

# Is Outsourcing or Insourcing E-Waste Regulatory Compliance effective?

Business Project B7RS101

Supervisor: Keelin Lee

15<sup>th</sup> April 2016

Dublin Business School

Lucy Cox-Kearns 10034671

## Contents

Abstract.....	3
1. Introduction.....	4
1.1 Problem Definition.....	4
1.1.1 Research Question.....	4
1.1.2 Research Hypothesis.....	4
1.1.3 Research Objectives.....	4
1.2 Background to the Problem.....	4
1.3 Research Organisation.....	5
1.4 Limitations.....	5
2. Literature Review.....	6
2.1 Introduction.....	6
2.2 What is insourcing?.....	6
2.3 What is outsourcing?.....	6
2.4 A History of E-Waste.....	6
2.5 Current E-Waste Situation.....	7
2.6 Insourcing as a Solution.....	7
2.6.1 Advantages.....	7
2.6.2 Disadvantages.....	8
2.7 Outsourcing as a Solution.....	9
2.7.1 Advantages.....	9
2.7.2 Disadvantages.....	10
2.8 Conclusion.....	11
3. Research Methods.....	12
3.1 Introduction.....	12
3.2 Research Problem.....	12
3.3 Research Hypothesis.....	12
3.4 Research Objectives.....	12
3.5 Research Design Strategy.....	12
3.6 Exploratory.....	12
3.7 Conclusive.....	13
3.8 Research Approach.....	13
3.8.1 Qualitative.....	13
3.8.2 Quantitative.....	13

3.9	Data Collection .....	13
3.9.1	Primary Data .....	13
3.9.2	Secondary Data .....	14
3.10	Primary Research Tools .....	14
3.11	Primary Research Tools Rejected .....	14
3.12	Conclusion .....	14
3.13	Research Limitations .....	15
4.	Data Analysis .....	16
4.1	Introduction.....	16
4.2	Research Problem .....	16
4.3	Objective One .....	16
4.3.1	Findings.....	16
4.4	Objective Two.....	17
4.4.1	Findings.....	17
4.5	Objective Three.....	17
4.5.1	Findings.....	17
4.6	Research Hypothesis .....	18
5.	Conclusion .....	20
5.1	Objective One .....	20
5.2	Objective Two.....	20
5.3	Objective Three.....	20
6.	References.....	22
7.	Appendix.....	24

## **Abstract**

This research project is researching whether outsourcing or insourcing e-waste for regulatory compliance is effective. The researcher will introduce you to the topic. Then the next section is the literature review which analyses all the secondary data. Following this is the methodology section which explains how all the research was conducted and then finally there is the data analysis section which is where the researcher analyses all the data and compares primary research to the literature review. Then the researcher concludes all the findings.

# 1. Introduction

Waste electrical and electronic equipment (WEEE or E-waste) must be disposed of properly to reduce waste, to protect the environment from hazardous materials and to obtain more useful materials in recycling. The importance of management of WEEE has become clearer in the last years and it is expected that quantities of WEEE will increase. Therefore, the management of WEEE is a critical and important decision (Kaya, İ 2012).

The purpose of this study is to find the most effective solution to the problem of managing the regulated compliance activities that relate to the sales of electronic equipment and the disposal of electronic waste. Whether that will be the option of outsourcing or insourcing for the producer. The study will outline the problem and then analyse secondary and primary research that will lead to the research hypothesis.

## 1.1 Problem Definition

### 1.1.1 Research Question

- Is outsourcing or insourcing e-waste regulatory compliance effective?

### 1.1.2 Research Hypothesis

The researcher believes the outcome of the research project will be that the research hypothesis will be deemed to be that outsourcing is the most effective solution.

### 1.1.3 Research Objectives

The objectives of this research project are to establish the following:

- Which option is more secure for a company so they are sure internal information is not exposed?
- The more cost friendly approach.
- Which option helps a company be more environmentally sustainable with their products?

## 1.2 Background to the Problem

3.20 to 50 million metric tons of e-waste are disposed worldwide every year and it is estimated that only 12.5% of e-waste is currently recycled (dosomething.org, unknown). The management of WEEE is a very critical and important not only for waste treatment but also to recover of valuable materials (Kayla, i 2012). The issue of illegal dumping of e-waste in

underdeveloped countries is a huge problem. In 2003 the Waste Electrical and Electronic Equipment (WEEE) Directive became European Law. This set targets for collection, recycling and recovery for different types of electronic goods (Lanyard, 2011). This means that companies need to find the most effective solution to deal with this issue which is either to insource or outsource the compliance activities.

### **1.3 Research Organisation**

This research project starts off with the literature review. In this section the researcher has analysed all secondary research, information and data that is relevant to this research topic. The researcher defines both the solutions and then gives a background to the issue of e-waste. This is followed by the current environmental situation which is followed by an in depth analyses of the advantages and disadvantages associated with both insourcing and outsourcing as an e-waste solution.

The next section of this research project is the methodology section. The research outlines the problem, hypothesis and the objectives of this study. After this the researcher explains the research design strategy, the research approach, data collection, and the research tools that were used. The researcher then notes the limitations that occurred when conducting the research.

Following on from the methodology section is the data analysis section. In this section of the research project the researcher analyses all the primary data alongside the literature review to answer the research questions. The researcher goes through each objective and outlines the findings associated with it. After this the research was able to deem the research hypothesis true.

### **1.4 Limitations**

The researcher encountered several limitations when carrying out the research for this project. The first limitation was the lack of experience conducting primary research and analysing this data. The second limitation that the researcher encountered was that a lot of information around the cost of recycling was unavailable as this is internal company information and they were not willing to share this sensitive data. The last limitation that the researcher occurred was the time constraint. To fully understand this topic and to research and analyse all the relevant data would take much more time.

## **2. Literature Review**

### **2.1 Introduction**

This section of the research project will examine the literature used to support the research objectives. E-Waste is a relatively new concept so there is not a huge amount of literature. However the literature that was available is up to date and very relevant. This should lead to a better understanding of the research topic and aid the researcher in determining the hypothesis.

### **2.2 What is insourcing?**

Insourcing is a business practice in which work that would otherwise have been contracted out is performed in house. Insourcing often involves bringing in specialists to fill temporary needs or training existing personnel to perform tasks that would otherwise have been outsourced (Rouse, 2009).

### **2.3 What is outsourcing?**

Outsourcing is an arrangement in which one company provides services for another company that could also be or usually have been provided in-house (Rouse, 2007).

### **2.4 A History of E-Waste**

Danielle Lanyard noted major events in the history of E-Waste. E-Waste first became a problem in 1976. The Resource Conservation and Recovery Act (RCRA) is enacted and their purpose is to govern the disposal of solid and hazardous waste. This led to the underground and illegal dumping of E-Waste in less developed countries. There were several incidents that followed this that led to the the Basel Convention, an international treaty that was signed on the 22<sup>nd</sup> March 1989, that was designed to reduce the movements of hazardous waste between nations. This was supported by the Bamako Convention which is a treaty of African nations prohibiting the import of any hazardous waste. This saw the first electronic waste system implemented in 1991 in Switzerland. Years later the Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC along with the RoHS Directive 2002/95/EC became European Law in February 2003. This set collection, recycling and recovery targets for electrical and electronic goods. The United States are a lot further behind the rest of the world when it comes to E-waste as they spent a lot of time fighting the Basel Convention and by 2003 only California had legislation around the issue of e-waste. In August 2005 it is

stated that Electronic manufacturers are officially financially responsible for the compliance of the WEEE Directive. All of this legislation led to the pressure on producers to comply and create solutions that allowed them to do this effectively. Furthermore in December 2011 the European Union revised the WEEE directive, setting higher targets from 2016. As a result attention will focus on how the recycling and reuse of business WEEE (waste electronic and electrical equipment) is recorded and captured (Harvey, N 2012).

## **2.5 Current E-Waste Situation**

Production and use of electrical and electronic equipment (EEE) have been clearly increased over the last years. This has led to huge amounts of waste of electrical and electronic equipment (WEEE) (Kaya, İ 2012). Waste from Electric and Electronic Equipments (WEEEs) is currently considered to be one of the fastest growing waste streams in the world, with an estimated growth rate going from 3% up to 5% per year (Cucchiella, F, D'Adamo, I, Lenny Koh, S, & Rosa, P 2015). The amount of electronic waste (e-waste) is rapidly increasing due to economic growth and the advancement of information technology. End-of-life (EOL) cathode ray tube (CRT) TVs and computer monitors make up the greatest proportion of the total mass of e-waste (Yoshida, A, Terazono, A, Jr.Ballesteros, F, Nguyen, D, Sukandar, S, Kojima, M, & Sakata, S 2016). This means that companies have a huge responsibility to deal with this waste effectively. As there is a lot of new regulations in place regarding e-waste this means that companies have a lot of rules to comply with when dealing with this issue. Thus meaning they need to find the most effective solution to achieve full compliance.

## **2.6 Insourcing as a Solution**

### **2.6.1 Advantages**

#### **2.6.1.1 Security**

There are significant risks associated with the disposal of IT assets: the risk of data breach, the risk of non-compliance with environmental or industry regulations (Miller, 2013). This is one of the main reasons companies choose to insource their e-waste compliance activities.

The most comforting thing about assigning your own IT team to perform IT asset disposition is that you know the job is getting done by the professionals you trust to oversee your IT infrastructure every day (Miller, 2013). This allows a company to have full control over who they use to wipe their data and can be sure there would not be a security breach. Projects can



be done under the direct supervision of the management and board of directors without having to deal with the second layer of management or a third party organization (Watson, 2015).

#### **2.6.1.2 Cost**

It was hard to locate any information that included figures regarding the cost surrounding insourcing as an e-waste solution. However for any company it is clear that tough cost control is a primary responsibility of senior management (Chorafas, 2002). A lot of companies look at insourcing as a long term investment making it a worthwhile expense. If you provide your employees with the needed training, you will make a long-term investment in them (Watson, 2015).

#### **2.6.1.3 Environmental Sustainability**

The recycling of electric or electronic waste (E-waste) products could allow the diminishing use of virgin resources in manufacturing and, consequently, it could contribute in reducing the environmental pollution (Cucchiella, F, D'Adamo, I, Lenny Koh, S, & Rosa, P 2015). If a company chooses to insource they will have a lot of the resources on site already that can be used in new products. This allows a company to reduce their carbon footprint and create more products using recycled materials.

### **2.6.2 Disadvantages**

#### **2.6.2.1 Security**

Rarely do your IT staff members have the luxury of focusing on one task at a time. And that's just what's required to do data destruction the right way (Miller, 2013). If a company chooses to insource the risks are small but they are still there, (Miller, 2013) points out some possible flaws with the choice of insourcing, for example, an IT technician in the midst of sanitizing the data on a pile of laptops was called away to another task before completing the data sanitization? They may come back and realise they have not completed a certain device and move on to the next one leaving it unfinished. Or another scenario would be another technician might collect some of the laptops and have them packaged for remarketing or recycling without realizing your customers' sensitive data was still on one of them. This creates a huge risk. Serious—and costly—data breaches have been triggered before by the information contained on a single laptop (Miller, 2013).

### **2.6.2.2 Cost**

Cost is the main disadvantage of insourcing. It could come with a hefty price tag (Watson, 2015). As stated above it is a big investment to train staff accordingly. Managing processes internally can distract an organisation from focusing on growing the business and from being flexible and can possibly contribute to missing out on growth opportunities (Stanley). The majority of secondary research indicates that insourcing is the more expensive option with (Watson, 2015) stating it is more expensive.

### **2.6.2.3 Environmental Sustainability**

The major sources of growth in the future will be in emerging economies such as China and India where the recycling infrastructure is completely underdeveloped (Fitzpatrick, 2013). E-waste management is one of the most pressing issues in India right now, and it is highly distressing to know that some of the reputed companies openly ignore their responsibilities (Agarwal, 2014). It is clear that companies are struggling to meet standards and in some instances not even trying. If the volume of e-waste is already an issue that is only projected to increase then companies really need to act in the most efficient way possible. The importance of management of WEEE has become clearer in the last years and it is expected that quantities of WEEE will increase. Therefore, the management of WEEE is a critical and important decision. (Kaya, İ 2012). Companies may lack resources and expertise if they choose the solution of insourcing so therefore may not be as environmentally sustainable as they have the potential to be.

## **2.7 Outsourcing as a Solution**

### **2.7.1 Advantages**

#### **2.7.1.1 Security**

Outsourcing gives you access to specialized skill sets of resources and processes that insourcing simply cannot match (Watson, 2015). A company that specialises in this area has to be much more meticulous with their destruction of data and compliance with regulations. A team that specializes only in IT asset disposition will complete every step of the process without distraction. That includes packing and transporting the equipment, sanitizing data, and documenting the entire process so you have auditable reports ready to prove you've done IT asset disposal correctly (Miller, 2013).

### **2.7.1.2 Cost**

When examining all the secondary research it is evident that many people are of the opinion that outsourcing is the more cost effective approach to the issue of e-waste. Outsourcing eludes the need to hire individuals in-house; hence recruitment and operational costs can be minimized to a great extent (flatworldsolutions, 2016). This reduces the resources a company needs greatly as outsourcing has vastly reduced the amount of time and management expertise required (Stanley, 2009). Another benefit to outsourcing is that a company that solely focuses on recycling and reuse of e-waste can partner with several other businesses and share the cost among them thus, making it a much more cost effective way to deal with the issue of e-waste. Reduced overheads: spreading the overheads of an internal operation over several accounts can enable the supplier to provide this management service at lower costs (Stanley, 2009).

### **2.7.1.3 Environmental Sustainability**

Production and use of electrical and electronic equipment (EEE) have been clearly increased over the last years. This has led to huge amounts of waste of electrical and electronic equipment (WEEE). The management of WEEE is a very critical and important not only for waste treatment but also to recover of valuable materials (Kayla, i 2012). Formal recyclers are experts in this area and therefore can be as efficient as possible.

## **2.7.2 Disadvantages**

### **2.7.2.1 Security**

There can be an issue with security when you choose to outsource. Companies should be careful to choose a reputable supplier, with a good track record (Stanley, 2009). Stanley suggests making sure your data is protected and the contract has a penalty clause if an incident occurs. Issues such as intellectual property rights need protection.

### **2.7.2.2 Cost**

When a company chooses to outsource, more often than not it is the more cost effective option. Outsourcing gives access to the skills and knowledge that will help reduce expenditure while improving service quality (Stanley, 2009). However Stanley also notes there are some hidden costs: there are costs incurred in procurement and selection of outsourcing suppliers and in the mobilisation of the contracts.

### **2.7.2.3 *Environmental Sustainability***

There was very little information to support any disadvantages associated with environmental sustainability through outsourcing. Various forms of informal activity have long played an under-recognized yet substantial role in solid waste management, especially in developing countries. In particular, informal activity is prominent in the electronic waste (e-waste) sector, whose volume and impacts have grown rapidly over recent decades (Davis, J, & Garb, Y 2015). Formal recyclers just need to continually be up to date with new recycling methods.

## **2.8 Conclusion**

The researcher has gone through the history of e-waste and the necessity for an effective solution. There has been an in depth analysis done of all relevant secondary researcher and from that the researcher has noted the main findings.

## **3. Research Methods**

### **3.1 Introduction**

Research is the process of finding out information and investigating the unknown to solve a problem (Maylor & Blackmon, 2005). It is defined by them as a systematic process that includes defining, designing, doing and describing an investigation into a research problem.

### **3.2 Research Problem**

Is outsourcing or insourcing electronic waste regulatory compliance effective?

### **3.3 Research Hypothesis**

The hypothesis is that outsourcing will be the more effective approach to this issue.

### **3.4 Research Objectives**

The objectives of investigating this issue are to determine:

- i. Which option is more secure for a company so they are sure internal information is not exposed?
- ii. The more cost friendly approach.
- iii. Which option helps a company be more environmentally sustainable with their products?

### **3.5 Research Design Strategy**

A research design provides a framework for the collection and analysis of data. A choice of research design reflects decisions about the priority being given to a range of dimensions of the research process (Bryman & Bell, 2007).

### **3.6 Exploratory**

Malhorta (2012) defines exploratory research as a type of research design that has as its primary objective the provision of insights into and comprehension of the problem situation confronting the researcher. Exploratory research is appropriate when the problem needs to be defined more precisely (Malhorta, 2010). The researcher will conduct exploratory research to gain a better insight into the problem. Starting with secondary research and then following it up with qualitative research including interviews.

### **3.7 Conclusive**

Malhorta (2012) Conclusive Research is defined as research designed to assist the decision maker in determining, evaluating, and selecting the best course of action for a given situation. The objective of conclusive research is to test specific hypothesis and examine specific relationships (Malhorta, 2012). The researcher will follow up on previous research by conducting a conclusive design strategy which will involve establishing specific facts. However the research will not focus heavily on this method as it is less suited to this project.

### **3.8 Research Approach**

Depending on the precise technique you adopt, you can of course use both qualitative and quantitative techniques in your research (Jancowicz, 2005).

#### **3.8.1 Qualitative**

Qualitative research is defined as an unstructured, exploratory research methodology based on small samples that provides insights and understanding of the problem (Malhorta, 2012). This study will focus on conducting qualitative research to familiarize yourself with the situation in depth: build a 'rich picture' of the meanings involved (Jancowicz, 2005).

#### **3.8.2 Quantitative**

Quantitative research is defined as a research methodology that seeks to quantify the data and, typically, applies some form of statistical analysis (Jankowicz, 2010). This project will not use quantitative research as it not possible to use structured research methods when investigating this topic.

### **3.9 Data Collection**

Secondary data are also helpful in designing subsequent primary research and, as well, can provide a baseline with which to compare your primary data collection results. Therefore, it is always wise to begin any research activity with a review of the secondary data (Novak, 1996).

#### **3.9.1 Primary Data**

Primary data consist of material that you have gathered yourself: systematic observations, information from archives, the results of questionnaires and interviews, case studies which you have compiled (Jankowicz, 2005). This report will focus heavily on primary data.

### **3.9.2 Secondary Data**

Secondary data include everything else, being results from other people's primary data collection as reported in a wide variety of formats: company annual reports, technical manuals, government and trade body publications, books and journals (Jankowicz, 2005). Secondary data will also be used as it gives the researcher a broader range of information that they do not have direct access to.

### **3.10 Primary Research Tools**

The interview is probably the most widely employed method in qualitative research (Bryman & Bell, 2007). They state that it is the flexibility of the interview that makes it so attractive. This report will include interviews of several professionals in this field. The majority of interviews will be done via email as they are all based in different countries. The interviews will be semi-structured, asking the interviewees similar questions however the questions need to remain specific to their job role. Taking a structured approach makes sure that the data you collect are consistent across interviews (Maylor and Blackmon, 2005).

### **3.11 Primary Research Tools Rejected**

The focus group method is a form of group interview in which: there are several participants (in addition to the moderator/facilitator); there is an emphasis in the questioning on a particular fairly tightly defined topic (Bryman & Bell, 2007). This method is not suitable for this project as it would be impossible to get all the interviewees in one location.

Observation is the recording of behavioural patterns of people, objects, and events in a systematic manner to obtain information about the phenomenon of interest (Malhorta, 2010). It would not be possible to collect data relevant to this topic using this method of research.

### **3.12 Conclusion**

In this section of the project the researched examined, investigated and evaluated which methods of research and data collection methods that was most appropriate for this study.

The researcher outlined the research problems and objectives and from that determined that exploratory quantitative research would be the most fitting. The researcher felt a mixture of primary and secondary research was necessary. Interviews were deemed the most ideal method of primary data collection, ruling out focus groups and observation.

The research will be explored further in the section of data analysis.

### **3.13 Research Limitations**

The researcher found that some of the questions asked in interview were regarding information that was confidential and they were unable to share. The researcher also found it very difficult to find companies figures. This left some gaps in the research.



## 4. Data Analysis

### 4.1 Introduction

After the research problem has been defined and a suitable approach developed, an appropriate research design formulated, and the fieldwork conducted, the researcher can move on to data preparation and analysis (Malhorta, 2010).

After all the data had been collected the researcher began analysing all the data. The data will be used alongside the literature review to answer the three research objectives. Then the research hypothesis will be proven or disproven.

### 4.2 Research Problem

Is outsourcing or insourcing electronic waste regulatory compliance effective?

### 4.3 Objective One

Which option is more secure for a company so they are sure internal information is not exposed?

#### 4.3.1 Findings

After conducting an interview with Jean Cox-Kearns of the Reverse Logistics Group (RLG) she explained that for computers disposed of by consumers at municipality collection points (civic amenity centres – Ireland) there is no obligation to remove the data from computer devices, the responsibility is with the consumer to do this before disposing of their IT. However she also went on to say that for commercial customers who want this service provided it is done using a licensed software that is a license per use and will put a fingerprint on each drive that is completely erased (overwritten with binary code '0's and 1's in random patterns). Each device must be tracked and reported and regular audits must be conducted. So there is a benefit in outsourcing as this is an extra service you can avail of that you have complete traceability of and can ensure that the service has been carried out efficiently due to the tracking ability. In the literature review this was also brought to light along with the fact that formal recyclers have much more expertise. However it was clear that the issue of security was a big concern for companies and a lot of them felt insourcing would be the more secure option.

## 4.4 Objective Two

The more cost friendly approach.

### 4.4.1 Findings

Mary Jaques of Lenovo gave her opinion on this by explaining that Lenovo believe this route of outsourcing is the better option as they are not, at core, a logistics or recycling company and it isn't strategic to their business to invest a lot in becoming really, really good at that. She says that they choose to outsource to the best partners in the business who focus exclusively on this practice. The outsourcer can then leverage economies of scale and spread the benefit out over several clients so it is more cost effective.

This is supported by the information Jean Cox-Kearns provided stating that cost is determined by complexity of markets, the number of products, and the extent of the services being provided. Generally the cost will not exceed the cost of resourcing the work internally (depends on the size of the company) however we will definitely deliver the work more accurately and effectively with our expertise.

RLG is a company that provides an outsourced solution and Lenovo is a company that outsource. Both their statements maintain that outsourcing is the most cost effective. However, if there is a greater expense the skills and proficiency outsourcing companies boast would outweigh any extra cost.

This is echoed in the findings of the literature review. While insourcing and training employees can be considered a long term investment it is clear that the majority of people believe outsourcing is the more cost friendly approach.

## 4.5 Objective Three

Which option helps a company be more environmentally sustainable with their products?

### 4.5.1 Findings

Ruediger Kuehr, from the United Nations University and Secretary of Step (Solving the E-Waste Problem), Professor Margaret Bates from the University of Northampton and Jaques are all in agreement that reuse is the best solution for e-waste. With Kuehr stating that the generation of e-waste is unavoidable, though we would be doing good if the life-time of our gadgets would be extended – or at least components would be long-time re-used. He proposes the idea of dematerialization. Then, we would no longer purchase the product as such, but the

service the product provides. Then it would be in the interest of the manufacturer to establish easy return-paths, better design for re-use of components, re-consideration of design when it comes to recycling – but still serving the consumer with latest state-of-art products for maximum service. He believes this this would substantially increase collection in formal systems.

Gina Killykelly of Dell explains that they offer a free consumer takeback programme in the majority of countries where regulation is implemented or in development. She goes on to say that this is not mandatory but demonstrates the company's commitment to environmental sustainability.

The products a company produces have a huge impact on their ability to be environmentally sustainable with their products. Bates stated in her interview that she believes at the moment this is missing a large amount of small WEEE. This makes it easier for companies producing larger electronic goods to run an internal recycling solution.

Another factor that affects a company's ability to insource is the size of a company. Bates also states that there is a benefit to keeping everything in house as you have control but depending on the level at which you insource you may not have the expertise or systems in place such as for collection. It would be easier for larger companies as they would have more resources to insource that smaller companies may be lacking.

The researcher believe that although there are companies capable of insourcing for the majority of companies outsourcing would be the better option due to the resources and expertise that these big recyclers hold.

In the literature review it was determined that outsourcing provided the highest level of expertise and experience. It was also believed that a company that insources may not have the resources to be as environmentally sustainable as they desire to be.

#### **4.6 Research Hypothesis**

After conducting and analysing all the primary research, alongside the secondary research. The researcher deems the hypothesis to be true. Outsourcing is the best option as it is nearly always the more cost effective method and the expertise of the companies that recycle allows them to do the best job and create the most environmentally sustainable option. However this

is not to say that if a company has the resources and are willing to insource they should do as they wish.

## 5. Conclusion

The purpose of this study was to determine whether insourcing or outsourcing e-waste was regulatory compliance effective. The researcher conducted a lot of secondary research. The researcher also conducted a lot of primary research in the form of interviews with professionals in the environmental industry.

The secondary and primary data had a lot of similarities that complimented each other. The literature review section outlined the advantages and disadvantages associated with the two options or outsourcing or insourcing. It was clear that the issue of security was a main concern with outsourcing. It was also clear that the more cost friendly approach was outsourcing. It was also evident that the expertise that was associated with outsourcing allowed that to be the more environmentally sustainable option. The interviews conducted determined that the majority of the professionals were of the opinion that outsourcing was the more effective solution.

### 5.1 Objective One

The first objective was which option is more secure for a company so they are sure internal information is not exposed? It was found that the main concern in outsourcing was the security and safety of data. This is why a lot of companies chose the option of insourcing as they have more control. However it was also established that when a company chooses to outsource that company must put a footprint on everything they touch and everything must be trackable.

### 5.2 Objective Two

The second objective was the most cost effective approach. It was a unanimous opinion that the more cost friendly approach was outsourcing. This was evident in the literature review and was echoed in the primary data. In the incidents when outsourcing was more expensive it was compensated by the level of expertise offered.

### 5.3 Objective Three

The third research topic was to determine which was allowed a company to be the most environmentally sustainable. It was evident in both primary and secondary research that outsourcing offered a lot more expertise in this field and that this was the option that allowed

a company to be the most environmentally sustainable. Formal recyclers had the resources to provide this service on a large scale.

## 6. References

- i.** Cucchiella, F, D'Adamo, I, Lenny Koh, S, & Rosa, P 2015, 'Recycling of WEEEs: An economic assessment of present and future e-waste streams', *Renewable & Sustainable Energy Reviews*, 51, pp. 263-272, GreenFILE, EBSCOhost, viewed 11 April 2016.
- ii.** Yoshida, A, Terazono, A, Jr.Ballesteros, F, Nguyen, D, Sukandar, S, Kojima, M, & Sakata, S 2016, 'E-waste recycling processes in Indonesia, the Philippines, and Vietnam: A case study of cathode ray tube TVs and monitors', *Resources, Conservation & Recycling*, 106, pp. 48-58, GreenFILE, EBSCOhost, viewed 11 April 2016.
- iii.** Davis, J, & Garb, Y 2015, 'A model for partnering with the informal e-waste industry: Rationale, principles and a case study', *Resources, Conservation & Recycling*, 105, pp. 73-83, GreenFILE, EBSCOhost, viewed 11 April 2016.
- iv.** Kaya, İ 2012, 'Evaluation of outsourcing alternatives under fuzzy environment for waste management', *Resources, Conservation & Recycling*, 60, pp. 107-118, GreenFILE, EBSCOhost, viewed 11 April 2016.
- v.** Martin, B, & McDermott, E 2001, 'Outsourcing: A Growing Trend in EHS Management', *Environmental Quality Management*, 11, 2, pp. 45-50, GreenFILE, EBSCOhost, viewed 11 April 2016.
- vi.** 'Recast directive sets high targets for dealing with waste electronics' 2012, ENDS (Environmental Data Services), 445, pp. 50-51, GreenFILE, EBSCOhost, viewed 11 April 2016.
- vii.** Harvey, N 2012, 'WEEE are in this together', *Local Authority Waste & Recycling*, 20, 4, p. 8, GreenFILE, EBSCOhost, viewed 11 April 2016.
- viii.** Flatworld Solutions (2016) The Advantages and Disadvantages of Outsourcing, pros and cons of Outsourcing. Available at: <https://www.flatworldsolutions.com/articles/advantages-disadvantages-outsourcing.php> (Accessed: 4 April 2016).
- ix.** Stanley, K. (2009) Outsourcing versus Insourcing in a cost-cutting climate. Available at: <http://fmlink.com/articles/outsourcing-versus-insourcing-in-a-cost-cutting-climate/> (Accessed: 19 April 2016).
- x.** Watson, M. (2015) Advantages of Insourcing vs Outsourcing. Available at: [http://www.communicate.co.za/\\_blog/Communicate\\_Blog/post/advantages-of-insourcing-vs-outsourcing/](http://www.communicate.co.za/_blog/Communicate_Blog/post/advantages-of-insourcing-vs-outsourcing/) (Accessed: 05 April 2016).
- xi.** Miller, C. (2016) The great debate: Whether to Insource or Outsource data destruction. Available at: <http://blog.lifespantechology.com/it-asset-disposition-blog/bid/299334/The-Great-Debate-Whether-to-Insource-or-Outsource-Data-Destruction> (Accessed: 03 April 2016).
- xii.** Agarwal, R. (2014) Top companies perform dismally on e-waste management! Available at: <http://toxicslink.org/?q=article/top-companies-perform-dismally-e-waste-management> (Accessed: 03 April 2016).
- xiii.** Lanyard, D. (2011) E-wasted Timeline. Available at: <http://e-wastedmovie.com/index.php/e-wasted-timeline.html> (Accessed: 03 April 2016).

- xiv.** Maylor, H. and Blackmon, K. (2005) *Researching Business and Management*. first edition edn. pp. 5, 138
- xv.** Jankowicz, A.D. (2005) *Business Research Projects*. fourth edition edn. pp. 223, 123, 59
- xvi.** Malhotra, N. (2012) *Basic Marketing Research: Integration of social media*. fourth edn. pp. 223, 123, 59
- xvii.** Bryman, A. and Bell, E. (2007) *Business Research Methods*. second edn. pp. 472, 511, 40
- xviii.** Fitzpatrick, C. (2013) *E-Waste Management*. Edited by Klaus Hieronymi, Ramzy Kahhat, and Eric Williams. Routledge. pp. 211
- xix.** Chorafas, D. (2002) *Outsourcing Insourcing and IT for Enterprise Management*. .
- xx.** Malhotra, N. (2010) *Marketing Research An Applied Orientation*. Edited by Sally Yagan. sixth edn, pp. 171, 172, 451 Pearson.
- xxi.** *Marketing Research (1996) Secondary Data Analysis Lecture Notes*, Vanderbilt University,



## 7. Appendix

### Ruediger Kuehr -

Ad 1.) I am heading a Programme of the United Nations, dealing among other things also with e-waste. As such I am also a member of the diplomatic corps and function as the Executive Secretary of the Step Initiative, I got to know your Mum through.

Ad 2.) The generation of e-waste is unavoidable, though we would be doing good if the life-time of our gadgets would be extended – or at least components would be long-time re-used. However, one day all machines are becoming e-waste. And then we should aim for close to 100% collection rates – a big challenge these days, where only 6.5 million tonnes of the 41.8 million tonnes generated are reported officially collected around the globe. I am a strong supporter of the idea of dematerialization. Then, we would no longer purchase the product as such, but the service the product provides. Then it would be in the interest of the manufacturer to establish easy return-paths, better design for re-use of components, re-consideration of design when it comes to recycling – but still serving the consumer with latest state-of-art products for max. service. This would substantially increase collection in formal systems.

Ad 3.) The global nature of production, versus the nation-state driven compliance-systems. This leads into no harmonized approaches, but a diversity hard, if not impossible, to follow/meet.

Ad 4.) In my understanding compliance goes into the core-business and can best be met internally. The benefit of out-sourcing is certainly to be closer to the demands of some states. But consultants have also a tendency to talk oneself blue into the face for high charges.

### Margaret Bates – University of Northampton

1. What is your job? Professor of Sustainable Wastes Management at the University of Northampton
2. In your opinion what is the best way to deal with e-waste? (end of life) efficient collection (though I believe at the moment this is missing a large amount of small WEEE) and then manual disassembly to enable reuse of components and whole appliances followed by automated recovery
3. What are the main challenges of Producers to be compliant with waste regulations? At the moment the economics are problematic- in the UK the problems with the steel industry are having a big impact on WEEE reprocessors and so some recyclers are becoming very selective about where they collect from. I think in the future as collection targets get higher then trying to capture products that currently slip through the system will become increasingly problematic
4. Do you see any benefits to producers outsourcing compliance activities or insourcing them? The main problem with outsourcing is lack of control – before the WEEE recast producers in the UK were found to be paying £60million more for compliance than recycling actually cost. If you keep everything in house then you have control but depending on the level at which you insource you may not have the expertise or systems in place such as for collection

**Gina KillyKelly - Dell**

1. Typically, in countries where there is Regulation to be complied with, we use 'collective solution', whereby the "compliance scheme" represents producers and is in effect, the conduit between all stakeholders in the chain (recyclers, collectors producers, Gov etc.). We pay a fee to the compliance scheme, based on our market share, waste collected or another methodology and they in turn manage the downstream compliance activities (collection, treatment, awareness etc.). We also offer a Free Consumer Takeback programme, often in countries where Regulation is in development and thus, not a mandatory service (optional) but demonstrating the company's commitment to.
2. We only manage the internal reporting and payment re. calculation of our obligation in a particular country at a stream level. Typically, all other activities (collection, treatment etc.) are outsourced to the compliance scheme (representing the producer group).
3. Monitoring & audits of the compliance scheme, in accordance with Gov. Legislation and requirements. Typically, these audits are carried out by either: Gov agency, internal scheme auditors or external auditors, however

**Laura Mulligan - Dell**

1. How does Dell comply with WEEE, Battery and Packaging regulations?

Dell complies with WEEE, Battery & Packaging regulations through their membership of compliance schemes in the various countries and/or providing an individual solution.

2. Do you manage the whole process internally?

Parts of the end to end process are managed internally however some of the activity is managed by the individual compliance schemes/vendors

3. What is the cost?

\$4 million +

4. How do you ensure regulations are met?

Regulations are met by ensuring the relevant requirements for each country are adhere to within the agreed legal deadline i.e reporting, payment and that Dell customers have the ability to dispose of equipment in an environmentally friendly manner.

**Mary Jaques - Lenovo**

1. What is your job?

My job title is "Senior Engineer, Global Environmental Affairs" at Lenovo. My role is the team leader for our Global Environmental Affairs and Sustainability Team. I also directly manage our Americas environmental and sustainability compliance programs, including recycling and product take back programs.

2. In your opinion what is the best way to deal with e-waste? (end of life)

Ideally the best solution is to process for reuse and recycling as close to the waste source as possible to minimize the carbon footprint of the transportation aspect of the recycling process. However, we also need to balance the need to only use qualified recyclers that meet our rigorous audit and qualification process so there might not always be a local recycler that meets our standards. In those cases we might want to use a regional model that consolidates waste and moves it to relatively centralized processing locations for reuse/repair and/or recycling.

The waste hierarchy of promoting reuse, then recycling, then disposal as a last resort applies to electronics waste. The drivers are both environmental and economic. Due to the costs involved in handling end of life equipment, everyone in the value chain is incentivized to get the most value out of a used product as possible to help minimize overall costs to the system. Therefore, in most cases if a product can be repaired and reused, that is our first preference, then recycling for materials value recover, then landfill only in exceptional circumstances.

We try to have a two tiered approach to recycling with the baseline being free recycling for household consumers in compliance with local laws. On top of that, we also want to make our customers happy and help our larger customers recover value from their used systems so we treat recycling for our large customers as a service offering that we can sell to them (or pay them back for in some cases). These larger customers can customize solutions including asset tracking, on site harddrive destruction, etc.

3. What are the main challenges of Producers to be compliant with waste regulations?

The biggest challenges are 1) dealing with the sheer volume and dynamic pace of change in recycling regulations; 2) managing risk in our supply chain and ensuring we are using good suppliers; 3) making sure we're minimizing the cost to Lenovo to run a compliant, environmentally sound program.

4. Do you see any benefits to producers outsourcing compliance activities or insourcing them?

For Lenovo, we think it makes a lot of sense to outsource this work. Our core competency is building innovative PC, phone, and server products. We are not at our core a logistics or recycling company and it isn't strategic to our business to invest a lot in becoming really, really good at that. Our strategy is to outsource this work to the best partners in the business who focus exclusively on this practice so that they get really good at all elements of this process. Our partners can leverage economies of scale and do the regulatory tracking and reporting work for more than one company so it isn't just Lenovo investing x hours in tracking and reporting – our partner can invest those same x hours and spread the benefit out over several clients so it is more cost effective. They can also leverage higher recycling volumes to get better pricing with suppliers – so it isn't just Lenovo asking

for a price from a recycler but our partner asking for a price for multiple customers. Finally, the cost of doing audits and approving suppliers are shared among our partner's client base rather than just absorbed by Lenovo. It is our view that recycling isn't our core business so we don't want to invest a lot in managing this ourselves but rather we'll hire someone externally who is really good at this to drive cost efficiencies and reduce the overall burden to Lenovo.

This makes sense for something like recycling. However, for other areas of environmental and sustainability programs we don't think it makes sense to outsource. For example, for our product environmental initiatives like designing more energy efficient products or using recycled content materials in our products, we really need someone internal who knows our products and our manufacturing processes so hiring an external partner doesn't make sense.

**Jean Cox-Kearns – Reverse Logistics Group**

1. What is it exactly your company does?

RLG is a group of companies that all work to support companies with both regulatory compliance, recovering value and resources from what is deemed waste; designing circular economy solutions for companies and supporting companies to be regulatory 100% compliant in the most cost effective manner.

2. How do you propose your company to another business? (What are the benefits to going with RLG)

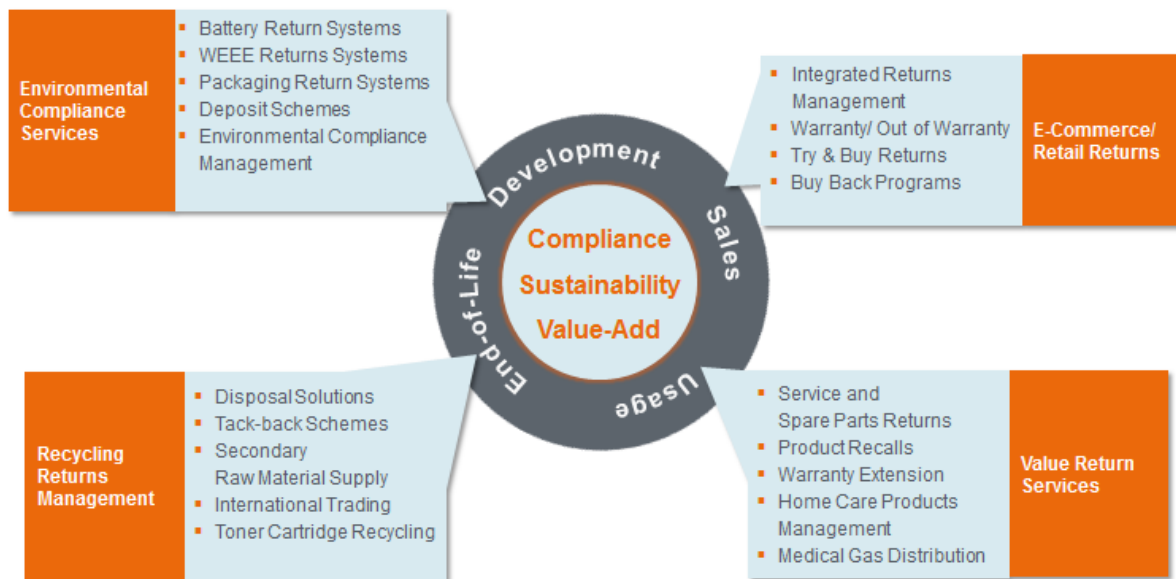
The Reverse Logistics Group facilitates highly innovative next-generation returns and recycling management solutions

We are experts in generating highest value return with pure focus on reverse processes end-to-end along a product lifecycle

While being a global company we act local in our process management and integrate local structures in our modular solution offerings

We understand Environmental regulation and we have global experience in delivering results. We are the experts.

## We support you throughout the whole product lifecycle



## We are unique in our industry with our global reach



### 3. How would you go about making a deal with them?

To be compliant to regulation there are a number of deliverables:

- You must be registered as a producer with a minimum of one but possibly more regulatory or government bodies.
- You must have access to all your sales data (products being put on the market)

- You must be able to merge your sales data with your product data (specs) to report as per the regulations requirements which usually differ by country and even by state
- You have to have collection networks (logistics, recyclers, refurbishers)

Generally managing all of these activities is not the core competency of a company that is placing products onto the market (producer or distributor or retailer). We can bring expertise to the table and do these activities for companies, usually helping them to reduce cost, finding places where they get it wrong when doing it themselves and just support the activities necessary to be compliant.

4. What is the process after a deal is made? (E-waste - end of life, are computers recycled, refurbished)

When we make a deal with a company then the follow is usually as follows:-

The customer must give us visibility of all of their activities in each market.

They provide us both their sales data and their product information (product info can be difficult)

We check the registration status of the company ensure they are registered in the right categories for the right products.

We select partners to work with for waste collection and treatment

We report for our customer when required to do so.

We pay all costs attached to meeting obligation

All activities are tracked in our report cockpit and the customer has access to all info.

We regularly review data to look for cost saving opportunities.

We manage all regulatory audits connected to being 100% compliant.

5. How much does it cost?

Cost is determined by complexity of markets, no. of products, the extent of the services we are providing, generally the cost will not exceed the cost of resourcing the work internally (depends on the size of the company) however we will definitely deliver the work more accurately and effectively with our expertise.

6. How do ensure regulations are met? (Each country is different,)

We will conduct an assessment once we have the customers sales and product data to ensure that they are meeting the regulations 100% in each country.

7. How do you ensure computers are securely cleared? (Files wont be exposed)

For computers disposed of by consumers at municipality collection points (civic amenity centres – Ireland) there is no obligation to remove the data from computer devices, the responsibility is with the consumer to do this before disposing of their IT. For commercial customers who want this service provided it is done using a licensed software that is a license per use and will put a

fingerprint on each drive that is completely erased (overwritten with binary code '0's and 1's in random patterns). Each device must be tracked and reported and regular audits must be conducted.