both the population and overall level of affluence increases. These rapidly growing countries demand increasing amounts of raw materials to fuel their growth, and this trend is set to intensify over the coming decades. A recent article in the *Wall Street Journal* quoted a senior executive of the Yunnan Copper Group who asserted that Chinese companies would continue to be the world's largest market for copper for at least another five years (Wall Street Journal 2011). At the same time, there is increased demand for electronic waste worldwide due to technological and industrial innovations that continue to develop new ways of extracting value from electronics (ibid).

There is also considerable pressure on all levels of governments worldwide to develop and implement safe, secure and efficient management and regulatory systems for electronic waste that will maximize benefits to the social and economic well-being of their citizens (in addition to those in other countries). Yet, due to the increasing commodification of waste, there has been a trend towards the privatization of the management of waste from electronics; the effect of which has been the increased competition for and contestation over used electronics and electronic scrap. For instance, secondhand electronics are considered value-less (waste) by a majority of the public in European, American and even some Asian contexts (i.e. Singapore, Japan, etc.), yet the same devices have considerable value in other countries throughout the developing world.

Interestingly, one of my respondents in the field, Mr. Shaji, a trader in Little India, told me that the transient nature of value is an observation he has made for himself, and

has served as the inspiration for him setting up a business in trading secondhand electronics. He told me in his own words that his business is based around the fundamental idea of "change". In explaining his use of this word, Mr. Shaji noted that the people of the developing world are becoming the largest users of electronics in the world, and are currently using "the Western world's" discarded electronics, as consumers there typically replace their products every three to five years or when the new models come out. So Mr. Shaji's concept of change refers both to technological changes and the way in which technology moves geographic locations (sometimes more than once) during its lifespan. Moreover, it attests to the shifting category of value that has been central in this thesis (see Lepawsky and McNabb 2010; Lepawsky and Billah 2011).

The remainder of this concluding chapter is organized into two main sections where I discuss the significance of the two primary findings from this research. The first section considers the implications stemming from Singapore's role in facilitating the regional trade in secondhand electronics within the developing world, and how this role is facilitated by Singapore's unique characteristics as a legal jurisdiction; while the second section considers the political implications of the way that flows of secondhand electronics are currently regulated, and the grey trading practices that have developed around them. Because I have already summarized my findings made in the empirical chapters of this thesis in previous chapters, my focus in both sections here will be on the broader significance of these findings. Finally, I conclude with a brief discussion of the broader significance of this work as a whole, by considering the competing claims

surrounding how the trade in secondhand electronics should or should not be regulated to achieve a more just technological world.

5.1 Singapore: facilitating the il/licit trade and traffic of secondhand electronics

Singapore's government electronics procurement (GeBIZ) program, the small amount of electronics collected in take-back programs in the city, and the clustering of secondhand electronics shops firms within Little India, as well as the large numbers of foreign traders coming into Singapore underscores the nation's role as a global source of secondhand electronics. Moreover, these observations confirm Lepawsky and Billah's (2011) assertion that Singapore is a key hub city facilitating the trade in secondhand electronics throughout the Southeast Asian region, and the developing world more broadly. As I have argued in the introductory chapter, and in chapter three, Singapore's unique characteristics as a legal jurisdiction have helped to shape this role. For instance, its enthusiastic approach to attracting global business (to make up for the geographically small size of its territorial borders), has led to Singapore developing a 'business friendly' model of commercial trade. From my informant accounts, and what I have read in the literature, this business friendly attitude has resulted in the government sacrificing the level of enforcement in its ports. In this way, Singapore's 'business friendly' attitude has led to certain grey activities becoming common in its ports, such as the practice of the 'switch b/l', or changing of the bill of lading (shipping documents), which I discussed in chapter four. This practice is not illegal *per se*, but its legality is certainly ambiguous, because of the way in which it allows shippers to 'hide' what is packed inside their containers.

Another key finding of this thesis is that the destinations that secondhand electronics go to upon being sold in (or trans-shipped through) Singapore proves that the international trade in secondhand electronics is not just inter-regional (i.e. North-South), as the prevailing discourse in dominant media representations would suggest (e.g. BAN 2005; CBC 2008; CBS 2009; Greenpeace 2008). This finding supports Lepawsky and McNabb's (2010) assertion that trade within developing regions is increasing in prevalence due to the falling price of electronics and increasing affluence in those countries. As such, my findings here also reinforce Yu et al.'s (2010) assertion that most of the world's e-waste will be generated in the developing world by 2015. This acknowledgement, then, points out critical flaws in legislation like the Basel Convention, which only bans trade in e-waste from developed to developing regions, but not within the developing countries themselves. Therefore, (inter)national e-waste legislation aiming to reduce the environmental injustices of e-waste dumping in developing regions, must take seriously these shifting patterns in the way e-waste is generated and traded around the world. If not, new problems will emerge in regards to how the problem of increasing e-waste generation is managed.

Yet on the other hand, the nature of the trade that I witnessed in Singapore and Malaysia (i.e. mostly for purposes of reuse, rather than dumping) demonstrates the benefits that could be gleaned by modifying national e-waste legislation in countries like Indonesia, Malaysia and Bangladesh so as to allow imports of secondhand electronics. This would not only benefit consumers who would gain more affordable access to electronics, and help to decrease the 'digital divide' but it would also bring in economic

benefits for the electronics refurbishment industry, as well, and the companies and individuals involved in that business. Yet I have also discussed the complexities and challenges of making such a move, due to the divergent interests involved in determining *how* and for *whom* e-waste flows should be regulated, or how the social should be composed (Latour 2005; Valverde 2009).

Furthermore this work has provided the empirical basis for further research on the role of particular jurisdictions in facilitating the regional trade in secondhand electronics. I refer here to the linkages between Singapore and West African nations such as Nigeria and Ghana; and the role of major cities in those countries as regional hubs in the African trade of secondhand electronics. Writers like Grant and Oteng (2012), Minter (2011a), and Shinkuma and Huong (2009) have started to take up this call, but more work remains to be done. The fact that most of the world's e-waste will soon be generated and traded within the developing world, in addition to the vast economic value of this trade, necessitates increased attention to these trade flows so that the economic and legislative implications associated with them can be understood in a timely manner.

5.2 Grey zones, il/licit flows and jurisdiction: How to regulate the international flows of secondhand electronics?

Another important point arising from this thesis about the trade in secondhand electronics in Singapore is that the legal and illegal are intertwined, which is not an entirely new finding, but it does impact how secondhand electronics are traded through Singapore, and how this trade is regulated. As Hornsby and Hobbs (2007) argue in a

study on cigarette bootlegging, entrepreneurial smugglers can exploit the ambiguous legal spaces created by the shifting and uneven terrain of international trade laws, thereby creating fruitful opportunities for trafficking. This il/licit trade happens because much smuggling of commodities like e-waste typically takes place on the international seas, where there is no universal law since jurisdictions are largely free to develop their own laws governing their legal territories. Yet as emphasized in chapter four, simply homogenizing the legislation governing the trade in secondhand electronics amongst different countries may not necessarily be desirable, due to the differing nature of trade in e-waste amongst the different countries, and their differing geographies. Moreover, the forms and standards of legislation currently governing the trade and management of secondhand electronics in particular countries and regions incorporate laws which reach beyond their own jurisdictional boundaries. One example of a negative consequence stemming from this extension of legal jurisdiction, as Lepawsky (2012) succinctly points out is that some countries are thus prohibited from receiving valuable imports of secondhand electronics from other jurisdictions. Therefore, national legislation must be modified to rectify this injustice by enacting legislation in such a way that its effects are confined to the jurisdiction in which it is enacted.

Because of the nature of the new global economy, electronic devices are produced in the corners of Asia, like Batam, and are then traded around the world. Once these electronics have reached the end of their useful lives for their first owners, they are then traded to other countries and sometimes reused by new owners who either cannot afford, or prefer not to, purchase the new products. Therefore, As Mr. Ravi told me in an

interview with him, "Borders are only for political purposes" - they do not apply to the flow of commodities. This border-less nature of trade, however, does not just apply to flows of e-waste or secondhand electronics. Rather, as Deborah Cowen makes clear in a recent article on the emerging philosophy of port security and commodity flow, borders are now becoming more flexible in terms of how they are regulated by nation states (Cowen 2010). Or as she puts it, government approaches to security recast the "border from an endpoint to a zone of critical flows - from a borderline to 'seam' space" (2010, 602). Cowen's argument fits it with other writers like Carolyn Nordstrom, whose book *Global Outlaws* (2007), which I have discussed previously in this thesis, recognizes that international trade now trumps port security, or rather, that ports have been reconfigured to protect the uninterrupted flow of global commodities.

Because ports now prioritize the uninterrupted flow of global trade, Robert Neuwirth (2011, 114) simply states, "where there are borders, there is smuggling". Indeed, it is now easier than ever before for traders to sell and transport commodities, including waste materials, across national borders. This increasing border-less nature of global trade makes it a challenge for states to enact effective legislation within their own territories, because "states have increasingly shifted away from governing a relatively fixed and clear-cut national population resident within its territory" (Urry 2003, 109). As a result, as most of my informants and the literature on port security assert, nation-states are not physically able inspect most containers flowing through their ports.

Though there have been some instances of shipments of secondhand electronics or e-waste being inspected at ports in Asia, as reported frequently in the media, and even by

my own informants; Mr. Ravi, the head of an electronics recycling company in Singapore, asserted that in his experience, "none of the countries in Asia have any regulations on e-waste - including Singapore". What he means here is that a country may have *legislation* on e-waste, but the actual regulation of those laws is not well enforced. The logic here is that if the regulation of the laws in one country are not consistent, then those companies which do operate fully within the law in that particular country will be penalized on the marketplace if their competitors sacrifice legality for profit. This was indeed a common complaint that emerged from interviews with my informants in Singapore and Malaysia, such as Mr. Verhagen, Mr. Ravi, and Mr. Shim. However, as I have emphasized elsewhere in this thesis, it is very difficult to, and sometimes not desirable, for states to strictly monitor all goods going into and out of their ports.

One possible reason for this inconsistent regulation, as one contact told me, is because e-waste is such a new issue, it is a rather low priority on the National Environmental Agency (NEA)'s priority list. But perhaps more importantly, as Mr. Ravi spoke to, the authorities in Singapore (and other countries) do not necessarily know what the basic standards are for electronics recyclers, or for trade regulations specific to e-waste. This statement reflects Fung's opinion on the regulatory challenges faced by Malaysia as well, so it may indeed be a major issue constraining the regulation of secondhand electronics trading in Asia in general. Indeed, even in Europe and North America, where e-waste legislation is more advanced, policy makers are constantly struggling to keep up with developments in the e-waste management industry. Ravi told me that this lack of specific know-how on the part of the Singapore government stems

from the fact that there is no international standard or benchmark for these practices, particularly in Asia, and hence no firm guidelines for the authorities to follow.

Another problem confronting the management of international e-waste flows, as Mr. Ravi explained, is that most countries in the world follow the Basel Convention, yet the laws of the Basel Convention are often vague and left up to the interpretation of individual governments, as noted in section 4.2 of this thesis. Not only this, but the laws of the convention are left up to shipper interpretations as well. For instance, as Ravi described, one can decide to declare that they are transporting hazardous e-waste, or they can "put some another interpretation". As I have detailed in chapter four, these 'other interpretations' create significant grey areas in the trade and traffic of secondhand electronics, and often easily succeed in getting through port and customs inspection.

The ability of entrepreneurial NGOs, such as the Basel Action Network (BAN) to influence national e-waste legislation is a clear example of why I have argued for the inclusion of post-Marxist sensibilities in my analysis in this thesis. Though ANT's attention to forms and standards has been useful, post-Marxism has allowed me to trace how certain actors exercise power to bring about the production of environmental and technological injustices - such as barring imports of secondhand electronics to developing countries. Though, staying true to ANT, I do not use power as an explanatory term here, because it is clear that organizations like BAN or Greenpeace have not created such injustices on their own. Rather, it is clear that various broadcasting corporations, industry representatives, and individual nation states have all been involved as well. Nonetheless, the discussion in this thesis on how e-waste legislation is negotiated at different levels of

jurisdiction does reflect certain critiques of ANT's conceptualization of power, which have made the charge that some actors have the power to harness - or otherwise influence - the power of other actors (e.g. Castree 2002; Gareau 2005; Perkins 2007).

As such, my use of both ANT and post-Marxism has been useful in their combined ability to trace the emergence and resolution of controversies and uncertainties surrounding technological injustices. Moreover, it has allowed a reconstruction of the 'tiny conduits' through which particular methods of legislating flows of secondhand electronics, as through international standards such as the Basel Convention, have been given shape and made hegemonic (c.f. Holifield 2009, 655). Thus, my aim here has been to register the different associations involved in the management of secondhand electronics, and to suggest possibilities for reassembling them in more technologically just ways.

5.3 Closing words

In my interview with Mr. Ravi, he brought up one issue which I think is fitting to end this thesis on, as it concerns the underlying political and ethical motivation for this thesis, namely that of affordable access to technology. As Mr. Ravi pointed out, electronics are now becoming a bigger part of the lives of all, and this is not just in the developed countries, but in the developing ones as well (as has been a dominant theme of this thesis). Yet, as consumers, we often have little control over the way that electronic corporations actually manufacture their products, what materials they use, or perhaps more importantly, *how much* they produce. This is a point addressed by waste scholar Zsusa Gille in her work on waste regimes, in which she writes about the politics of waste,

and its original production. Gille's politics of waste, or 'waste regimes', refers to, not only: how wastes are regulated, accessed, or distributed *once they are produced;* but also: "allows us to understand the economic, social and cultural origins of specific wastes as well as the logic of their generation" (Gille 2010, 1056; original emphasis). As Mr. Ravi astutely put it, "[manufaturers] have to package the goods attractively to be able to sell them, to catch the consumer's eye". What is implied by this statement is that manufacturers increasingly design products so that they are difficult to repair and refurbish, and instead need to be disposed of and replaced with new products. However, in the absence of any effective legislation to combat this trend amongst electronics manufacturers, growing portions of the worlds population may be left without access to affordable electronics.[61] Therefore, a system must be developed, particularly in the world's developing regions, which encourages products to be designed in a way that reduces the need for *disposal* of electronics, and instead facilitates their reuse. This way, the social can be reassembled as one that is more technologically just for all, regardless of purchasing power.

[61] See Lepawsky (2012) for a review of such 'extended producer responsibility' legislation in the U.S. and Canada.

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