

Is the trade of electronic waste sacrificing the environment for economic efficiency? China's Taizhou City as a case study

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Abstract

This paper provides key findings obtained through a field investigation in the booming site of electronic waste recycling (e-recycling) in Taizhou City, Zhejiang Province, China, and analyzes the entire cycle of the business focusing on its socioeconomic players and environmental impacts. The analysis demonstrates various risks associated with every point in the flow of electronic waste (e-waste) and manifests the complexity in resolving the problem. In addition, the paper includes a critical review of the roles of different players in the political arena of e-waste trading and recycling in an attempt to shed light on the resolution of the vast issue of global e-waste. Last but not least, the paper suggests a few alternatives, such as offering more incentives to develop “greener” technologies, that may ameliorate the situation in the short run and other policy measures required to achieve a longer term solution.

Introduction

Situated on the winding east coast of middle China, the Taizhou area enjoys a widespread fame for its beautiful natural scenery and the entrepreneurship of its people. Known as “the renowned mountain in the sea” for hundreds of years, this 9,411-square-kilometer land area encompasses more than ten national tourist sites, such as the Tiantai Mountain and the “Holy Residence,” and over a hundred provincial and local scenic spots. Moreover, it prides itself not only on being one of the main production bases of grain, fruit and fish in China, but also on serving as an important port of foreign trade with the outside world. For the past two decades, the Taizhou government has gone to great lengths to improve its infrastructure, especially traffic

and telecommunication, in order to boost Taizhou's economy and "to build Taizhou a modern coastal city of advanced science, industry and trade before 2020."¹

At a glance, Taizhou seems to possess so many attractive characteristics to support its rapid economic growth. In recent years, nevertheless, a relatively unnoticeable business there has emerged, expanded and escalated to an extent that is profoundly impacting the development pathways of this 2100-year-old region. That business is the environmentally notorious electronic waste recycling (e-recycling)².

E-Waste and E-Recycling in a nutshell

As information technology has rapidly advanced and the volume of electronic devices markedly surged, an increasing amount of obsolete electronic devices starts to pile up at almost every corner of the world at uneven rates. A wide, growing range of electronic devices, such as refrigerators, hand-held cellular phones, and computers, are now also known as "electronic waste," which in total can contain up to 1000 toxic substances, including lead, chromium, and plastic additives. Often rich in precious metals and other reusable materials such as plastics, e-waste has been perceived as a source of additional income by more and more peasants and unemployed laborers in Taizhou, one of the first and biggest e-recycling sites in China.

Different counties of Taizhou usually specialize in different stages of e-waste processing, from manual dismantling, circuit board cooking, acid bathing and stripping, to open burning and dumping. Primitive tools along with toxic chemicals are used, yet few protective measures are taken, if any. In manual dismantling, for example, e-recyclers use chisels, hammers and at times

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¹ Government website of Zhejiang Province. China. 2005

² BAN/SVTC 2002

cutting torches to separate various types of metals and “re-soldable” components. For circuit boards that are more complicated and harder to process, they simply cook the wastes over charcoal burners and resell the chips and other recovered components to acid strippers for further processing. A pungent smell permeates the workshops, accompanying black fumes rising from the cooked circuit boards. Strikingly, most e-recyclers, if not all, don't even wear a respirator and they work directly in front of the burners for hours. “I couldn't stand the smell at first, but it became alright after a while. At any rate, I'm making money out of this and that's the most important thing,” said an anonymous e-recycler, burning a circuit board, bare on the top. On the other corner of his workshop, a bottle of isoamyl acetate and another bottle of industrial thinner were waiting to be applied, both of which are flammable and toxic chemicals that could be dangerous to the environment and human health if improperly handled.

Equally polluting is the open burning of cables to recover metals. Because of the thick fumes and strong smell arising from burning the plastic coverings of the cables, such activities usually take place after midnight to conceal themselves from local authority's monitoring. Several anonymous e-recyclers reported that they, too, hated to burn the cables, but it was impossible to separate the huge number of wires and plastic coverings with bare hands and simple tools, due in large part to low efficiency of such manual dismantling. Revealingly, in a few workshops, e-recyclers have reportedly invented some small “machines” with the capacity to process large volume of cables with increased efficiency, causing no damage to the environment or human health. The actual effectiveness and limited popularity of such machines, however, remains an open question.

Evolution of the E-Recycling Business in Taizhou City

Because of a large population and little cultivated land, per capita productivity of the Taizhou area remains low and the peasants there are always struggling with poverty. In Wenling County, for example, the first and by far the biggest e-recycling base in Taizhou, a population of around 1.1 million live on an area of merely 934.72 square kilometers³. This directly results in an extremely low proportion of per capita cultivated land, 0.03 ha or 333.33 square meters, which is 37.5% lower than the warning level that the UN has set⁴. In consequence, when e-recycling started to appear in Wenling, peasants voluntarily joined the local army of e-recyclers and felt generally content with the more profitable and less physically demanding alternative to farming.

Since early 1990s, the number of e-recyclers in Taizhou has grown exponentially and recycling bases have proliferated. In Wenling County of Taizhou, for instance, modest, family-sized e-recycling workshops have become ubiquitous and neighboring counties seem to share this trend. According to Mr. Ye, a local e-recycler with more than ten years of experience⁵, virtually every family in Wenling County has a direct connection to this business, i.e. either they are engaged in recycling e-waste themselves or their relatives are doing so. Although this may well be an exaggeration of the real situation, it nevertheless offers alarming indications of the scale of the e-recycling business in the Taizhou area. Indeed, according to the Economic and Trade Commission of Taizhou City, as of January 2005, more than 40,000 people in Taizhou work in the e-recycling industry and process around 2 million metric tons of e-waste annually, which “places the area on the very top of the list of regions receiving electric equipments in the world.”⁶

³ Government website of Wenling County, Zhejiang Province, China 2005

⁴ Bureau of Wenling Party Committee 2000

⁵ Ye 2005

⁶ Government website of the Economic and Trade Commission of Taizhou City, Zhejiang Province, China 2005

Sources of Electronic Waste in Taizhou City

Historically, local e-recyclers have sought e-waste from two major sources: domestic pipelines and foreign imports, the latter usually facilitated by some so-called ‘e-waste dealers’.⁷ As is common practice in China, recyclers pay for the materials they want to recycle, simply because rapid economic growth demands a constant supply of raw materials. The same logic applies to electronic waste, meaning that e-recyclers have to buy the e-waste they wish to process. In practice, when the collective need for new e-waste reaches a certain level, those e-recyclers form an informal cooperation and send one or several representative buyers to the cities, where stocks of e-waste are abundant, and purchase a large amount (e.g. thousands of tons) from e-waste suppliers every time. They then share the expenses in proportion to the quantity each one takes. In this way, they eliminate duplicate travel costs and related expenses, and reduce competitions in the e-waste market.

Specifically, in terms of domestic e-waste suppliers, any machine-intensive factories could in fact qualify as a ‘feeder’ in the eyes of these peasants, and as computers have pervasively integrated into modern life, virtually all companies above a certain scale could generate a considerable amount of e-waste sought after by these hungry peasants. As Mr. Ye reported during a personal interview, making a deal used to be quite easy, since factories and companies were eager to get rid of their waste and environmental regulations were too lax to prevent possible damages caused by such behaviors. What comes as a slight comfort to the environmentally concerned is that it has become increasingly difficult and less profitable to buy in e-wastes, as Mr. Ye complained, due mainly to more competition among e-recyclers, stricter regulations, and greater enforcement efforts, especially after the late 90’s. At the same time,

⁷ BAN/SVTC 2002

transporting the waste has become riskier because of more stringent inspection for e-waste across provincial borders and at other checkpoints.

Interestingly, in the case of domestic e-waste sourcing, the same peasants often act simultaneously as an e-recycler and as an e-waste dealer, hence blurring the distinctions between the two. Consequently, the deals become harder to trace and monitor (i.e. now the authority has to deal with many more “dealers” with less e-waste, whereas before the authority could focus on a few dealers who traded large amounts of e-waste,) unfortunately adding more difficulty to managing the domestic flow of e-waste than in the foreign import case, where e-waste dealers have to exist between e-recyclers and e-waste providers.

In the case of foreign imports, as already indicated, virtually every deal involves an independent e-waste dealer who bridges the two ends. According to Mr. Ye, the Wenling base has credible ‘contacts’ from all over the world, notably in the U.S., Japan and Taiwan. Many of these dealers came from the Taizhou area themselves and were more or less engaged in e-recycling before. Therefore, they understand the business extremely well and know the most profitable kinds of e-waste, i.e. those rich in re-tradable and precious metals.

To assure themselves on the “quality” of the upcoming imports, e-recyclers usually demand photos of the waste from dealers before negotiating a price, which falls in the range between three thousand and tens of thousands of Yuan per metric ton (or equivalently, between four hundred and several thousand US dollars per metric ton,) depending on the specific composition of e-waste (e.g. circuit boards, monitors, etc) and the expected return after processing. Besides, both dealers and e-recyclers hardly trust strange sellers unless through direct referral by someone in the “network.” Their increased cautiousness has predominantly resulted from two fears: one being that the Chinese customs may block their shipments and the other

being that exporters may not send over the e-waste after receiving deposits. Still, as Mr. Ye pointed out, most e-recyclers in Taizhou prefers foreign imports of e-waste because such e-waste usually contains a far higher percentage of valuable and re-tradable materials.

A final yet essential step of importing foreign e-waste involves literally bribing and corrupting the local government and customs officials. Because of the ‘better quality’ of imported e-waste, e-recyclers are willing to sacrifice a bigger portion of their profits to buy political protection than for domestic e-waste. After local officials take an eye off the trade of e-waste, e-recyclers can easily smuggle in the waste and, in some extreme cases, receive a legal permit to import e-waste (herein treated as metal scraps, which can be legally imported in China) as long as it has been dismantled or smashed, and mixed with other metal scraps⁸.

The Intermediate Steps

Before arriving at individual e-recycling workshops, e-wastes from different sources are first stored—or rather, piled—in the vicinity of Wenling, notably in Zeguo County where hundreds of Mu’s⁹ of farmland has been converted to accommodate e-wastes. Poor farmers in these areas suffer from full exposure to all these potentially hazardous materials, which now stand on their farmland and take the place of crops. Worse still, just a few hundred meters away, various fruits such as watermelons and grapes are grown, harvested and transported to neighboring towns and cities. No protection is present whatsoever. If these fruits are polluted by means of water contamination or dust, which is likely the case, a variety of toxic substances contained in e-waste such as lead and cadmium, will ultimately accumulate in human bodies and cause serious damage. At stake is not only the environment, but also human health. Indeed,

⁸ See Annex I for a permit that e-recyclers in Taizhou used to import e-waste.

⁹ 1 Mu = 666.67 square meters

anecdotes have already started to spread across the e-recycling community in Wenling County regarding the negative effects of improperly handling e-waste on recyclers, according to Mr. Ye.

From these storage places, e-wastes make their way to one county after another, where the actual ‘recycling’ procedures take place, intermediate and/or final ‘products’ are made, and a new round of distribution starts.

The Destinations of Processed E-Waste

Thanks to its long e-recycling record, the Wenling County of Taizhou has been regarded as the heaven for cheap raw materials and electric equipments by all kinds of private manufacturers, large and small. Buyers from these firms are attracted from all over the nation to Wenling to order ‘fresh’ and untaxed metals at a discounted price, such as copper, aluminum, antimony and palladium, just to name a few. Local factories also use ‘recycled’ e-wastes to produce simple electric equipments, and their products are reportedly much favored by buyers from the upper end of the supply chain.¹⁰

Although state-owned companies and institutions in China have more stringent sourcing policies and usually don’t purchase raw materials or electric equipments from such underground sources, exceptions do exist. According to Mr. Dai, a veteran seller of processed e-wastes and related products in Wenling, he had managed to sell electric meters which had been produced or refurbished in local factories, to the local Bureau of Electricity and some airport authorities, for he had established solid personal connections with the officials from the property and purchasing departments of the foregoing institutions.¹¹

¹⁰ Ye 2005

¹¹ Dai 2005

Despite the seeming fact that such business benefits both buyers and sellers, it has inherently profound social implications: sellers (e-recyclers) produce the goods at the cost of the environment and human health (including that of the tourists who happen to be in the vicinity of the region,) and buyers use such goods in their production at the risk of those who are in the upper end of the supply chain and, ultimately, the consumers. In this sense, the entire society has to bear the costs and risks in the long run, which are generated by these two parties who gain in the short run.

A Multi-Level Analysis of the “E-Waste Politics”

E-recycling exists and booms in Taizhou not only because of the willingness of local peasants. In truth, local governments and customs, the central government of China, the exporting countries of e-waste, manufacturers, and international/regional/local nongovernmental organizations all have an indispensable role to play in this dynamic system, a large part of it being political.

For the peasants of Taizhou, poverty and consequently a lack of access to education contribute most significantly to their willingness to engage in e-recycling. It comes as no surprise that no e-recyclers in Taizhou have received any higher education. As a result, they face an embarrassingly narrow array of jobs to choose from and live under constant pressure to make ends meet. Money, therefore, has become so important to them that they are willing to sacrifice everything including their own health and the environment for it. Indeed, most of those e-recyclers are partially aware that e-recycling hurts their health and the environment, yet the myopic, utilitarian-like thinking and the typical self-comforting strategy of these people, so to speak, have led them to believe that it would still be worth their while to recycle e-waste for, say,

15 years and then quit. In this way, they would get richer and the environment and their health would not be harmed that significantly.¹² Although addressing the issue of poverty is well beyond the scope of this paper, it seems essential that, to fully resolve the problem of e-waste, serious attention and effective government policies do need to be focused on poverty reduction within a reasonable time frame.

For the local governments and customs, their failure to control and stop the e-recycling activities under their noses mainly results from insufficiency of the responsibility system, distorted political ambitions and illegal economic incentives. The geographical and political distance between the central government of China and the local governments literally frees the latter ones from taking on many responsibilities that they ought to. In consequence, local governments can, in practice, choose not to enforce central government's policies as effectively as they should if doing so better serves their political and economics interests, which is precisely the case for e-recycling.

Due to the central government's deep-rooted prejudice to rely heavily—if not exclusively—on economic growth figures to evaluate lower-level governments' performance, environmental policies that may negatively affect economic growth in the short run have long been extremely difficult to be enforced at the local level. In the case of e-recycling, Taizhou City's government officials clearly do not wish to cease the business, because it helps raise the average level of income in the short run which they could interpret as some sort of success in the reduction of poverty or unemployment¹³. As a result, even though the importation of various kinds of electronic waste has been banned or at least controlled in China¹⁴, the enforcement of

¹² Ye 2005

¹³ Government website of the Economic and Trade Commission of Taizhou City, Zhejiang Province, China 2005

¹⁴ BAN/SVTC 2002

such policies remains poor. Finally, local government officials can almost safely take bribery from e-waste dealers, owing in large part to the inadequacy of monitoring and punishment in the current administrative structure. This makes local enforcements of environmental regulations even less likely to be effective. To counter such difficulties, one alternative that the central government may consider is to centralize the regulatory structure of e-waste management and to establish a special subdivision under the State Environmental Protection Administration, for example. A similar model has already been quite successful in Britain and implemented in France.¹⁵

For the central government of China, the main challenges lie in the conflict between China's voracious appetite for (cheap) raw materials to sustain its dazzling economic growth and the toxic substances in e-waste that could substantially escalate the already out-of-control environmental degradations in China. Although the central government has taken several regulatory actions regarding the importation of e-waste to China, enforcement efforts remain ineffectual due to the various obstacles created by other domestic and foreign political interest groups, and to the slow pace of political reform of the China's Communist Party. In that sense, the issue of e-waste serves nothing more than reflecting the many other hidden environmental crises in this country.

Fortunately, an increasingly strong and diverse group of people from different social backgrounds have become more and more concerned about the environment, and have voiced their disquiet over the central government's "pro-growth, damn-the-consequences" attitude. One of the most publicly influential people among this group is Pan Yue, Vice Minister of the State Environmental Protection Administration. A courageous figure, Pan has fearlessly confronted the politically powerful polluters in China for years, which is rare among Chinese government

¹⁵ O'Neill 2001

officials. Just recently, he warned the public of an environmental catastrophe with a stunning estimate, "The pollution load of China will quadruple by 2020, when the country's GDP quadruples, if the pace of pollution remains unchanged."¹⁶ Ironically, the year 2020 coincides with the planned date of modernization of Taizhou City set forth by its ambitious government, inviting serious contemplation on the ecological future of this agitated land.

For exporting countries of e-waste, a more responsible attitude toward e-waste would require further reduction of toxic substances in electronic equipments at the design and manufacturing stages, increased reuse of obsolete ones and safe disposal of their wastes, as opposed to the current laissez-faire approach that connives at the shipping away of e-waste to less developed countries. Political resistance naturally arises when lawmakers intend to phase out the use of toxic substances in the design of electronic devices and ban the transboundary movement of hazardous wastes, which the WEEE and RoHS directives¹⁷ of EU will soon require of the manufacturers within the EU community. However, the commitment to sustainable development truthfully speaks louder than short-term economic gains. Although manufacturers may lobby against such regulations by claiming that they compromise economic efficiency, empirical studies¹⁸ have shown that compliance cost as percentage of total cost in most cases does not exceed a mere 3%. At the core of the dispute is not how much responsible approaches of handling e-waste cost, but rather how the governments view their roles as a contributor to the sustainable common future of human being vis-à-vis a protector of the economic interests of small vested groups.

For the manufacturers, their decision to approach "greener" design and to take on responsibilities for end-of-life electronics could significantly ameliorate the situation. Green

¹⁶ Roberts 2005

¹⁷ EU 2005

¹⁸ Tobey 1990

design essentially refers to the idea that electronics should be designed in a way that minimizes the use of toxic substances and allows greater capacity for upgrade in order to lower the rate at which electronic waste is generated each year. As early as 2002, totally “green” computers have appeared in Japan¹⁹ and one has reason to believe that more and more such products will continue to appear after the WEEE and RoHS become effective. In terms of extended responsibilities, an increasing number of manufacturers seem to have felt the implications of the EU directives and are starting to take on more responsibilities than they did before. For example, IBM has started to buy back used computers and sell refurbished ones at discounted prices in the U.S. in order to absorb the huge amount of wandering e-waste. Although the prospect seems rather bright, a bigger proportion of manufacturers need to follow this trend before meaningful effects could take place.

For environmental nongovernmental organizations (NGOs), especially local ones that can more directly influence the public attitude toward environmental challenges, their increased activism would add significant weight toward the environmental side of the balance if more and more people become aware of the serious ecological damage that e-waste would cause and pressure the authority to solve this issue. Equally important, international NGOs would serve as necessary bridges and monitors as the problem of e-waste increasingly transforms from local to global.

To conclude, the above analysis has demonstrated the complexity of the e-waste problem and, accordingly, the breadth and depth of international, national, and local coordination required to achieve a long-term solution. On the international level, governments need to take a step further and encourage more innovative technologies that allow “greener” design, manufacturing, and disposal of electronic equipments. On the national level, poverty alleviation is key, as well as

¹⁹ Iles 2004

timely political reform at the central government level that truly embraces the concept of “sustainable development” to the extent that environmental quality plays an equally important role as economic growth figures in assessing local government officials. On the local level, more stringent measures on controlling the traffic of electronic wastes will be indispensable, as well as more economic incentives to increase public involvement in monitoring and reporting illegal e-recycling activities.

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