From Europe, to the Agbogbloshie Scrapyard

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Abstract

The challenge of sound e-waste treatment is something that is a global concern when relating to good business practices, safe working conditions, information security and environment. This research applies a holistic view of the illegal trade of e-waste from Europe to Ghana by aiming to highlight some of its drivers. By applying an adapted RV-model to identify the actors engaged in smuggling and rational choice theory to analyse market incentives this research identifies legal and procedural weaknesses that enable the illegal shipment of e-waste.

The actors identified to target West Africa was in general smaller groups. These groups have established routes and transit points that complicate the international coordination of enforcers and inhibit their capacity to build strong cases against criminals. They target countries within the EU with limited enforcement capacity, high shipping volumes and low penalty rates for environmental crimes to exploit the domestic responsibility of enforcement and sentencing. They also mask e-waste as used electronics which is not heavily regulated and for which there is a strong Ghanaian market demand and employs a large number of workers in the informal sector, with the supply chain with an estimated 200,000 people employed.

The main problems identified was enforcement procedures, international and domestic coordination, relative cost for formal recycling, lack of alternatives for workers and officials as well lack of deterring sentencing. This has led to secondary effects such as poor environmental and health protection as well as physical- and data-security.

Key Words: WEEE, e-waste, trade regulation, EU, Ghana
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I INTRODUCTION

Agbogbloshie scrapyard have been referred to as a modern “Sodom and Gomorrah” after the two cities condemned by god in the bible, by the local population, as reported by the Guardian (Hirsch, 2013). The area has been named this after its harsh visuals as a result of being one of West Africa’s e-waste dumping-grounds. The scrapyard of Agbogbloshie in Accra, Ghana, is positioned just across the street of one of the largest fruit markets in the country. The area was leased by a group that signed as the Scrap Dealers’ Association of Ghana with the NYC (The National Youth Council) in 1994 (Amoyaw-Osei et al., 2011, p 3). Growing in sync with the expansion of the adjacent market, driven by the possibility of cheaper living outside the governments administrational reach, and further expanded by migration from the northern parts of the country. Agbogbloshie has become a hub for the informal waste sector in Ghana as well as an array of informal and formal businesses (Amoyaw-Osei et al., 2011, p 3). One of the sectors that has come out of the informal economy is the second-hand market of electronics (Grant and Oteng-Ababio, 2012). This sector has driven up demand for cheaper electronics and shipments arrive in Accra resulting in functioning items are sold, salvaged for parts while the rest end up in Agbogbloshie informal e-waste treatment or in smaller scrapyards around the area (Amoyaw-Osei et al., 2011). Used electronics shippings has been used to mask illegal transport of e-waste from western countries into Ghana’s informal sector and there is an emerging illegal market operating in both the EU and West Africa (Europol, 2011). The volume of unusable goods from the EU indicates that there is a deliberate shipping of unusable electronics or e-waste to regions where there is a lack of strict waste-management to cut costs and to keep waste quotas (Europol, 2011).

These shipping’s put both environment and the people working with it in danger. To free up the metals and remove casings such as plastic, it is common practice for workers in the informal waste treatment sector to openly burn it (Oteng-Ababio, 2012). This results in soil- and water contamination as well as inhalation of toxins by the people working in the informal waste management (Itai et al., 2014).

This raises the issue of developing countries bearing the environmental cost of the developed world’s electronics consumption. Proper legislation and enforcement is therefore vital to ensure, not only that environmental standards are upheld and to inhibit environmental
deterioration but also to alleviate suffering of people living near the waste management areas. This work focusses on the international and European legislation as well as the domestic legislation and control within Ghana, relating to praxis around the export of hazardous waste. It also goes into the waste management itself and its internal drivers. Since Ghana is a country with English as its official language, I will have access to domestic reports as well. This will help with providing a domestic aspect to the information that is presented.

With the global consumption of electronics raising, the waste management has become increasingly important. In the west the demand for new electronics has increased the exchange rate of old equipment and demand for affordable electronics in West Africa has made this an important target for exporters (Amoyaw-Osei et al., 2011). Efficient and safe electronic disposal becomes an issue of environment, sustainable development, health and security of data stored in hard drives and other hardware. This can in turn be an issue of national security which will be shown later in this research. International legislation is fundamental to ensure that the environmental cost is not shifted to developing countries in an effort to circumvent agreements enacted to raise overall waste management. With both the Basel Convention and domestic laws in place, a review of these in combination with reports on the waste shipments may function to give an idea of where there might be a legislative weakness and the research can function to further the efforts in creating sound and humane legal framework for efficient trade and waste management. In this research I use the term EEE when referring to Electrical and Electronic Equipment and WEEE for Waste Electrical and Electronic Equipment.
1.1 Objective

This paper aims to give an overview over the legal framework and implementation meant to regulate the trade and shipment of WEEE and the effects of WEEE smuggling. Through analysing legal statures, international agreements, enforcement data and field studies this paper aims to clarify the motivation for the involved actors to commit or participate in environmental crime. Through reviewing processes of how European e-waste is being smuggled from the EU and to Agbogbloshie, Ghana as well as how the waste ends up being processed and disposed of. This research hopes to highlight primarily legal and security issues relating practices of actors and their effects to health, environment, physical security and e-security.

1.2 Research Questions

- What international and European legislation is in place regulating the export of e-waste and how is it implemented?
- How well does Ghana’s enforcement function and what efforts are made to regulate the problem of import of e-waste?
- What impact does the flows of WEEE have relating to health, environment, physical security and e-security?
- What judicial weaknesses can be identified, and what forms of enforcement can be considered effective when addressing the issue of e-waste smuggling?
1.3 Literature Review

Some academic literature has been written on the Agbogbloshie scrapyard and a number of reports addresses the subject. The literature tends to either address the social- or environmental aspects of the area or discuss if the e-waste has positive or detrimental effects on the country’s environmental and economic development. For example, a research conducted on the migration of young girls from the northern parts of Ghana to the south, to among other places the Agbogbloshie market for work was found having positive effects on the local economy (Agyei, Kumi and Yeboah, 2015). Other research addresses the environmental effects and points at a multitude of metals and toxins in the soil as a result of the open burning of waste, which can present a direct hazard to workers and people in surrounding areas (Itai et al., 2014).

Joseph Amankwah-Amoah writes that the import of waste from developed countries negative impact overshadows the positive impact on the domestic economy (2016). Even though the market for repaired second-hand electronics has a positive impact on Ghana’s economy he points out that there is a need for more structured employment provided by certified waste management companies (Amankwah-Amoah, 2016).

Martin Oteng-Ababio writes that the e-waste management is to a large extent handled by the informal sector (2012). He also points out in a paper written with Richard Grant, that the Ghanaian government has failed to successfully implement the Basel Convention which is the international convention regulating the movement of hazardous waste. He raises good points in certain aspects relating to the Basel convention but this could be elaborated upon. He does provide valuable information about the arrival and absorption of WEE in Ghana that will be used in later part of this research (Oteng-Ababio, 2012, Grant and Oteng-Ababio, 2012). Martin Oteng-Ababio has published a lot of good research by himself and in collaboration with others on Agbogbloshie and the greater Accra area, some of which will be used in this research.

Angela D. Akorsu writes about whether the labour standards from the formal market is transferring into the informal sector (2013). The result showed poor protection of informal workers, lack of representation and legal support. She focuses on basic-manufacturing and highlights a need to look at other sectors to give a better understanding of the legal protection in the informal sector (D. Akorsu, 2013).
An interesting aspect that will be raised here that is not often addressed more than an occasional mentioning. It is the security of data from salvaged WEEE and EEE. This is in my opinion, through my research what I have identified as the biggest research gap. One interesting article that does address the issue is “E-waste environmental and information security threat: GCC countries vulnerabilities” (Alghazo, Ouda and Hassan, 2018). This article addresses security threats in the Gulf area relating to WEEE and presents indications that it has been used in orchestrating attacks on oil rigs and financial facilities. In this research the data-security will be used in a more holistic perspective to be shown as one of the risks when relating to illegal WEEE trade. But the debate on sound e-waste treatment has had a disconnection from the actual use of second-hand EEE and WEEE which will be addressed in the end.

With regard to e-security, Jason Warner does address the Ghanaian techno-spiritual practice of e-crime called Sakawa. This will be addressed in the end portion of this research, as Warner points out that the Ghanaian cybercrime is not properly recognized in western research and discourse. (Warner, 2011). A portion on data-security will be addressed in this research but future research would be beneficial to shed light on the phenomenon of e-waste-and data-security in West Africa. There is for example a lack of information on Sakawa in scientific journals, but the curious reader can find its incorporation easily through reviewing popular culture such as music videos, movies through Youtube and other platforms.

The legal implementation in the debate that surrounds Ghana is very hard to navigate. Environmental policies get reformed and specific environmental goals have set dates to be enacted. In the research it will be presented some of the main legal structures that regulates the European shipments of WEEE. This research will aim to bring a contemporary view of the issue. It will also aim to trace how the formal European electronics market and informal waste management economy of Agbogbloshie, Ghana merge through smuggling. It is often highlighted that the majority of the e-waste burned in Agbogbloshie comes from the western world (Oteng-Ababio, 2012, Greenpeace 2008, Amoyaw-Osei et al., 2011). There is a general clamour for a legal framework that protects both Ghana and the people employed in the informal sector which will be reviewed here to create a picture of praxis and waste flows.

To help provide a better understanding I will in this research review the legislative texts and reports provided by international institutions and the EU, look at Ghanaian domestic laws which will then be put against data available on import of waste and field studies. This paper
can be used to help identifying different areas of interest for other researchers or give an overview of how European e-waste relates to the informal waste sector of Ghana and what effects that brings. It touches several subjects relating to the interdisciplinary subject of peace- and development and health, environment, physical security, e-security and to some extent safety of sensitive data and national security.
1.4 Theoretical Framework

The main objective of this study will be to understand the existence and underlying factors that motivate the smuggling of e-waste. This paper will assume that the market acts upon certain incentives that the actors estimate will make an action beneficial. Therefore, concepts from rational choice theory as well as economic trade theory through an adapted version of the RV-model (Ricardo-Viner) will be used to analyse the behaviour of actors around the smuggling of e-waste. Rational choice theory will not be applied to individuals working with the waste management since the focus is on the driving actors. Also, the availability of information and options, especially for the younger workers that are involved in the Agbogbloshie waste treatment is limited. Even though the subject itself is very relevant and interesting it will not extensively be used here. Instead I will first go through some core elements in the rational choice theory, criticism and why we will use it for market actors. Later I will go through some core concepts in the RV-model and the adapted version to give an overview of the criteria I will use in my analysis in this paper.

The rational choice theory builds on the premises that an actor will through an analysis of the information available weigh his or her preferences and make a decision that is deemed the most beneficial. The theory presumes that a person has logically consistent goals, actors are therefore rational (Wittek, Snijders and Nee, 2013). Criteria that are affecting the decision-making process are preferences, beliefs and constraints. 1) Preferences are the individual or subjective tastes of an actor in weighing his or her decision (Wittek, Snijders and Nee, 2013, p34). 2) Beliefs, this can be in form of expectations of the future, for example a thief makes the decision to steal under the belief that he will not be caught or person buys a stock in the belief that it will increase in value (Wittek, Snijders and Nee, 2013, p34). 3) The last criteria are constraints, this is the limitation of options available, for example a person wants to buy a house but can only afford to rent an apartment (Wittek, Snijders and Nee, 2013, p34). With all the criteria in the decision-making process the actor can weigh and rank them. The decision-making process might rank the options from I, II and III. I being the most preferable; will in this model be assumed be more preferable than both II and III. Option III cannot be preferable to either II or I, the decision-making process is therefore not cyclical but rather one option will be the most favourable and therefore neither of the other options will be preferable over the preferred one (Blume and Easley, 2007).
Raymond Boudon raises the objection that even though rational choice theory is attractive in explaining the causality by assuming that the choice is the most beneficial it does not necessarily make it absolutely true (1998). Raymond makes a comparison, of a illuminated area from beams of a street light, even though searching in the lit area would surely be easier there is no guarantee that what is looked for is actually there (Boudon, 1998, p 817-818).

There is also criticism raised that interests alone are not what determines a person’s views and actions, and it does not fully take into account subjective factors (Boudon, 1998). The rational choice theory can also more easily be applied in retrospect, that is if looked for, there can probably be found a somewhat rational reason for most actions (Boudon, 1998). In an attempt to be humorous, it could be said that a rational choice might in fact be a choice rationalized. Actors should according to him be assumed rational until they can be assumed not to be. But beliefs are often normative in nature and not necessarily well grounded in reality. People can feel strongly about subjects that they are not very familiar with (Boudon, 1998).

Though through the rather simple function of the rational choice that will be used in this work, we will assume that it will function as a useful tool. Economic actors will be assumed to make what is deemed rational choices. Larger actors might even have people working solely to find the rational choice when dealing with for example waste management. It can therefore be assumed that there is a larger availability of information and the three criteria of preferences, beliefs and constraints can be applied to the criteria of the adapted RV-model that is presented below. It is important to note that circumstances can change and a choice previously deemed rational may turn out to not be when the criteria are shifted. It is therefore not a guarantee that a choice deemed rational is a good one.

To understand the RV-model, we need to look at the interaction between states from a two states world perspective (Chand, 1998, p 16-17). This simplification of trading interaction between two countries instead of an intricate network of actors that helps us to analyse the trade relation between countries and sectors. This allows us to understand the determining factors of trade through comparative advantage (Chand, 1998, p 22). To analyse the model, we also assume that there is no cost of moving labour (Chand) and that the exchange rate between two countries are at 1:1 ratio. The model takes three factors into consideration in relation to production, which in turn produces two final goods. One factor is specific to the sector of production, that can be specific machinery or land requirements. Labour is considered a mobile factor, while human capital is not considered mobile (Chand, 1998).
That is the accumulated sector specific skill developed by an existing labour unit (Vollrath and Vo, 1989). Therefore, there might be a need to withdraw labour to increase human capital, for example by moving workers from production work into education. In the RV-model it is therefore considered that the human capital is not mobile, that is sector specific accumulated professional skill is not directly transferable (Vollrath and Vo, 1989). A good accountant will probably not be a better surgeon as a result of that persons acquired skill in economics. Therefore, if we think in terms of two sectors, two factors are specific to the sector, for example machinery and the acquired skill of the workers, while labour itself is mobile.

Production factors that are used in the RV-model will be less applicable to our analysis but it might be good to mention them. The RV-model provides the notion of several factors playing a part in production which contrast to the classical Ricardian model which only considers labour. With the factor of fixed recourses, the RV-model helps to explain the law of diminishing returns. It states that a certain point adding labour will not increase productivity and the return to labour ratio will decrease. As an example, you have a certain area of farmland to cultivate, at some point the output will decrease because of the limitation of the fixed recourse (Vollrath and Vo, 1989).

Now, to understand the nature of smuggling of e-waste, two aspects of analysis needs to be considered. First is the aspect that relates to the economic incentives for smuggling, the second is the aspect of international justice. Mary E. Lovely and Douglas Nelson put forward an analytical framework touching these two aspects in an adapted RV (Ricardo-Viner) model addressing smuggling instead of trade. In a similar way to the economic RV-model, this analytical framework builds on three main aspects, 1) the national origin of the smugglers, 2) how the smuggling is conducted or means of smuggling, 3) the enforcement of the law and anti-smuggling actions (Lovely and Nelson, 1995, p 27). Each point will be further explained later. This model is created also to relate to the smugglings effect on domestic welfare, in this paper the means of identification is what will be primarily used.

1) This point is short and relatively straight forward. It is assumed that the act of smuggling is not solely conducted by actors abroad. But is undertaken by domestic actors, that is the country where the goods are destined (Lovely and Nelson, 1995).
2) There are two different possibilities of the means of smuggling. One assumes that the smugglers acquire the goods meant to import to the domestic arena from the world.
market. This one also assumes that smuggled goods also lose a fraction of every shipment due to circumstances unique to smuggling. In this scenario the smuggling is conducted so called “ships of the night” (Lovely and Nelson, 1995, p 28). The other scenario is the camouflaging of smuggled goods as legal goods. In this model its assumed that there is also domestic cost carried for smuggling cargo, this differentiates from classical assumptions that smuggling cost is carried abroad (Lovely and Nelson, 1995).

3) This point relates to government trying to tackle smuggling activities. This point is central for the calculations and decision making of smugglers. It relates to both safety and relative cost of smuggling and will be present in any decision making related to smuggling of goods. How well the government can tackle smuggling determines the loss of cargo and incarceration of perpetrators which in turn affects the overall smuggling costs (Lovely and Nelson, 1995).

As a last note, the model concludes that in a country with rampant tariffs, the smuggling activities does not necessarily result in negative domestic welfare even though recourses subsequently are funnelled into unproductive activities. The anti-smuggling activities can also affect the overall cost of import, but an efficient anti-smuggling activity can function to increase the overall volume of imports (Lovely and Nelson, 1995, p 40).

In summary the rational choice theory will be the underlying assumption implying that the economic actors involved have weighed and chosen the option deemed most suitable from the given criteria. That means that, they have weighed their options and decided that there is enough to gain from consciously or unconsciously enable the smuggling of e-waste. The adapted RV-model is used to see how the smuggling is conducted and hopefully will provide a more or less conclusive answer of why. This may in turn help to understand how to deter this type of economic activity and where the attraction of such activities stems from. Incentives will be valued from cost of management of e-waste, risk/cost of smuggling, as well as actual capacity and constraints of EU member states as well as Ghana to address the problem.
1.5 Methodological Framework

When designing this research, focus was on the relationship between the western countries and developing world in regards to global issues. The research subject started to take shape when I found articles on the Agbogbloshie scrapyard. When looking into appropriate legislation, it became apparent that there exists a legal framework meant to inhibit shipments of hazardous waste, such as the Basel Convention (1989). Still there is e-waste ending up in Agbogbloshie even though there are legal restrictions on its movement. I decided to review the underlying drivers, incentives, restrictions and its effects to provide a holistic view of the phenomenon of e-waste smuggling from EU to Ghana.

The choice of EU as sender and Ghana as a receiver was made based on the following criteria. First of all, the official language of Ghana being English, this allows me to have access to extensive information on both sides. EU has a strong external and internal focus on environmental legislation and sound waste treatment (IMPEL and Basel Convention, 2012, EC A, 2018, EC B, 2018). Ghana is at the same time going through an extensive digitalization process (Grant and Oteng-Ababio, 2012). Also hope that my findings from this research can be used in other countries going through a similar process.

1.5.1 Assumptions and definitions

To ensure that the research stays focused, there will be certain assumptions made. First is that the smuggling of e-waste has a negative impact on the overall efforts to ensure environmental safety. Second is that there is a better capacity for legislation and environmentally friendly waste management in the formal sector. In this research the term EEE will be used for classifying of Electrical and Electronic Equipment and WEEE for Waste Electrical and Electronic Equipment. The name Agbogbloshie and Old Fadama is sometimes interchangeable when writing about the market, dealers and scrapyard. Technically the areas are a few 100-meters apart separated by the Abose-Okai Road but the interconnection in reporting and because both areas function as an extended community this research will regard them as one (Daum, Stoler and Grant, 2017, p 2). I will when referring to either Old Fadama or Agbogbloshie refer to the extended community.
1.5.2 Method and approach

The research will be conducted as a qualitative desk study grounded in abductive reasoning. When weighing the approaches to reasoning, deductive reasoning was immediately excluded as an option. This is due to the data on smuggling not being efficient in a way that good smugglers don’t declare their shipping information or methods of transport. This also makes it impossible to efficiently quantify data in a reliable manner to identify causality patterns. That being, in regards to the contemporary circumstances it is impossible to find a causality that will result in a precise quantification or deduction. The option of inductive reasoning was more plausible since it simply assumes to provide the likely line of reasoning to a conclusion (Bryman, 2015). Though since its purpose when applied is to develop a theory it will not be used here, as well as deductive since it is primarily used to prove a theory. Deductive will not be used since no theory will be proved or rejected and inductive since the data collected are not meant to develop a theory (Bryman, 2015, p 21, 22). Therefore, I settled to use an abductive method of reasoning since it uses theory to provide an explanation on the subjective understanding and circumstances of the actors involved relating to the different market factors presented (Bryman, 2015). By reviewing legal framework, definitions, compliance, identification of actors, estimations and the effects of the WEEE smuggling. And through the rational choice theory and an adapted RV-model for smuggling by applying an abductive approach understand the underlying drivers of the smuggling of WEEE.

1.5.3 Sources of information

Most of the information will be in the form of legal texts and data provided by national and international institutions. The EU will be a major source of information, partly because of the abundance and quality of information available through reports and legislation. European Legislation also carries high judicial weight and countries are obligated to actualize European legislation. They also often support foreign investigations and estimation reports in cooperation with the Basel Convention regional offices and secretariat, conducting trainings on inspection routines for foreign workers handling imports (IMPEL and Basel Convention, 2012). The EU and Basel Convention therefore work as a supporting agent in shaping domestic regulation as well as to provide routines for enforcement of such legislation.

When relating to Ghana there will be higher reliance of reports from NGO’s and researchers as well as some articles to highlight certain events. This in an aim to point to the underlying incentives that drives the illegal WEEE trading and reactions from the Ghanaian officials.
When analyzing illegal market actors, I will primarily review reports from international police organization such as Europol and Interpol.

Legal texts, will be mainly from primary sources and will be taken from official homepages, press releases and reports of the EU and relevant institutions. Certain information on Ghana’s domestic laws will be provided as secondary sources by for example the ILO. This is due to not all cases and laws being accessible for the public.

1.5.4 Challenges

The reporting of environmental data is not consistent within the EU. Some countries have been noted for having limited institutional capacity regarding environmental enforcement and almost no data on environmental transgressions while others have good enforcement and many reported cases. I will focus on international legislation and compliance rather than individual cases (Eurojust, 2014). It has also been difficult attaining legal texts from official Ghanaian sources since the country has not comprehensibly digitalized its legal texts and court cases not being accessible to the public (EU Emergency Fund for Africa, 2016).

1.6 Limitations and Delimitations

This research will take a top down approach, by viewing how the legal framework to track the transition from the formal European electronics market into the informal waste management sector of Ghana. This will result in looking more on the legal aspects of the research and less on any underlying customs in border management by the European and Ghanaian border guards thus rather look at it from a perspective of general praxis. It will also fall short on being able to identify the actual in-depth methods of smuggling but will rather give an overview of the methods of smuggling. This research therefore assumes that there are probably many methods not accounted for, this since successful smuggling supposedly goes unnoticed. Most of the data on smuggling will be based on estimations and gaps in data relating to number of EEE distributed and number of WEEE collected. This is to be expected when the nature of smuggling is to operate outside the eye of legislative and judicial bodies.

As an effort to partially get around the lack of exact numbers, this paper will utilize estimations and rapports on waste legislation and waste management in Ghana. One other limitation is that the research will focus on the EU as a conduit for the developing world’s e-waste smuggling and will not evaluate the management of e-waste produced domestically and on the African continent.
2 Findings
2.1 The Basel convention and WSR

The Basel convention from 1989 regulates international movements of hazardous waste which is enacted in the EU through legislation called the WSR (Waste Shipment Regulation). Under general obligations the Basel convention states in section (d) “Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;” (Basel convention, 1989, p 15). The Basel convention doesn’t clearly define the term environmentally sound but as an international agreement provide an overlying guideline of management. The convention is encouraging countries to attempt to maximize internal waste treatment, especially for hazardous waste which export should be minimized (Basel convention, 1989).

1995 a proposal known as the Basel Convention Ban Amendment, was proposed to address the issue of hazardous exports to developing countries. The proposal was supposed to stop all exports to non-OECD countries under the motivation that this sort of export carried a high risk of not being treated in an “environmentally sound” manner (Basel.int, a 2018). In contrast to the standard Basel agreement where it is possible to export to developing countries following strict regulation (Basel convention, 1989), there would be a total ban. The Ban Amendment has not been fully implemented and has no date when it is supposed to be in affect (Basel.int, b 2018).

It is acknowledged that enforcement of the Basel convention is problematic as well, as clear distinction between EEE and WEEE is not comprehensibly outlined. However, the movement of hazardous waste from EU to developing countries not following correct procedure is prohibited according to the convention (UNEP, n.d., p 5). It is not clear what repercussions are called for when rules are broken, by only stating that the illegal movement of waste is criminal. The proper conduct calls for possibility of tracing of sender as well as recipient. Requirements to keep within the regulatory frame countries are required to have a PIC (prior informed request), this requires the sender to have the written consent of the receiver as well as inform them on what is being shipped, this to ensure accountability of shipment and final treatment (Basel convention, 1989).
The WSR takes the regulation further by giving classifications on different levels of potentially environmentally harmful waste. Green meaning that waste is less-hazardous and amber meaning that it is more hazardous, which includes WEEE. If the waste is meant to be shipped for recycling it will be treated in a milder fashion, this goes as well for green marked shipments which doesn’t need a full PIC procedure. It will in that case only require that the paper work is filled in correctly. There is also made distinction if the shipment is meant to be recycled or dumped. If it is destined to be dumped in a land fill then it is prohibited to export it outside the EU. Amber shipments have the additional requirement that there is a confirmation of both arrival and treatment from the receiving country (REGULATION (EC) No 1013/2006).

2.2 European classification, cost and approach to WEEE

The EU has through its reviewing of its waste behavior observed that the registered total amount of recycled WEEE by its member states is not proportional that what is consumed. This has been identified as an indication of electronics being shipped outside of EU and non-OECD countries is assumed to be the primary destination. This, regardless of it being illegal to ship to non-OECD countries for dumping WEEE as stated in the Basel convention. There is no such prohibition on secondhand goods though which opens the possibility to exploit shipping regulation by sending broken or near end of life products (EEA, 2012, p 27).

According to a Eurostat report based on 2012 figures (with exception of Cyprus that only had 2010 figures), an average of 39 % of WEEE was accounted for as collected. This is based on numbers of EEE products that were in the market and percentage of these collected as WEEE, with the best performers collecting between 47-77 % and worst performers collecting between 14-34 % (EC, 2015, p 35-36).

The legislation for WEEE implemented by the EU, products that are to be defined as EEE and therefore when no longer functioning are classified as WEEE are specified as “equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA and designed for use with a voltage rating not exceeding 1000 Volt for alternating current and 1500 Volt for direct current.” (EUROPEAN COMMISSION DIRECTORATE-GENERAL ENVIRONMENT, 2005, p 11). The EU has later recognized that this definition makes some types of waste products escape
the definition of E-waste. This could be products that doesn’t have electricity as its primary energy source but for example is driven primarily by gas. Or where electricity is not needed in the main function of the appliance or where it is a part of another product, for example an electric timer on a gas stove or a car radio (European Commission – DG Environment, 2013, p 11-13).

The 2012 directive was designed to address some of the classification problems that arose from the grey areas as a result the formulation in the old legislation. Some areas that were not enacted in the 2002 legislation should be enacted latest by 15-august 2018 and put in practice by member states (EUROPEAN COMMISSION DIRECTORATE-GENERAL ENVIRONMENT, 2005, p 17). Some of the new items that is now addressed in the directive and classified as EEE are, solar panels, household luminaries. Products that are explicitly excluded from the EEE classification are not directly relevant to this research but might be of interest to future readers. Equipment destined to be sent into space, large scale fixed equipment such as escalators and power transmission stations, “Means of transport for persons or goods, excluding electric two-wheel vehicles which are not type-approved” such as helicopters or trains, mobile machinery not designed for roads such as electric forklifts, research equipment exclusively available for business to business usage, church pipe-organs (EC, 2013, p 6).

Regardless of definition of is to be considered e-waste, what is to be considered second-hand EEE is open to interpretation. This makes it possible to send products that are so damaged or old that they in some cases can be considered WEEE (EEA, 2012, p 27-28). The ILO reported that this was the most common way to disguise illegal trade by mixing it with used wares, camouflaging the shipment (ILO, 2012, p 55).

Another problem in waste declaration is that smaller waste management businesses don’t need to report if the amount of hazardous waste transported from the facility, not exceeding 2-ton in a year. This means in reality that the data in E-PRTR (European Pollutant Release and Transfer Register) only accounts for one third of all hazardous waste shipments (EEA, 2012, p 8).

It is unclear how accurate the European Commission’s cost estimations of recycling WEEE is, estimations are largely based on data from 1997 and that report stated that the cost prediction was lower than the cost shown in estimation trails (EPEC, 2005, p 66). EPEC waste report showed that in high estimation trails costs could be even €2000/t (inclusive of
collection) for smaller more complex WEEE products (EPEC, 2005, p 66). This is much
costlier than the 1997 estimations. This estimation is related to that the components are
generally smaller and more complex. Larger EEE products such as refrigerators and larger
appliances carry a lower estimated cost of recycling. (EPEC, 2005, p 66). The ILO reported
that one of the main issues of the nature of modern WEEE management is a lack of financial
incentives to treat complex electronics since they will require modern and expensive
equipment and will be labor intensive. But they also note that rise of metal prices and
increase in WEEE volumes can function to incentivize an expansion of formal WEEE

2.3 Consistency in compliance from EU member states and legal approach

The recycling rate of e-waste varies strongly between member states. Eurostat takes the
volumes that were collected for treatment and compare them to the sum collection rate
divided by the average of EEE put in the market during the prior three years. 2014 the
average was 32.2 % between the 28 accounted EU and EEA (European Economic Area)
countries with the lowest scoring being Malta with 11.5 and highest being Lichtenstein with a
117.8 % recycling rate (Ec.europa.eu, 2018). 2012 a high estimation presented by the ILO
stating as much as 80 % of WEEE is shipped from developed countries to developing ones,
many times illegally, resulting in it ending up in the informal waste sector (ILO, 2012, p 9).

Critique occasionally raised against the WSR and its enforcement on the trade of WEEE,
relates to the rather complex system of shipment classification. Also, that the Basel
convention and WSR carries different codes of identification when dealing with waste which
creates a need for a large number of well trained staff (Netherlands Court of Audit, 2013).
This can complicate procedure, since it puts pressure on shipping terminals capacity.
Countries under the WSR are themselves deciding bodies on the legal repercussions of
transgressions. The concern of inconsistency in quality throughout a number of ports in the
EEA has been raised in particular that the lack of recourses in some ports negatively effects
the capacity to tackle WEEE smuggling. Movement of waste then can be used to exploit this
inherent weakness, resulting in that countries with lower recourses can function as an exit
point for potential smugglers (Netherlands Court of Audit, 2013).

As an example, to highlight the scope of overall shipping volumes of wares going through a
port. The port of Rotterdam saw in 2017 a throughput of a total of 467-million ton with
142.6-million ton being in containers (Port of Rotterdam, 2018). With high volumes there is a need for countries to have sufficient recourses to ensure that there is a consistent check-up process (CWIT consortium, 2013). This can be indicated through reporting frequency when investigating Hamburg, Le Havre, Rotterdam and Antwerp which all have high numbers of reported violations and quite developed enforcement routines, showing a probable use of volume as coverage for smuggling (EC, 2013, p 10). This makes it possible for criminal actors to move merchandise to the places where it is perceived to be the lowest risk of detection as well as repercussions. Some countries have not yet enacted adequate institutions to persecute offenders which may entice criminals to target these countries for their operation (CWIT consortium, 2013, p 16-17).

The legal formulation of required actions against those failing to comply with the WSR regulations are “by effective, proportionate and dissuasive criminal penalties” (Eurojust, 2014, p 18). The repercussions can in many cases just result in fines. With loose definition on what repercussions are called for this type of environmental crime, the range of interpretations opens up for the possible for an actor to just count potential fine as a cost of conducting business (Eurojust, 2014). Not only the level of repercussion being inconsistent but also building a case is recourse intensive and requires a lot of coordination. Many investigations struggle with cross border smuggling cases, when shipments are being accused for illegal movement there is need for additional investigation to determine who is the source or initiator of the crime (Eurojust, 2014, p 18). This is problematic since many criminal actors use the means of transit destinations and waste changing hands to hide their illegal activities making it harder to trace the source (EC, 2013). It also follows the problem when the country is requesting evidence and information from the country of which the offender is suspected to originate. This can result in several hurdles in criminal investigations, for example when the offender is a company that has offices that are situated in several countries. The process of providing the evidence, sending it, getting the right request in a time frame that is in compliance with the domestic law can therefore result in weak case against the prosecuted. Then there is the matter of interrogation of suspects and identification of intermediates, which can become even more difficult when suspects are located outside the EU (Eurojust, 2014, p 16-18). Acquiring data from for example West Africa can be very difficult since they still highly rely on a paper documentation, resulting in low reports to enforcement agencies like for example Interpol from the region (EU Emergency Fund for Africa, 2016). Lastly there is the matter of burden of evidence. Often, the illegal shipment pass through several countries
and ports, all with different judicial jurisdictions, the shipment might pass certain jurisdictions but fail at some juncture point. This becomes problematic when EU companies have foreign offices which enables offenders to rely on the complexity of the legislation. Citing that they assumed the shipment was in compliance since a certified business signed the receipt (Eurojust, 2014, p 17,19). The high frequency of updates on environmental legislation works to strengthen this type of argument. This becomes a catch 22 when loopholes in the legislation are discovered which in turn is creating a need for reform, puts a need to train personal and inform the public.

Enforcements can be especially problematic relating to article 36 which relates to shipments to non-OECD countries, stating (f) “wastes the import of which has been prohibited by the country of destination; or”, (g) “wastes which the competent authority of dispatch has reason to believe will not be managed in an environmentally sound manner, as referred to in Article 49, in the country of destination concerned”. (REGULATION (EC) No 1013/2006). This raises the problem of evidence of treatment not being environmentally sound, with the requirement of convincing evidence which many times is hard to acquire especially with connecting a specific ware, to judicial person as well as identifying its treatment. Especially if article 36 (f) is fulfilled and the receiving non-OECD country approves import of WEEE for environmentally sound treatment (Eurojust, 2014, p 19). Then there needs to be witnesses and documentation that ties the evidence to the suspected perpetrator (Eurojust, 2014, p 19). Defenders may also claim that containers have been unsealed at some point of its journey making it hard to eliminate the possibility of evidence tampering (Eurojust, 2014).

The actual repercussions also vary between EEA states, the scales of punishment and/or repercussions range from withdrawal of permits and fines to prison sentences. Though some countries lack framework or recourses to effectively handle WEEE offenders where a ship intercepted before departing from its harbor will be considered only an attempt for smuggling which carries a lower severity of offence and in some cases is not even considered an actual offence in itself (CWIT consortium, 2013, p 17). Where the scale of repercussions is lower, it might not even be possible to acquire permission for more severe means to gathering evidence such as camera footage, audio surveillance etc. (Eurojust, 2014, p 18).

Though European weak points for smuggling operations has at least partly been identified. In 2011 Europol identified that the western Balkans was one of these exit points, that is Albania, Hungary and Romania but also Italy was identified. There was found evidence that permits
were issued and that both private and public sector was involved in enabling the illegal shipping of WEEE (Europol, 2011, p 40). In some cases, these countries have a severe lack of enforcement with the example of Romania there is no specialized investigative or judicial unit targeting environmental crime (Eurojust, 2014, p 28).

2016 the EU updated the WSR to help with enforcement of shipments, providing a check and classification list as a frame of reference for officials to more easily be able identify the legality of shipments. This helps the people working in entry and exit points with identification of cargo in accordance with the international trade agreements in place which may help to at least partially address the issue of human capital insufficiency (Eur-lex.europa.eu, 2016). This doesn’t necessarily compensate for the shortcomings in inter- and intrastate coordination and collaboration when building cases which many times falls short in keeping transgressors accountable (Eurojust, 2014).

Though efforts from the EU has also been put forward to assist receiving countries, with the example of the €5,000,000 project to strengthen the police coordination in Western Africa and cooperation with Interpol. This aims to combat among other things criminal groups and smuggling organizations by increasing cooperation and exchange of information. This as well as transition from the previously mentioned paper-based documentation of investigations and criminals. By for example digitalizing the data, the police will have access to investigations as well as hindering evidence tampering or destruction of documents (EU Emergency Fund for Africa, 2016). These sorts of investments may help to increase capacity to combat cross-border criminals as well as utilize the digitalization of countries like Ghana to combat emerging problems.
2.4 Identifying the actors’

A report from Europol notes that most of the groups engaged in smuggling and especially targeting West Africa are composed of between 5-10 people with some sort of ethnic connection to the destined country. These groups utilize the sometimes-unclear distinction between second-hand EEE and WEEE. According to the Europol report there is an exchange between market actors, regular businesses and criminal groups, between larger organizations as well as smaller actors. These kinds of networks can encompass actors within financial, recycling, export and import sectors. Actors in the private and public sector helps the smugglers to obtain the papers that allows for movement of merchandise. They also provide transit storage sites when moving waste towards the final destination (Europol, 2011).

In 2013 Europol raised the issue that the increased cost of waste management as well as increase in volumes can in combination with economic strain in the market incentivize a larger involvement of organized criminal groups into waste smuggling. They further emphasized that there are already well-established land routes utilized within the EU and port infrastructure to move waste from EU to non-OECD countries (Europol, 2013). Though as for now, it seems as the larger organization primarily target Asia, which receives the highest volumes (Europol, 2011). ILO has pointed out that even though small scale smuggling tends to be destined to west Africa, also larger scale actors may be attracted. As a consequence of the strengthening of regulations in Asia, there is a risk that the flows will be shifted and result in an increase of illegal WEEE shipments towards West Africa (ILO, 2012, p 14).

Criminal networks do vary in size and scope, from families to trading networks as well as people masking as tourists coming to acquire WEEE to ship to their native country utilizing brokers and white-collar criminals. These actors are assumed to utilize strategic admittance of paper work, providing them close to the time of departure as well as targeting ports with limited recourses to efficiently escape thorough shipping inspection (ILO, 2012, p 16-17). This is partly enabled through the expansion of the waste recycling sector which in itself can be considered positive, but it has also had the effect of increased tolerance to movement of waste between countries (ILO 2012, p 14).

The smugglers see the potential to gain profits from a number of actors, first from local authorities that are trying to achieve their recycling target quota, second from businesses in an attempt to alleviate their responsibility under the Producer Responsibility Regulations and
third from buyers in the recipient country (Pollution Crime Working Group, Interpol, 2009). With some countries struggling with their own internal waste management this can be an attractive prospect.

The estimated profit per ton for brokers of e-waste is around €450/t (Pollution Crime Working Group, Interpol, 2009), with estimated cost for the legal actors in the collection of e-waste between €105-€187/t and processing €210-€270/t and complex products as stated in previous section being able of reaching a cost of €2000/t for collection and processing (EPEC, 2005, p 66). This illustrates why this might incentivize officials to look the other way on these types of operations and how it can attract business.

2.5 Estimations of smuggling and how merchandise enters Ghana

Ghana has signed a number of agreements relating to waste and environment. One of them is the Bamako Convention (on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa) which came into force 1998. This legislation was aimed to stop all imports into Africa from parties that are “non-contracting” (ILO, 2012, p 35). Though the African enforcement suffers from the same problems that European does with allocating recourses and cooperation between nations in ensuring legality. Ghana has tried adopting new legislation to combat smuggling, including signing The Libreville Declaration. Which relates to the need for research on human health and environment impacts. Ghana has also signed The Durban Declaration which is supposed to help African countries enforce environmental legislation. Nevertheless, many parts of it is not properly enforced (ILO, 2012, p 35, 36).

The nature of smuggling brings the inherent shortcoming in providing exact numbers since the success of the activity is measured by whether the action goes undetected. As previously shown in this paper one of the most common identified methods of smuggling is labeling as used EEE which can be observed in many reports (Grant and Oteng-Ababio, 2012, EEA, 2012, ILO, 2012,). One of the problems here is that there is a lack of overview on secondhand goods statistics, that is the dividing line between EEE and WEEE (ILO, 2012, p 13). When the distinction of WEEE and secondhand EEE is rather unclear the reliability becomes unclear as well. Here I will rather give an idea of what the estimated volumes of WEEE are. Also, later there will be an overview of the scope of Ghana’s WEEE informal sector.
Methods that then are employed, are viewing of shipment data, this meaning looking at shipment inspections and viewing the total number of violations. When viewing IMPEL (European Union Network for the Implementation and Enforcement of Environmental Law) inspections supported by the European Commission, the violation rates between 2008 and 2010 were 853 violations out of 3454 shipments from the EU, which is just under 25 %. In 120 company inspections there were 95 cases of illegal exports (EC, 2013, p 9). There is however a clear unbalance in reporting between countries with most being reported by Germany, UK, Netherlands (EC, 2013). Netherlands has been reported as having ports that are large transit hubs for export of e-waste. This in combination with good enforcement of WSR legislation, influences the number of reported cases. Countries that have been stated in previous section as identified exit points sometimes have very low reporting, coming back to the example of Romania which has been noted for lack of, data availability and internal planning for its waste management (EC, 2015, p 152).

There have been employed several methods to be able to enter smuggled WEEE into West Africa. By marking shipments as EEE and moving the merchandise through busy ports, the transport carries a lower risk of detection. The phenomenon of port-hoping that can be identified in Europe and can be identified in Africa as well, where ports work as transit stations before reaching the final destination (Grant and Oteng-Ababio, 2012, p 9). Other ways to ease the shipment and entry is to mark these cargos of end of life EEE products as charity, while senders still retain a profit, these types of shipments tend to go through controls more easily (Daum, Stoler and Grant, 2017).

The entry to the Ghanaian market is made easier through the rapid growth of ICT (Information and Communications Technology) in the country. This initiative has made the electronics market expand dramatically. The volumes of used computers coming into Ghana rose by some 250 % between 2004-2009 from approximately value of $22.7- to $59-million based on declarations of import (Grant and Oteng-Ababio, 2012, p 8). This expansion has made secondhand electronics available to individuals, companies and organizations (Oteng-Ababio, 2012). According to numbers presented by Greenpeace in 2008 between 25-75 % of second-hand electronics entering Ghana cannot be reused indicating that, the bridging of the digital gap is sometimes masking a dumping of electronic waste on the poor. This is emphasised since second-hand and working EEE wares many times also have a short life span before breaking (Greenpeace, 2008, p 4, 10).
There has also been a transition to cellular phones in Ghana driving the market of secondhand cellphones. The increase in cellphone service subscriptions from around 1-million 2001 to around 15-million in 2009 is an indication of the exploding market (Oteng-Ababio, 2012, 154-155). Ghanaian legislation states that second-hand goods will be inspected on arrival (Cotecna, 2012). So, the merchandise should be reviewed on arrival but the problem is still present with a shortage of recourse and enforcement of international treaties and legislation (Daum, Stoler and Grant, 2017).

Concern has been raised that there has been a lack of incentive for Ghana authorities to strengthen legislation and enforcement, citing that the WEEE chain is estimated to sustain the livelihood of at least 200,000 people (Daum, Stoler and Grant, 2017, p 1-2). The informal sector does function as a cheap way for the city of Accra to manage its waste which otherwise would fall on private companies. It also employs a large portion of unskilled workers and functions as a poverty alleviator of sorts. With the waste sector generating between $105-$268 million USD per year, there are strong incentives to keep this sector live and kicking (Oteng-Ababio, Amankwaa and Chama, 2014, p 163-164).

The domestic regulation of secondhand EEE is largely unrestricted and therefore poor quality and nonfunctioning EEE equipment will be very likely to manage to slip through. Some of these machines will later be salvaged for spare parts but other parts and many nonfunctioning EEE will end up in the Agbogbloshie scrapyard (Amoyaw-Osei et al., 2011). Apart from this there are many creative ways to enter EEE or WEEE without having to declare the nature of the merchandise. It was discovered that thousands of tons of EEE and WEEE had been sent from European ports into Ghana’s neighbor, Nigeria, this by means of filling used trucks and vehicles with waste and used electronics (EU Network for the Implementation and Enforcement of Environmental Law, 2018). Estimation of 2009 was that only 1 % of WEEE coming into Ghana actually went into formal facilities (Daum, Stoler and Grant, 2017, p 9).

The fact is that the informal sector is a larger employer than the formal one. The National Employment Report of 2015 showed that around 59,99 % of the people of Ghana were working in the informal sector, with 40,1 % in the formal (IBES, 2015, p 30). The greater Accra region also functions as an economical hub employing most people across both the formal and informal sector (IBES, 2015, p 31). For poor northern Ghanaians migrating to work in Agbogbloshie waste management provides a semi-stable source of income. The collectors work at the bottom, with children being the lowest potential earners as self-
employed actors with an average of less than $20-USD per month (ILO, 2012, p 28). The fact is that the informal sector employs child labor and has higher risk for unfair business relations with low official insight (Oteng-Ababio, Amankwaa and Chama, 2014).

2.6 The drivers of informal WEEE management

As mentioned before, Ghana has since 2003 made attempts to develop the digital sector with the help of an ICT policy (Information and Communications Technology). Most electronic wares come from outside of Ghana, with a large portion being second-hand EEE gods, many in the condition of being in the end of their lifecycle (Amoyaw-Osei et al., 2011, p 13). The expanding EEE trade is enabled by the patronage of informal and formal actors alike. This since all levels of society are consumers of secondhand EEE from private, corporate to public. And since most Ghanaians can’t afford new merchandise second-hand electronics becomes the best option for many citizens. The end of life EEE is later bought when it is no longer functioning as WEEE by door-to-door collectors, this makes it hard for the formal collectors to compete since they usually can’t pay for WEEE (Amoyaw-Osei et al., 2011, p 78). As an illustration you can find in (Appendix 3.) a door-to-door collectors cart outside the Accra Central Mosque.

Most of the WEEE ends up in Agbogbloshie the largest scrapyard in the greater Accra area and a hub for e-waste recycling treating more waste than the other smaller ones that exist in the neighboring areas such as Kokompe, Ashaiman and Gallaway. New waste areas are emerging as a result of oversaturation in Agbogbloshie (Amoyaw-Osei et al., 2011,).

The area of Agbogbloshie was registered with the NYC (The National Youth Council) in 1994 when approached by scrap dealers who leased parts of the land under the Scrap Dealers’ Association of Ghana. The area has been gradually transforming into a slum which expansion has accelerated by factors such as migration from northern conflict areas, the adjacent markets expansion and the possibility to settle cheaply without strict supervision (Amoyaw-Osei et al., 2011, p 15). The rents in Old Fadama is the cheapest in the city, being closest to the Agbogbloshie waste dump. In these areas the waste management surrounds many vital points, for example areas for livestock to graze. The WEEE is scattered in the greater area with adults and children alike ranging from working in toxic conditions to spending their leisure-time in contaminated areas, which keeps them continuously exposed to toxic materials (Daum, Stoler and Grant, 2017).
Reports from Amnesty International shows methods of forced eviction as mean to try to control the informal settlement of Old Fadama and Agbogbloshie (Amnesty International, 2011). The Same strategy has been employed to contain the neighboring market. The chief of AMA (The Accra Metropolitan Assembly) stating reasons of the congestion of the expanding market as well as health concerns as follows: “the onion is food people come to buy and you have to display the onion on the ground for people to buy”, the Old Fadama market is one of the food hubs in Accra (Ghana Star, 2018). Indeed, the area is a cluster of informal and formal actors, traders, repair shops, food stalls etc. and waste management is just a part of this extended community even though its effects are visible throughout the area (Daum, Stoler and Grant, 2017, p 3) see (Appendix 5. 6. 7.).

The city of Accra tries to control the expansion of the area by regularly demolishing the shacks and shanty houses made and evicting its inhabitants on short notice. Agbogbloshie is one of the largest informal settlements in Ghana with an estimate of between 55,000-79,000 inhabitants (Amnesty International, 2011, p 2). Estimated enumerations from 2009 showed that there was 79,684 people living in the 0.4km$^2$ of Old Fadama (Daum, Stoler and Grant, 2017, p 3). Poverty has gradually become an urban problem in Ghana driven by people attracted to areas like Old Fadama to enter economic activity without strong legal and social barriers. With the area attracting a large number of people looking to work in Agbogbloshie and with the limited space on which to accommodate this need, new waste sites are emerging around the greater Accra area (Oteng-Ababio, Amankwaa and Chama, 2014).

2.7 Environment, health and socioeconomic effects

The cost of illegal WEEE smuggling is vast with long reaching effects. Here some of the main concerns are identified. Since the interdisciplinary scope of WEEE smuggling reaches from environmental cost, health to physical- and e-security, I will try to address them very distinctly. The first three will be reviewed to a lesser extent than the last point. This is not done on the basis of valuing these hardships lower but rather that there is a larger gap in information on e-security and to sound disposal of hardware. It is also because there are many great articles and researches done targeting the area on the subject of environment and health.

WEEE contains many precious metals, some examples of metals that are sought after are gold, silver, platinum, palladium, these metals are usually in some way attached to less
desirable materials such as plastic and wood through for example circuit boards. Also elements that are harmful can be found such as mercury, lead, arsenic, cadmium (Alghazo, Ouda and Hassan, 2018). One of the metals that is sought after by people working in Agbogbloshie is copper which provides the seller around approximately $3.91-USD per kg (Daum, Stoler and Grant, 2017, p 10). The general practice when extracting copper for workers is to look for cables. These cables tend to be insulated and covered with plastic. The method employed is to burn of the plastic which requires a stable temperature, too much heat and the copper will lose value. To establish this temperature other waste is burned, foam, plastic-parts and casings. The same method is employed for computer parts. This burning release hydroxylated PBDE, lead and tin in the air (Daum, Stoler and Grant, 2017, p 10).

Many times, informal workers don’t use safety equipment partly due to harsh climate which makes face masks and such equipment straining to use. Instead many try employing spiritual means to ensure safety, such as praying before work (D. Akorsu, 2013). This leaves workers unprotected when high levels of substance are released into the air (Amoyaw-Osei et al., 2011). The adjacent market has also been a health concern when dealing with the expansion of Agbogbloshie, smog of the burning waste is leaving residue particles on food harmful when ingested as well as inhaled (Daum, Stoler and Grant, 2017). The average time spent working in the scrapyard is between 3-7 years, with low wages, high risk in health and job security, it functions as better of two worse alternatives for people working in scrapyard. Many of which are from the northern parts which are suffering from high food insecurity (ILO, 2012, p 28).

Old Fadama is situated by the Odaw river which is in the upper part of Koorle Lagoon which runs out into the Gulf of Guinea. The river runs by the scrapyard and Old Fadama (Appendix 8.). The Odaw river and Accra are susceptible to flooding, when this happens contaminants from the Agbogbloshie scrapyard are flushed down into the river which then flows into the Koorle Lagoon and then into the ocean (Amoyaw-Osei et al., 2011, p 72) see (Appendix, 4., 9.). The Odaw river can fluctuate in water levels depending on if it’s rainy or dry season, floods do happen regularly, with the major 2015 flood claiming 150-lives (News Ghana, 2017). In the aftermath to tackle the problems of floods in the area AMA put in motion another demolition plan of Old Fadama to prevent future floods. This met criticism saying that the flood couldn’t be blamed on the people of Old Fadama, stating that the floods was due to the quality of the storm drain (Myjoyonline, 2015). 2017 there was another large-scale flood causing structural and financial damage (News Ghana, 2017).
There have been concern that the people living in the slums don’t have access to sanitation, safe water, housing security or structural quality (Rain et al., 2011, p 11). In Accra there is an estimated 172,000 people living in areas where there is risk of flooding and f 33,000 who are estimated to live in substandard housing in slum areas (Rain et al., 2011, p 2). Agbogbloshies market is situated on a flat area by the river side which causes the contaminants to move and be found in surface water around the greater area when subjected to floods or heavy rain (Amoyaw-Osei et al., 2011).

2.8 Information security and implications of WEEE smuggling

Most of the computer and cellphone hardware arriving in Ghana is secondhand EEE and WEEE. The equipment ranges from electronics previously for private use, other from businesses and some from public institutions of from the country of origin. These hard drives can contain valuable information as well as other memory components (Warner, 2011). Something that is not clear to many users, private or otherwise is that formatting a disc doesn’t permanently delete all previous information. Some companies like IBM and Dell specialize in managing old hardware (Truini, 2007). IBM had a contract with Sweden in 2015 relating to protection of data which leaked through subsidiaries in eastern Europe (Anderson, 2017). The circumstances were not related to hardware but raises the question of using third parties to secure sensitive information from public institutions.

The common usage of data to gain monetary reward and utilize it for cybercrime is a phenomenon in Ghana called “Sakawa” which stands for “social justice used to justify cyber-fraud” with spiritualistic aspects (Warner, 2011, p 742). It should be mentioned that Ghana is not a leading country in cybercrime. It is rather a relatively new phenomenon. Though when relating to certain aspects such as identity theft they are ranked third after USA and Great Briton (Warner, 2011, p 739). Sakawa can incorporate different type of scams, romance scam, stealing credit-card information, gambling scams etc. but the practice itself is when African spiritualism meets modern technology (VICE, 2013). The interesting part of this is an emergence of culture that surrounds e-criminality, which has been an increasing concern for Ghana police (Warner, 2011, 747). A possible scenario is that this problem will become more sophisticated as time progresses. The so called “Sakawa boys” are often people from poor backgrounds from urban areas (Warner, 2011, p 746). Sakawa has had a strong penetration on popular culture not only in Ghana but also in other West African countries such as Nigeria. This can be seen throughout internet through example music videos and through
Nollywood (Nigerian version of Hollywood) filmizations (Werner 2011, p 745). The Europol report “EU Serious and Organised Crime Threat Assessment” addresses the risk of having your personal data online that can be used by organized crime. Though it seems that they overlook the need for safe disposal of old hardware (Europol, 2013).

During the last few years many aspects of information security have come into focus. This through hacking allegations on the 2016-election in the US election (CNN, 2018), and as regards the ministry of transportation in Sweden with its insufficient security, leaked personal information of its citizens and infrastructure as well as intelligence officers working undercover in 2015 (Anderson, 2017). Or the more recent Cambridge Analytica scandal in the UK and USA (Confessore, 2018). An interesting aspect that is not often approached regarding broken and end of life EEE is the possibility to recover data (Truini, 2007). The possibility to recover formatted hard drives and factory reset cellphones exposes possible leakage of sensitive information like example private medical history. Many data recovery techniques can be used not only to retrieve information from hard drives but also DRAM (Dynamic random-access memory) or SRAM (Static random-access memory). These can be used for a number of attacks (Alghazo, Ouda and Hassan, 2018). Alghazo, Ouda and Hassan has identified e-waste as a “soft target” to gain political and economic advantages (2018, p 7). This opens up for the concern that sensitive data is being sold by retailers around Old Fadama and Agbogbloshie online and on the market and can technically be made available for purchase for anyone with a computer.

One case reported by CBC was a student acquiring a hard drive in Ghana containing information about multimillion dollar defense contracts for a price of $40-USD (Chung, 2009). Information can relatively easily be restored and gathered and can in turn be used for cybercrime, fraud, extortion etc. (Warner, 2011). Another severe case was the acquisition of a hard drive via Ebay that contained information on missile defense systems in Iraq. Interestingly machines from hospitals, US army, mental institutions and American Environmental Protection Agency has been attained by acquiring secondhand hardware from Ghanaian electronic traders (Warner, 2011, p 737).

For the inquisitive reader it is easy to find Ghanaian sites that sell hard drives and other hardware which also shows the technical development taking place in the country. There are also many movies, music videos etc. that are available relating to the practice of Sakawa,
music videos can be found easily on Youtube as well as some Nollywood filmizations. Some are being referred to in the VICE documentary about the subject of Sakawa (2013).
3 Analysis
To make interpretation of the findings easier to digest, this section will address the different criteria presented in the Theoretical Framework section. The first part will be relating to the adapted RV-model to analyze the actors, means of smuggling and inherent costs of smuggling. The second portion will be the rational choice theory which will help to analyze the incentives and restrictions that drives the export and import of WEEE.

3.1 Applying the adapted RV-model

1) The smugglers who target West Africa, according to data provided by Europol primarily act in the form of smaller network of 5-10 individuals with ethnic ties to the country which they target (Europol, 2011). There are concerns that the nature of this constellation will change but so far, the actors targeting West Africa tend to be small scale. More recent reports have warned that there might be an entry of larger organized groups targeting West Africa if WEEE management becomes costlier. This can also follow economic recession in the market which may incentivize businesses to engage in illegal WEEE shipping (Europol, 2013). The ILO also warned that organized groups can shift their attention towards Africa if Asia target more recourses to combat WEEE smuggling (ILO, 2012, p 14).

2) The method used for smuggling identified in this research are primarily one of camouflage using regular trade routes masking WEEE as secondhand EEE rather than “ships of the night”. The legislation on EEE seems to be specified and regulated on both international and domestic levels (UNEP, n.d, Amoyaw-Osei et al., 2011, Daum, Stoler and Grant, 2017). The cost of shipment seems to be primarily be carried by people native to Ghana, both through purchase and management (ILO, 2012, Europol, 2011). Though there seem to be a combination of private and financial actors as well as public, indicating that the problem is deeply rooted in modern waste management (Europol, 2011, Europol 2013). This becomes possible due to coordination problems between institutions, capacity for actors to allocate recourses to enforcement, complexity of legislation and difficulties to build good cases against organizations and individual actors (Eurojust, 2014). If the enforcement doesn’t improve, there is no reason to believe that the nature of the smuggling will change character. There might be a shift towards more organized groups entering the trade depending on international politics and market climate. Another alternative is as time progresses the criminal elements in Ghana will become more sophisticated at exploiting regulation and recourses available for monetary profit.
3) The greatest risk facing smugglers seems to be loss of cargo. EU could do much more to combat WEEE smuggling. Though some efforts have been made. New projects have been initiated by EU, inside of EU and abroad to ensure compliance and enforcement. This has been presented in a communication from the EC (European Commission) to the European Parliament 18 January (EC A, 2018) and in a press release 19 January 2018, it was declared a launch for an action plan to ensure compliance of its members (EC B, 2018). There is the raised concern that the member countries should ensure that the enforcement is “effective, proportionate and dissuasive” which has been identified as a concern in this research as well (EC A, 2018, p 2). If there is more of compliance with more severe punishment for transgressions in regard to environment, there is a need to secure stronger methods to build cases against smugglers. This could help to combat at least some of the concerns raised in the report by Eurojust, (2014).

So far, the obligation for countries themselves to punish smugglers has in large led to that criminals can hide behind established routes and utilize transit stations to avoid being persecuted (European Commission, 2013). In building of cases there has been in large problems to tie individuals and organizations to a specific crime (Eurojust, 2014). The implementation of new legislation doesn’t seem to dissuade smugglers but rather make it hard for workers to decipher and understand the different classifications of shipments, though efforts to alleviate this has been made. This through forms and check list of classifications of shipments under WSR and Basel Convention (Eur-lex.europa.eu, 2016) and international training programs (IMPEL and Basel Convention, 2012). I am only slightly optimistic that there might be improvements on the area of enforcement.

3.2 Applying the rational choice theory

I will now raise some plausible motives for different actors in a way that represents the different drivers identified in the text. I will distinguish five groups, a) profitable businesses, b) non or low profitable businesses, c) criminal actors, d) public officials and e) workers. This is more to highlight different approaches to conditions since there might not be a clear distinction between the different group types in given situations and locations. This differentiation is made on the premises that different actors may relate in certain ways to different situations, also that they have different capacity to base decisions on the given circumstances. For example, non or low profitable business has a stronger connection to constraints when making a choice than a profitable one.
1) Preferences: profitable businesses and non or low profitable businesses we will assume here, prefers to act within the scope of available legislation. Legal business practices mean that the business is covered by any protection that is provided within the legal market and have with it a higher market predictability. This may shift if a business is concerned that the market distortion caused by smuggling puts it at a disadvantage. It has been shown above that when there is an infringement on environmental legislation in regard to shipping of hazardous waste, that there is lack of enforcement and accountability. Both in regards to national capacity to build a strong case against perpetrators or to tie people and businesses to a specific action (Eurojust, 2014, p 18). The function deterring illegal activities by risk of repercussions are therefore limited in regards to both a) and b). Which in turn can make these actors prefer to act outside the law since the possibility of benefit outweighs the risk and consequences of potentially being caught. Group a) will have a larger room to act on preference while group b) may be more limited on basis of constraints. Criminal actors will be assumed to choose the path of least resistance. By helping a), b) and d) comply with environmental quotas, criminal groups may incentivize them to knowingly or unknowingly engage in unlawful waste practices (Europol, 2011, p 40). The groups will be assumed to target the weakest point in both regards to exiting the European market and entering a foreign market. There have been presented reports indicating that this infrastructure is already in place, something that has also been reflected on earlier in this research (Europol, 2013). The act of changing ports seems to be a method used in both EU and Africa (Grant and Oteng-Ababio, 2012, p 9, EC, 2013, Europol, 2011), as well as using transit points lowering the risk that enforcement officers being able to build strong cases against perpetrators (Eurojust, 2014). There is also the extensive masking of WEEE as secondhand EEE, which has been rather unlegislated by both Ghanaian and Europeans officials (EEA, 2012, Amoyaw-Osei et al., 2011). There is also a demand of secondhand EEE in the Ghanaian market which most likely helps to keep shipments from being seized (Amoyaw-Osei et al., 2011). Group e) (workers) will not be addressed too much here, the higher income tier in the waste management chain are likely incentivized by monetary reward while lower are more motivated to work with WEEE on basis of constraints. With a rise of metal prices, a) and b) might be driven to develop the WEEE management sector. Though this may also attract larger criminal organizations (ILO, 2012). There would still be a need to address criminal actors if there was to be a larger legal WEEE sector in the EU and formal one in Ghana, since their activities will distort the fair competition between actors.
2) Beliefs: a) and b) are assumed to be incentivized by the possibility to cut cost and potentially see a small return, with estimation recycling cost reaching between €105-€187/t and processing €210-€270/t and high estimation for complex recycling, with costs reaching upwards €2000/t (EPEC, 2005, p 66). Instead they would expect providing a potential income as presented previously in this research, where an e-waste broker potentially sees an income on around €450/t (Pollution Crime Working Group, Interpol, 2009). Category b) will be more inclined to try to use alternative means to dispose waste in an unlawful manner to save money while category a) are more likely to have concerns about for example data safety or environmental image. It could also be plausible that actors are not always aware that they are engaging with group c) using for example utilization of smaller waste facilities not declaring their hazardous waste movements (EEA, 2012, p 8). Actors that are conscious about their illegal activities assumed to act on the belief that they won’t be serious consequences for their actions. Which seems at least at this moment be a reasonable assumption. But recent efforts to increase human capital and digitalize criminal records may help to deter criminals in the future (Eur-lex.europa.eu, 2016, EU Emergency Fund for Africa, 2016). Though as it is now criminal groups working across EU and Ghana can see several potential revenue streams from the private- and public sector as well as other criminal actors relying on the supply of hardware to scavenge information for conducting e-crime (Pollution Crime Working Group, Interpol, 2009, Warner, 2011). d) and e) in Ghana would be assumed to be more driven to promote enforcement legislation if there is a belief in the possibility for an alternative revenue stream. That meaning alternate employment opportunities for the approximate 200,000 working in the chain of the waste sector (Daum, Stoler and Grant, 2017, p 1-2). Though certain groups within group e) can presumably not be fully absorbed into a potential formal sector, for example child workers, who will still need to sustain a living. Also, as previously mentioned larger criminal organizations might shift stronger attention towards West Africa depending if they perceive higher resistance shipping WEEE to Asia (ILO, 2012) which can become a future challenge.

3) Constraints: a) will be less constrained than other categories, though they can be constrained due to profit targets or internal actors pushing for the organization to be recourse efficient. The ILO suggested increase in prices of raw materials would attract more actors to the formal waste sector in the EU (2012). It also reported that an economic downturn may press companies to use unsanctioned methods of waste management as a mean to save recourses (Europol, 2013). This would be presumed more pressing for group b). Group c) is
assumed to target Ghana on the basis of low resistance and demand driven by all other groups for cheap electronics. If legislation and enforcement are successfully developed the future constraints can function to shrink the illegal sector. Though the reformation may be time consuming depending on how extensive the overall involvement of the groups in question are since they will most likely resist these efforts.
4 Conclusion

I will conclude by with the help on my findings and the analysis thereof try to reply to my research questions one by one.

- What international and European legislation is in place regulating the export of e-waste and how is it implemented?

There are a quite a legislation in place to regulate the export of WEEE from the EU as well as in Ghana to prevent import thereof. The EU has created the WSR to actualize the statures of the Basel Convention into European legislation and as a consequence into the domestic legislation of its member states (Basel Convention, 1989, REGULATION (EC) No 1013/2006). Ghana has the Bamako Convention, The Libreville Declaration and the Durban Declaration (ILO, 2012). This research has identified certain legal weaknesses, in particular that there is no clear regulation of secondhand EEE. This has opened up for an extensive system of mislabeling merchandise (UNEP, n.d, Amoyaw-Osei et al., 2011, Daum, Stoler and Grant, 2017).

Major efforts have been directed to the implementation and coordination of present legislation. European legislation puts responsibility on its member states to domestically prosecute offenders. Lack of recourses for enforcement and domestic interpretation of the severity of the transgression makes it possible for dealers to target exit points deemed the weakest (Netherlands Court of Audit, 2013, Eurojust, 2014). As well as relying on poor international cooperation. This is mainly visible through difficulties in gathering evidence, building cases, and apprehending criminals, tying them to specific transgressions. (Eurojust, 2014).

- How well does Ghana’s enforcement function and what efforts are made to regulate the problem?

Ghanaian officials have been noted of being reluctant to more actively enforce legislation since that would jeopardize the jobs of around 200,000 people (Daum, Stoler and Grant, 2017, Oteng-Ababio, Amankwaa and Chama, 2014). At the same time there have been regular forced evictions and demolitions undertaken to tackle the expansion of Old Fadama and Agbogbloshie (Amnesty International, 2011, Ghana Star, 2018, Myjoyonline, 2015). These types of actions have been accused of being publicity stunts aimed to distract the public from the real issues and provide an image of forcefulness (Myjoyonline, 2015).
The Ghanaian problem of enforcing legislation, is in large similar to the problems facing Europe. Difficulties with international and regional coordination of investigations, recourse scarcity, human capital and capacity. To oversee the movement of shipment is a daunting task and is not helped by the fact that many of public records in West Africa are not being digitalized therefore needing time consuming and unreliable means of acquisition (ILO, 2012, EU Emergency Fund for Africa, 2016).

-What impact does the flows of WEEE have relating to health, environment, physical security and e-security?

It is hard to put an exact monetary cost on WEEE smuggling, partly due to the nature of smuggling. The success of smuggling is rooted in functioning away from the eyes of officials and law enforcers, something that is also true for the informal sector.

It has however been confirmed that there are severe costs encountered as a result of these activities. Areas which carry a high cost is environment both domestic and international. Accra is susceptible to floods, which results in the environmental impact is not contained only to Agbogbloshie, but spreads through the area and into the ocean (Rain, D., Engstrom, R., Ludlow, C. and Antos, S, 2011). As for the society, personal health for workers and people settled in surrounding areas is negatively impacted, this also affects children working with informal WEEE management (ILO, 2012, Amoyaw-Osei et al., 2011). Its existence also functions to undermine the legal capacity for WEEE management both in the EU and Ghana through distortion of fair competition. As well as severely raising the risk of sensitive data ending up in the hands of individuals and groups looking to exploit it for personal benefit, both in regards to information safety of individuals and national security (Warner, 2011, Alghazo, Ouda and Hassan, 2018).

-What judicial weaknesses can be identified, and what forms of enforcement can be considered effective when addressing the issue of e-waste smuggling?

A number of main concern has been raised in regards to efficient enforcement some that are being addressed and some that are not.

EU is making efforts to improve the coordination between jurisdiction both within the EU and in West Africa. The EU put forward this year, plans to ensure that repercussions for environmental crimes are addressed properly and to ensure compliance with EU legislation (EC A, 2018, EC B, 2018). There is also a project that will digitalize the criminal records in
West Africa, which is supposed to help international coordination and accessibility as well as to help address the risk of evidence tampering (EU Emergency Fund for Africa, 2016).

Another problem being addressed is the human capital capacity for officials handling import and export. The classification system of WSR and Basel convention is complex with its different codes of identification (Netherlands Court of Audit, 2013). In an effort to overcome this the EU has created a classification check list (Eur-lex.europa.eu, 2016). Also training programs has been implemented to help Ghanaian officials to control incoming shipments (IMPEL and Basel Convention, 2012).

The initiatives are in themselves good, though they are heavily dependent on the compliance of states involved as well as the professional integrity of officials working with handling of shipments. There is also a risk that strong enforcement of environmental legislation from the EU, if not done carefully, may incentivize officials and market actors to engage in illegal activities to manage environmental quotas (ILO, 2012).

The recurring problem of regulation and definition of EEE is something that is receiving less attention. As of now the relatively unregulated sector eases the exit of WEEE from the European market and entry into Ghanas (UNEP, n.d, Amoyaw-Osei et al., 2011, Daum, Stoler and Grant, 2017). Another problem is that facilities are only required to report movement of hazardous waste if it exceeds 2 ton per year. This limits the scope of registered E-PRTR to one third (EEA, 2012, p 8). With the usage of transit points to cover the sender of shipments (EC, 2013), this regulation undermines the capacity of enforcers to effectively investigate crimes.

In Ghana there is a need for real enforcement, as of now, forced evictions seems to be standard when addressing the problems of Old Fadama and Agbogbloshie (Amnesty International, 2011, Ghana Star, 2018, Myjoyonline, 2015).

It will be challenging to promote an improvement of the environmental treatment since there is a lack of institutional capacity in Ghana as well as in certain European transit hubs. A transition towards a formalization of the WEEE sector in Ghana could lead to providing an alternative stream of revenue for workers, companies and government (Amankwah-Amoah, 2016). As for now the illegal activities seems to have a comparative advantage but this may change in the future. If this happens, it may in turn allow for legitimate businesses to step in to fill the function now occupied by criminal actors.
But even if there is a formalization of the WEEE sector and regulation is successfully implemented the question still remains whether the low educated people of Old Fadama and Agbogbloshie can be absorbed into other activities. If there is no provided alternative for them they will presumably continue to work in these sectors informally and drive the demand for processing WEEE.

5 Suggestions for further research

The ICT-expansion can be seen if you go into Alexa, which is subsidiary of Amazons who provide information on top visited sites, this can be done in essentially any country. I encourage anyone with a curious nature to do this. If you look under Top Sites in Ghana you can find different types of sites, of course some less interest such as Google, Youtube etc. (Alexa.com, 2018). But it can help you to find where Ghanaians read their news, sell their items, bet money, market their businesses, you can also listen to Ghanaian radio and at least get a small idea of Ghanaian culture. It can help you to find websites and places where Ghanaians form- and voice their opinions. Here there could be found a number of interesting research topics relating to information flows, internet culture, how Ghanaians utilize internet in their everyday life or comparison of price and number of ads for used electronics over time. I have observed a certain disconnection from research conducted on EEE and WEEE in Ghana and the actual usage patterns of the internet which I would enjoy see more explored. The subject of hardware security in relation to national security is also an interesting subject. This would be an interesting concept to analyze with focus on the relationship between the US and China. This since China receives the majority of e-waste shipped and the US is one of the main exporters (ILO, 2012). What is clear is that this is a global problem and efforts to create global rules on how to conduct trade and decrease barriers, there is a need to coordinate actors to ensure a sound environment, health conditions and safety.
6 References


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7 Appendix

1. EEE dealer-Danny Computers (Google maps 2016, downloaded-2018)

3. Accra Central Mosque (Google maps 2016, downloaded-2018)

4. Odaw River (Google maps 2016, downloaded-2018)
5. Old Fadama market-1 (Google maps 2016, downloaded-2018)

7. Old Fadama police station (Google maps 2016, downloaded-2018)

8. 1) Agbogbloshie, 2) Old Fadama both passed by the Odaw river (Google maps 2018, downloaded-2018)
9. Korle Lagoon connecting the Odaw river to the ocean (Google maps 2018, downloaded-2018)