Regulatory standard setting for managing e-waste in the US

An exploratory study based on the Governance Triangle

by

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PREFACE

My interest in e-waste started during my Master's program Public Administration at the University of Twente. The specialization in Regulation & Innovation already pushed me in the direction of technology and after some research for several courses I found out that the US lacks federal regulations on e-waste. I am very conscious about the environment and was surprised that an environmental threat like e-waste is not regulated in such a large country. My initial research project required too much work for a master thesis and professor Heldeweg and doctor Daskalova managed to put me on the right track: exploring the workings of e-waste management in the US and relating this to the Governance Triangle.

Since it was an exploratory study it was an enormous learning process along the way. I realized there was too much information and too much going on to be all mentioned in this thesis, therefore I had to limit myself somewhat. It also felt odd that I had to resort to government/company/NGO websites, regulatory documents, policy papers and newspaper articles to assess the workings of e-waste management in the US. It felt unscientific but the exploratory nature of this thesis did not leave me any choice. The chosen NGOs, firms, and joint initiatives provide a representative, but not complete, overview of regulatory initiatives. I enjoyed scavenging the internet and learning more and more about the regulatory playing field of e-waste in the US and I believe I presented a comprehensive analysis of the regulatory status quo on e-waste management.

I would like to thank my grandmothers for supporting me in this process, especially at times when I felt like my work was below par. The same counts for my wonderful girlfriend who was always willing to discuss this process of evolving knowledge and the scientific aspects of e-waste. I would also like to thank my other family members who listened to me without having any clue of what I was talking about. Last but not least I want to thank my supervisors, doctor Daskalova and professor Heldeweg, who put me on the right track, gave me the trust to conduct this research completely by myself and who endured my multiple postponements due to the overwhelming amount of sources and my drive to include as much information as possible.

ABSTRACT

The physical environment is one of the biggest societal and scientific concerns. Electronic waste, e-waste, is one of the fastest growing environmental problems. The US is one of the biggest producers of e-waste but it has no federal regulation to control it. Little is known about the exact regulatory situation in the US. Therefore, this is an exploratory research study, based on the Governance Triangle, aiming to provide a comprehensive overview of the regulatory playing field on e-waste in the US. It does so by describing the regulatory activities within and between the three actor groups of states, firms, and NGOs. Furthermore, it provides information on how the Governance Triangle applies to the specific case of e-waste. The result of this study is that the regulatory playing field of e-waste in the United States is dominated by regulatory initiatives from states and firms. NGOs and joint initiatives are also involved, and the federal government only to a very limited extent. The implementation of a law prohibiting e-waste export and the endorsement of responsible ways of treating e-waste could be essential actions of the US federal government in stopping the e-waste problem. This study adds to existing literature by creating a comprehensive overview of the regulatory process on e-waste, providing a lot of suggestions and knowledge for future research, and showing that the Governance Triangle is also applicable to regulatory processes within the US.

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LIST OF ABBREVIATIONS

ANIME: Agenda setting, Negotiation, Implementation, Monitoring, Enforcement
BAN: Basel Action Network
CAER: Coalition for American Electronics Recycling
CDPHE: Colorado Department of Public Health & Environment
CSR: Corporate Social Responsibility
DC: District of Columbia
DEC: Department of Environmental Conservation
DENR: Department of Environmental and Natural Resources
DEP: Department of Environmental Protection
DES: Department of Environmental Services
DEQ: Department of Environmental Quality
DNR: Department of Natural Resources
DOH: Department of Health
DSWA: Delaware Solid Waste Authority
DTSC: California Department of Toxic Substances Control
ED: Environment Department
ENVCAP: Environmental Compliance Assistance Platform
EPA: Environmental Protection Agency
EPR: Extended Producer Responsibility
EPRP: Electronics Products Recycling Program
ERAI: Electronic Resellers Association International
ERCC: Electronics Recycling Coordination Clearinghouse
ETBC: Electronics TakeBack Coalition
EU: European Union
E-Waste: Electronics Waste
GIAP: Got-It-All-Power
IP: Inclusion Power
IPR: Individual Producer Responsibility
ISO: International Organization for Standardization
IT: Information Technology
LG: Lucky Goldstar/Life's Good
MDE: Maryland Department of the Environment
NCMS: National Center for Manufacturing Sciences
NCER: National Center for Electronics Recycling
NERC: Northeast Recycling Council
NGO: Non-Governmental Organization
NSES: National Strategy for Electronics Stewardship
PSI: Product Stewardship Institute
RERA: Responsible Electronics Recycling Act
RSS: Regulatory Standard Setting
R2:2013: Responsible Recycling 2013
SEERA: Secure E-Waste Export and Recycling Act
SERI: Sustainable Electronics Recycling Initiative
StEP: Stop the E-Waste Problem
US: United States of America
WUP: Wharton University of Pennsylvania

INTRODUCTION

"There's a new business model designed to remove waste entirely from the industrial process. It's called the circular economy. All waste is re-used to extract maximum value from the raw materials. It has been embraced in the electronics industry in Japan. Due to a lack of natural resources, 98% of all metal is recycled. The circular economy is enforced by law. All electronics must be recycled in Japan. The cost of recycling is also included in the price of buying electronics (…) Is the circular economy the key to saving our planet?" – The Economist, March 2nd 2017

The example of Japan shows the ingenuity of humankind. If we are forced to take unusual measures, which is the case due to their lack of natural resources, we are able to implement those while also establishing positive externalities. Only time can tell if the circular economy will "save our planet", but it is a step forward in reducing the strain on our environment and increasing the extracted value from what is deemed to be waste. Especially in the field of e-waste, waste that results from electronic products[1], there is a lot to improve and a lot to gain. However, not all countries are compelled, like Japan, to establish a circular economy for their electronic products. Nevertheless, the European Parliament, for example, decided to aim for an increased life-span of electronic products by introducing an EU label, promoting repairing and updating of e-products, increasing guarantee periods if necessary, and prohibiting the built-in features that make e-products obsolete long before they should be.[2]

Despite similar initiatives like that of Japan and the European Union, environmental change has been a global problem for decades. An important part of this global issue is the rapid

[1] Robinson, 2009, p. 184
[2] European Parliament, 2007

increase in municipal waste.[3] The fastest growing form of municipal waste is the aforementioned e-waste. The 'e' in e-waste stands for the group of products it represents, namely electrical and electronic products. Its growth is not expected to stop anytime soon due to worldwide economic growth, technological innovation and the short lifespan of e-products.[4] The amounts of e-waste are highest in the US and this region is also expected to have the highest increase of e-waste in the following years. The reason why e-waste is particularly harmful is because it contains highly contaminating parts that enter our environment as a result of its processing. Additionally, e-waste contains a lot of valuable materials. Proper treatment can result in cheaper production of new goods and less strain on natural resources.[5] The current situation in which the amounts of e-waste are rising and in which large parts of the United States have no e-waste regulation yet, indicates that the US does not provide sufficient regulation and legislation to reduce and limit e-waste.

For years, the US federal government has tried to implement e-waste regulations, but all bills that went to congress and senate floors did not make it.[6] As a result it became clear that implementing federal e-waste regulations came with too many problems for the US government to be established. The US federal government discarded the responsibility to the states when there was no consensus on how to implement such regulations.[7] Numerous states decided to adopt their own form of e-waste legislation. However, there are still many states without regulations on e-waste (see appendix). In these states local governments, NGOs and firms have been able to self-regulate, force regulation on companies or provide the people with ways of recycling e-waste. Even though the existence of these initiatives is possible, there are no guidelines and rules provided by the state governments. In scientific literature, there does not exist a comprehensive

[3] King, Burgess, Ijomah & McMahon, 2006, p. 257
[4] Babu, Parande & Basha, 2007, p. 307
[5] Robinson, 2009, p. 184
[6] H.R.2791, 2013
[7] WUP, 2016

overview of the regulatory process on e-waste in the United States. This is necessary before concluding anything about that process. It can, for example, lack government action, but other organizations and institutions might be able to fill that void. Government absence does not necessarily mean regulatory absence. Therefore, the goal of this exploratory study is to provide an insight in the regulatory playing field of e-waste in the United States.

To conduct this study the Governance Triangle, introduced by Abbott & Snidal (2008), is used as a theoretical framework. This framework describes the stages of development of the regulatory process, the necessary competencies to provide and implement effective regulations, and the roles and positions of states, firms and NGOs within the regulatory process.[8] The US federal government decided to leave the regulatory responsibility for managing e-waste completely to the states. This resulted in a limited number of states implementing e-waste regulations, still a high number of states without any regulations, and failed negotiations between states on a joint form of e-waste management.[9] One needs to be aware of the fact that next to the individual US states, the federal government is also part of this actor group. Therefore, the research question of this study is twofold. The first part of the question is "What does the regulatory playing field on e-waste in the United States look like?". The second part is "How does the Governance Triangle work in practice and how does it work within a federation like the US?". To clarify it more elaborately, the problem statement this thesis is focusing on is as follows. The US has no federal legislation on e-waste, which leaves implementation to individual states, firms, and NGOs. It is, however, unclear how they choose to handle the regulatory process. By using the Governance Triangle this thesis is trying to determine exactly that.

[8] Abbott & Snidal, 2008
[9] WUP, 2016

This thesis starts off by explaining the concept of e-waste and the importance of treating it properly. This paragraph is meant to describe its main characteristics and reasons why regulations on e-waste are beneficial in multiple aspects. It aims to answer the question "What is e-waste and why does it need to be regulated?". This is followed by an elaboration on the Governance Triangle by Abbott & Snidal (2008). This theoretical framework is the tenet of this article. This paragraph answers the question "What is the Governance Triangle and how does it work?". The third paragraph discusses the research method for this study. The fourth paragraph describes existing regulations and regulatory processes including those of states, NGOs, and firms in the United States. First, there will be attention for what regulatory activities are currently present within and between the three actor groups, states, firms, and NGOs. This part aims to answer the question "What are the current regulatory activities of states, firms, and NGOs on the matter of e-waste regulation?". Second, these current activities are related to the Governance Triangle to assess how it might differ from the Governance Triangle and/or how the Governance Triangle needs to be re-assessed within a federal setting. This part aims to answer the question "How do the current regulatory activities on e-waste within the US relate to the Governance Triangle?". The thesis ends with a conclusion, suggestions for future research and a discussion.

1. E-WASTE

E-waste consists of products with an electrical or electronic nature that are no longer of use to their owners.[10] Important traits of e-waste are the short life cycle, contaminating elements and valuable metals.[11] Not every e-product consists of the same toxic and valuable materials and

[10] Widmer et al., 2005, p. 438; Selin & VanDeveer, 2006, p. 7; Babu, Parande & Basha, 2007, p. 307; Baldé, Wang, Kuehr & Huisman, 2015, p. 8
[11] King, Burgess, Ijomah & McMahon, 2006, p. 259; Widmer, et al., 2005, p. 437; Babu, Parande & Basha, 2007, p. 307; Baldé, Wang, Kuehr & Huisman, 2015, p. 8

therefore it is hard to determine a universal e-waste processing procedure.[12] Currently, the annual number of globally created e-waste is approximately 20 to 25 million tons. The two regions where this amount is highest are the US and the EU.[13] Together it is estimated that they produce 16 to 18 million tons a year. The annual growth of approximately 3 to 5% is alarming as well.[14] For example, in the past ten years the amount of personal computers added to the worldwide heap of e-waste was around 1 billion tons.[15] The increased speed of technological developments in the past years also increases the potential amount of e-waste, especially in the US and EU regions.[16] The high numbers of e-waste in the EU and US could have been an incentive for involved countries to improve regulation, change policies and encourage innovation. However, 50-70% of the total amount of e-waste still gets shipped to poor countries. Rich countries claim to send it as charity or donations, but most of those products are of poor quality and end up as e-waste in big landfills causing a lot of environmental harm. The reasons for transport are partially charity and partially that it is a cheaper alternative as opposed to proper treatment.[17] Another concern that was recently raised in the US is the emergence of counterfeit products. Predominantly in China, microchips get extracted from e-waste and are used in new products. These products return to the US and lead to a lower reliability of products.[18] General Patrick O'Reilly commented in Forbes "We do not want a $12 million missile defense interceptor's reliability compromised by a $2 counterfeit part".[19] These counterfeit products can have serious consequences for citizens and the US armed forces and might therefore lead to the future implementation of SEERA. A proposed law banning the export of e-waste to developing countries that will be discussed in paragraph

[12] Baldé, Wang, Kuehr & Huisman, 2015, p. 8
[13] Robinson, 2009, p. 185; Widmer et al., 2005, p. 440
[14] King, Burgess, Ijomah & McMahon, 2006, p. 259; Babu, Parande & Basha, 2007, p. 308
[15] Robinson, 2009, p. 184; Widmer et al., 2005, p. 437
[16] Baldé, Wang, Kuehr & Huisman, 2015, p.8
[17] Widmer et al., 2005, p. 438
[18] Committee on Armed Services United States Senate, 2012
[19] Pentland, 2015

4.1.4. The 1989 Basel Convention regulates this export of e-waste. It is, for example, prohibited to transport e-waste from Basel countries to non-Basel countries. The convention does not include sanctions if countries do not comply, but it does require partaking countries to provide procedures that handle damage that results from exporting e-waste. Nevertheless, the valuable components of e-waste still make it an interesting export product. Furthermore, the US did not ratify the 1989 Basel Convention.[20] Next to this, US citizens tend to throw out e-products with their regular household waste which obstructs the possibility of properly treating it. Dumping e-waste in landfill and incinerating it are still two of the most contaminating ways of treating e-waste.[21]

The category of e-products, the products that create e-waste, is very broad and consists of numerous devices and appliances that everyone uses in their daily life. The most important categories of e-waste are "large household appliances, small household appliances, IT equipment, telecommunications, radio/tv/audio, lamps, monitoring and control, toys, and electrical and electronic tools".[22] Just within the US 3.2 million tons of e-waste was dumped in landfills in the year 1997. This number has steadily increased ever since.[23] The total number of e-waste grows every year with approximately 3.4 million tons.[24] If e-waste ends up in landfills its hazardous components have the ability to enter the environment and cause not only environmental harm, but also harm to humans. The most toxic materials are lead, cadmium, mercury, and chromium. Lead causes harm to several parts of the human body, mainly the nervous and blood systems. Cadmium affects the kidneys and the respiratory system. Mercury also harms the kidneys but can

[20] Widmer, et al., 2005, p. 438; Selin & VanDeveer, 2006, p. 9; Baldé, Wang, Kuehr & Huisman, 2015, p. 4
[21] Robinson, 2009, p. 187
[22] Babu, Parande & Basha, 2007, p. 308; Baldé, Wang, Kuehr & Huisman, 2015, p. 10
[23] Babu, Parande & Basha, 2007, p. 309
[24] E-Cycle, 2013; EPA, n.d.

also cause neural damage. Chromium has a more general health risk by intoxicating human body cells.[25]

The biggest cause of the e-waste problem is wrong treatment. Different products need different treatment, collection rates are very low, and transportation of e-waste to developing countries by e-recyclers lead to global environmental issues. The best e-waste treatment scenario is a situation in which "e-waste is collected and treated in state-of-the-art facilities".[26] This prevents harm to the environment, harm to humans, it creates jobs, and it increases safety.

***In summary**, e-waste poses an environmental, health, and safety threat. Treating it responsibly can potentially decrease production costs, reduce resource mining, and add jobs.*

2. GOVERNANCE TRIANGLE

The Governance Triangle by Abbott & Snidal (2008) is an analytical tool that provides us with a schematic depiction of regulatory schemes within the regulatory playing field of three actor groups. These three groups are states, firms and NGOs.[27] Even though the governance triangle is predominantly focused on transnational regulation it is suitable to analyze regulations on e-waste within the United States. It provides a framework that thoroughly maps regulatory processes and therefore fits the analysis of the regulatory situation on e-waste in the US. The US consists of 51 states that have high degrees of regulatory independence. Particularly since the responsibility for e-waste regulation has been given back from the federal government to state governments, the governance triangle is an appropriate theoretical framework to use in this exploratory study. The article about the Governance Triangle by Abbot & Snidal (2008) is elaborated on in this

[25] Babu, Parande & Basha, 2007, p. 309
[26] Baldé, Wang, Kuehr & Huisman, 2015, p. 13
[27] Abbott & Snidal, 2008

paragraph. Based on their theoretical framework the existing regulatory environment on e-waste in the US will be assessed in paragraph 4. At the end of this paragraph there is a short summary of the most important aspects of the Governance Triangle. The reason for the extensive elaboration that follows is the central position of the Governance Triangle in this article.

The state has usually been seen and been acting as the sole factor in creating and implementing mandatory regulations. In that case, a Governance Triangle describing the position and acts of three different actor groups would not make sense. However, as the e-waste issue shows, states often fail in implementing appropriate regulations. Therefore, regulatory standard setting (RSS) schemes, fueled by NGOs and/or firms have gained importance and momentum.[28] More and more regulations are being adopted through the process of regulatory standard-setting and the increased roles of NGOs and firms.[29] The emergence of RSS schemes with a bigger role for firms and NGOs is the result of three elements on the social demand side. First, public protests that put regulatory holes on the agenda of NGOs. Second, public entrepreneurs in NGOs and/or firms exposed and acted upon failing regulatory situations. Third, the development of ideas about corporate social responsibility (CSR), predominantly its place in society, towards stakeholders and within the firm itself.[30] This paragraph describes the most important elements of the Governance Triangle and the process of regulatory standard setting.

The effectiveness of RSS schemes is doubted because its regulatory process comes with challenges and is often very tedious.[31] This process, consisting of five tasks, is referred to as "ANIME: **A**genda-setting, **N**egotiation of standards, **I**mplementation, **M**onitoring,

[28] Ibid, p. 14
[29] Ibid, p.2
[30] Abbott & Snidal, 2008 p. 13
[31] Ibid

Enforcement".[32] If an institution focused on RSS schemes wants to be effective they need to possess four characteristics: independence, representativeness, expertise and operational capacity. The former two guarantee serving the public interest and the latter two guarantee effectiveness.[33] The issue is that for non-state actors it is hard to have all four characteristics. Therefore, they are hardly able to achieve their goals on their own.[34] The five stages, ANIME, combined with the four competencies are crucial in assessing regulatory processes. They are essential elements for successful regulation making. Later in this paragraph there will be more attention for their meanings and roles.

2.1 Schematic depiction

The governance triangle, as presented by Abbott & Snidal (2008, p. 7), provides us with a graphic depiction of possible positions and relations within regulatory schemes. The complete triangle represents the regulatory space which consists of seven separate zones that contain possible combinations of states, firms and NGOs.[35]

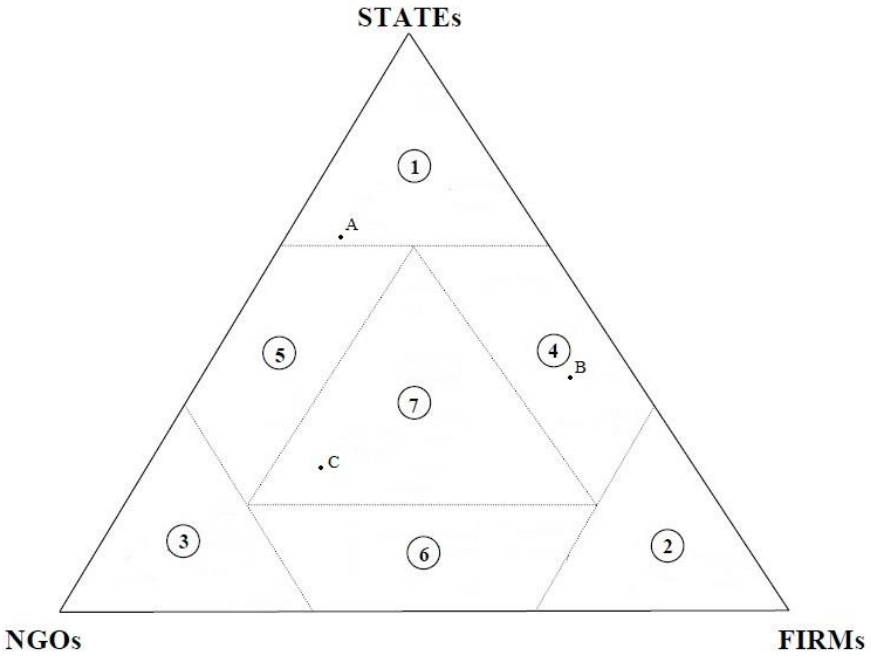


Figure 1: The Governance Triangle

[32] Ibid, p. 3
[33] Ibid, p.4; Mattli & Woods, p. 4
[34] Abbott & Snidal, 2008, p. 4
[35] Abbott & Snidal, 2008, p. 7

Zones 1, 2 and 3 represent regulatory zones in which either states, firms or NGOs implement regulations predominantly by themselves with very little influence from one of the other actor groups. Zone 1 consists of regulatory standards set by a state, states, or a partnership of states, towards businesses. Zone 2 consists of self-regulation by industries. These self-regulation schemes are also known as corporate social responsibility (CSR) policies. Finally, zone 3 consists of regulatory standards created and published by NGOs and partnerships of NGOs.[36]

Zones 4, 5 and 6 are regulatory zones in which two actor groups create joint regulations and in which the third actor group has little to no influence. Zone 4 consists of cooperating states and firms, zone 5 consists of cooperating states and NGOs, and zone 6 consists of cooperating firms and NGOs on implementing regulatory standards.[37]

Finally, zone 7 is a regulatory zone in which all actor groups have a role. Furthermore, it is necessary to note that the position of a regulatory scheme within each zone says a lot about the influence of each actor group on that particular scheme, even though it is not a precise measurement. To elaborate on this, figure 1 includes three examples of regulatory schemes. Scheme A is predominantly designed and implemented by a state, but even though its influence is minor, there does exist some influence from an NGO party. It is highly unlikely that there is any influence from a firm since in that case its position would be more situated on the left. Regulatory scheme B is a joint regulatory standard set by a state and a firm. However, the role of the firm was bigger than that of the state since the dot is closer to the actor group 'firms'. Finally, scheme C is created and executed through a cooperation of all three actor groups in which NGOs have the most important role.[38]

[36] Abbott & Snidal, 2008, p. 8
[37] Ibid
[38] Abbott & Snidal, 2008, p. 9

2.2 Evolution of the Governance Triangle

Another measurement is the density of the regulatory zones. Figures 2a-c show the evolution of density within the regulatory zones on regulatory processes in general. The darker the shade of grey the higher the density. This measurement indicates how many regulatory activity a certain zone experiences. The density of the zones has developed over time and in the most recent period (post-1994) there are three gradations of density. The highest density of regulatory schemes is found in zones 1 and 2. Either self-regulation by firms (CSR) or the implementation of regulations by states. Medium density is found in zones 3, 6 and the bottom half of zone 7. Either regulatory schemes pushed by NGOs, joint regulations by NGOs and firms, or regulatory schemes by all three actor groups with more important roles for either NGOs or states. The lowest regulatory density is found in zones 4, 5 and the top half of zone 7. Either joint regulatory schemes by states and NGOs, states and firms, or regulations that involve all three actor groups with the most important role for states. A first assessment of these density levels implies that states find it difficult to engage in regulatory cooperation with an increased level of responsibility and influence from NGOs and firms. Additionally, it is important to note that the pre-1985 governance triangle had a high density in zone 1 (states) and low density in all other zones, and in the period 1985-1994 there existed high density in zone 1 (states), medium density in zone 2 (firms) and low density in all other zones. Hence, the development of regulatory density in the governance triangle. Pre-1985 states where mostly involved in regulations, between 1985 and 1994 firms started to create more regulations (CSR), and post-1994 RSS schemes by NGOs and firms gained influence.[39]

[39] Abbott & Snidal, 2008, p. 10

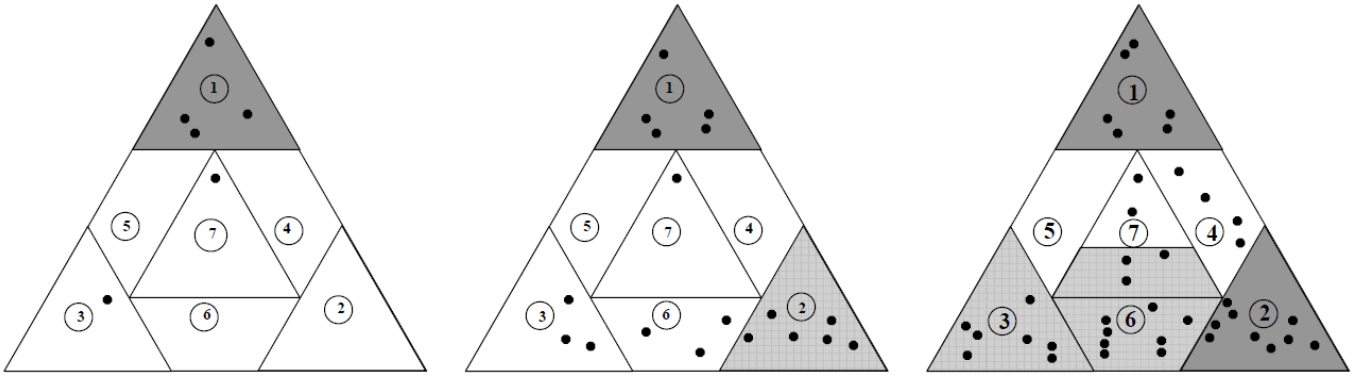


Figure 2a-c: Evolution of the Governance Triangle[40]

2.3 Goals, power and abilities

The actor groups do not only differ in density, they also differ in their goals, power, and abilities. They can all possibly take part in RSS schemes but they are not equal.[41] The three actor groups have different characteristics and preferred outcomes in the regulatory process. These differences predict and explain each group's behavior.

Firms focus on making money and even though one might think they are negative about regulations by default, it very often depends on the type of regulations. Their stance towards a certain regulation determines how they act upon it and in which way it influences them. In case of a negative outcome firms may resort to self-regulation in order to create a more profitable situation. Another motive for self-regulation is reputation. To maintain and increase profit firms depend on their reputation. By implementing self-regulatory schemes they are able to reduce the threat of activists whose actions might lead to a decrease in turnover. The final reason for firms to be included in RSS or implement CSR are the actions of their rivals. Big companies have a lot of

[40] Abbott & Snidal, 2008, p. 10
[41] Ibid, p. 15

space to engage in RSS and CSR and are therefore able to influence their entire industry. It improves the way the industry is perceived without harming their own firm.[42]

The actor group of NGOs has a very diverse character and consists of many groups that behave according to certain norms, values and beliefs. As opposed to firms, NGOs do not experience any direct benefit or discomfort from (non-)existent regulations. Therefore, they are less likely to soften their demands when it comes to regulatory negotiations. This can lead to friction when collaborating with firms that take their societal position seriously. They are willing to change their policies, but they do not want to comply to the, in their opinion, extreme standards set by NGOs. A common misunderstanding is that NGOs operate in society's interest. They have their own values and behave accordingly. In their behavior they do have to take into account that they are competing with other NGOs for example for publicity, funding and members. A final comment about NGOs is that even though they might have direct interests in their own country, for example the Environmental Defense Fund in the US, they can be concerned with environmental issues abroad.[43]

States are generally not seen as actors with their own interests, but actors that guard the public interest. In an international setting, or in the US case a federal setting, they do have their own interests. The position of states within the federal US is important in establishing policies. States might have the same interest, but the competitive nature, for example in drawing-in companies, might affect their willingness to collaborate.[44]

[42] Abbott & Snidal, 2008, p. 17
[43] Ibid, p. 18
[44] Ibid, p. 18

2.4 ANIME and the four core competencies

As mentioned earlier the process of implementing regulations is based on the ANIME-model. The five stages - Agenda-setting, Negotiation, Implementation, Monitoring, Enforcement – do not necessarily need to follow each other in this order. Also, not every actor can or needs to be involved in every stage of the process. The stages are, however, necessary to eventually form regulations.[45] For example, a firm can Monitor (through transferring dedication to employees and stakeholders) and be Enforced (citizens that approve or disapprove which determines the societal perception of that firm), and a state can Monitor (through making sure firms comply to regulations) and Enforce (through fining firms that violate regulations). But, there can also be reinforcing mechanisms that strengthen each other. A government can fine a firm after citizens raise awareness about a firm violating the rules.[46]

Abbott & Snidal (2008, p. 24) generated four competencies that are necessary for effective RSS and the eventual implementation: "(1) independence – especially important when the regulatory agenda is set and standards are invoked [AME] (2) representativeness – especially important to the promulgation and enforcement of standards [NE] (3) expertise (of the several kinds mentioned above) – important at every stage of the regulatory process [ANIME] (4) operational capacity (the practical abilities, resources and authority to perform necessary tasks) – especially important in the application of standards [IME].[47] Every actor group has certain skills and capabilities that make them more or less suitable to be active within the five aspects of the process of regulation.

[45] Abbott & Snidal, 2008, p. 21
[46] Ibid, p. 23
[47] Ibid, p. 24

(1) States often have all of the necessary competencies. They have their authority and legal systems, but they do not have the ability to implement regulations in firms. They do, however, have the ability to monitor and enforce their regulations.[48]

(2) Firms are the only actors able to implement regulations within their organizations. Other actors cannot do that for them. Furthermore, firms possess a lot of expertise. This is essential in creating (N), implementing (I) and monitoring (M) standards.

(3) NGOs are especially strong in their information management and have the ability to create a high level of legitimacy through their battle for the public interest. These characteristics make them effective in almost all five stages except for implementation. The greatest issue NGOs experience is that firms perceive them as the enemy, which might reduce their effectiveness. Table 1, by Abbott Snidal (2008, p. 27) shows the competencies of all actor groups within the five steps of the regulatory process. The dark area indicates there are no actor groups with that particular competency within that particular step within the ANIME process.

	Agenda-Setting	Negotiation	Implementation	Monitoring	Enforcement
Expertise	States NGOs	Business - Firms Normative - States NGOs	Firms	Firms NGOs (States)	States NGOs
Operational Capacity	States NGOs (Firms)	All	Firms		States (NGOs)
Independence	States (NGOs)			NGOs States	States (NGOs)
Representativeness	States (NGOs)	States			States

(Parentheses) indicate a secondary capacity.

Table 1: Actor Competencies in Stages of RSS Schemes

[48] Ibid, p. 25

2.5 The process of regulatory bargaining

Most striking about table 1 is that it shows that no actor group is able to adequately fulfill the regulatory process on their own. States and NGOs are not able to implement policies in firms, and firms are not able to approach regulatory standard setting from an independent position. Therefore, it is very unlikely to have the ANIME process executed by only one actor group. Even though states potentially possess all competencies, it is largely impossible for them to be active at the implementation stage. This is merely a task of firms. This results in bargaining being an important part of creating regulations. Table 1 is important in this process since it illustrates what each actor group can and cannot bring to the table. Bargaining is both implicit and explicit.[49] It is implicit in the sense that each actor strives to achieve what fits their own interests and it is explicit in the sense that each actor actively chooses who to or who not to partner up with to achieve its own interests. Working together comes with risks and costs, and might therefore reduce efficiency: "firms may increase their vulnerability to NGO pressure, while NGOs may be perceived as selling out".[50] One could conclude that one actor group can best do things on its own. But even within actor groups there are so many differences that working together has more risks than opportunities. Firms might be operating in the same field, but also have different impacts on society which influences their need to implement regulations. NGOs can have many interests and these could collide with other NGOs while working on a regulatory scheme.[51]

As mentioned, table 1 determines what an actor can or cannot bring to the development of regulations. However, the existing conditions and the power of actors are also important in the bargaining process. Abbott & Snidal (2008, p. 31) identify two types of power within the bargaining process. "Got-It-Alone-Power" (GIAP) and "Inclusion Power" (IP). The former is the

[49] Abbott & Snidal, 2008, p. 29
[50] Abbott & Snidal, 2008, p. 29
[51] Ibid, p. 30

capacity of an organization to implement a standard (NGO) or self-regulation (firm) without immediately affecting others. The presence of GIAP is strongly related to the competencies in table 1 and since every actor possesses certain competencies they are all able to use their GIAP to a certain extent. The latter, IP, indicates how essential the contribution of an actor to the RSS scheme is. Inclusion Power has an extreme form which is called "Veto Power". An actor uses this kind of power if it possess vital qualities to make the regulatory process work and is not willing to contribute. Additionally, the existing conditions, predominantly in the case of firms, determine an actor's bargaining power. If a company sells products with their brand name they are more vulnerable to consumer opinions and NGO pressure. They are expected to meet high expectations and act responsibly. Another condition which is important in determining an actor group's bargaining power is how many actors every side has. "Firms with many strong competitors may be unable to adopt higher standards without impairing their competitiveness".[52]

Each of the three singular zones (1, 2, and 3) within the governance triangle contain a combination of implicit bargaining and "Got-It-All-Power". These zones include regulatory schemes and initiatives created singularly by the three actor groups. Zone 1 includes regulatory schemes created by the state. These are the laws and regulations that are implemented on a state level. GIAP by the state in this zone is similar to the original model in which the state was the main regulatory actor. The fact that states were often unable to implement regulations was the reason for an increase in the regulatory effort of firms and NGOs and therefore the Governance Triangle. Nevertheless, states are still able to influence the regulatory bargaining process by promoting and implementing guidelines.[53] Zone 2 includes regulatory schemes created by firms for themselves. Because regulations can include characteristics that might hinder firms, it could

[52] Abbott & Snidal, 2008, p. 34
[53] Ibid, p. 33

be beneficial for them to strive for less regulation. Especially smaller companies tend to regulate almost nothing hoping that NGOs focus on bigger fish. Firms have the advantage that they know everything about their production process and therefore also know what the minimal regulations can be to satisfy NGOs. This makes them focus on competitors that did not implement any regulations yet. However, regulating before NGOs and advocacy groups are involved in a certain industry can lead to a spotlight on that particular industry causing increased pressure for more regulations. Nevertheless, firms are also able to use that pressure in their own favor. They can implement their own, more business friendly, regulatory standards and discard wishes from NGOs while still showing their willingness to implement change. The negative aspect of this can be that some firms might implement fake regulatory schemes solely meant to satisfy the public without actually making a change. It is difficult to make a proper distinction between firms that implement fake schemes or the ones that actually want to implement schemes that lead to improvements.[54] Zone 3 (NGOs) has a lower density than zones 1 and 2, and their GIAP is arguably lower than that of states and firms. Benefits of NGOs are that they are very independent and usually have a lot of knowledge on a certain subject. Furthermore, they have the ability to hold firms and states accountable by exercising pressure in several ways. The reason for their low GIAP is that they ultimately need states and firms for their regulatory demands to be accepted and implemented. Being too aggressive can lead to the public opinion turning against them and firms and states being reluctant to listen.[55]

Exercising "Got-It-All-Power" leads to different regulatory schemes from different zones that are focused on the same subject. This causes parallel regulations.[56] This is not necessarily bad but it might reduce the effectiveness of the individual regulations. Implicit bargaining, each

[54] Abott & Snidal, 2008, p. 35
[55] Ibid, p. 36
[56] Ibid, p. 37

actor striving to achieve what fits their own interests, leads to competitive behavior between RSS schemes. Each actor wants their regulatory scheme to dominate the phenomenon that is subject to regulations. Regulatory schemes that have a lot of participants and supporters within their zone have the ability to not only change the behavior of their participants, but also RSS schemes from different zones. An interesting mechanism is that of NGOs that publicly pressure firms but also give them the opportunity to resort to implementing regulations that are created by themselves. As a result of this NGOs might be tempted to reduce the impact of their regulations for the sake of appealing to more firms. The competition caused by the increased importance of NGOs and firms within the Governance Triangle leads to the development, improvement, interconnectedness and creation of more and new regulatory schemes. In a lot of industries this has led to numerous regulatory schemes, sometimes leading to confusion. However, as mentioned before, the electronics industry is not even near causing confusion with an abundance of RSS schemes on e-waste.[57]

The previous section focused on the individual behavior of the three group actors within the Governance Triangle. However, figures 2a-c show the evolution of the Governance Triangle and illustrate the increased importance of cooperation in RSS schemes. Nevertheless, firms and NGOs are also very often the opposites of each other. Firms think NGOs have a low understanding of doing business and NGOs think firms are acting immorally to create revenue. But often when NGOs and firms strive for the same goals (proper self-regulation and lobbying for strong regulations) cooperation can improve the quality of their regulatory scheme. Within the creation of collaborative schemes there are a few factors that determine bargaining power. The most important factor is that collaboration has to lead to a better scheme than an individually produced scheme. Other factors are the competencies of an actor group and the number of parties

[57] Abbott & Snidal, 2008, p. 39

within an actor group.[58] A balance in bargaining power leads to an RSS scheme in which NGOs can implement their standards and firms can save themselves from negative attention. However, often NGOs and firms do not see eye to eye causing the creation of predominantly unilateral regulatory standards. Firms have the upper hand in situations where there is no regulatory action by the state because NGOs do not have the ability to overpower a scheme by the industry and the public is not bothered with the intensity of a scheme. The existence of one is mostly sufficient.[59]

A similar but different form of collaboration is that of collaboration between schemes. As mentioned before unilateral schemes are often parallel schemes. They strive for the same thing within the same industry but have slight differences and are created by different actor groups. Combining the individual qualities and powers of unilateral regulatory schemes can improve the regulatory status quo within a particular subject, like e-waste. Furthermore, it simply improves the knowledge of participants in unilateral RSS schemes. Scheme collaboration is often formed by creating an umbrella organization with a certain label that firms get when complying to any of the participating schemes. However, collaboration often fails even though different RSS schemes can be focused on the same goal and might be a good fit. The initial creation of unilateral schemes already indicates there are differences in goals and ideology. These differences cause failure and again lead to the unilateral regulatory situation with parallel and competitive schemes.[60]

2.6 The role of states in no-state regulatory schemes

The previous sections were largely focused on the involvement of firms and NGOs on regulatory standard setting. It made clear that often the differences between these two actor groups are too

[58] Ibid p. 41
[59] Ibid, p. 41
[60] Abbott & Snidal, 2008, p. 42-43

big to create RSS schemes that can satisfy both. Firms prefer a reluctance of regulations and NGOs prefer an abundance. This often collides and leads to the development of unilateral regulations that are parallel and competitive. The background role of states, however, contributes to the development of joint regulations that serve the public interest. This influence does not necessarily mean the implementation of laws, but can also be support and endorsements. State influence is discussed based on the ANIME process. *Agenda setting.* The state can put issues on the agenda and promote certain regulatory schemes as legitimate regulatory options. The state can also literally contribute to the operations of certain RSS schemes. *Negotiation.* Firms and NGOs often have their own desires and goals and are willing to innovate within the regulatory playing field. However, they often tend to resort to standards that are already set by states because these offer guidelines to which performance can be easily measured. These guidelines are also often legitimized through politics. *Implementation*. Unless the state is a big buyer within a certain sector their power within this stage is very limited. If they are a big buyer they can demand their suppliers to implement certain standards. *Monitoring*. Literally monitoring every firm within an industry is very costly for states. They can, however, demand transparency which improves the chances for NGOs to monitor the behavior of firms. *Enforcement.* Like monitoring this is very expensive and it can be easily adopted by NGOs through monitoring and pressuring firms.[61] Even though the involvement of firms and NGOs in regulatory standard setting has increased the role of the state is not played out. States used to be the main actor within regulatory playing fields but they are evolving towards institutions that play a potentially decisive background role with their agenda setting, negotiation and enforcement competencies.[62]

[61] Abbott & Snidal, 2008, p. 43-48
[62] Ibid, p. 49

***In summary**, the Governance Triangle has a few essential features. First, the ANIME regulatory process that represents the stages of creating regulations: agenda setting, negotiation, implementation, monitoring, and enforcing. All three actor groups, states, firms and NGOs, have their own skills within the ANIME process. To determine their power and position there are four core competencies to be successful within the ANIME process. Independence, representativeness, expertise, and operational capacity. Often states possess all four competencies but slow decision making and politics cause a lack of regulatory decisiveness. This results in an increased role for firms and NGOs within the regulatory process. The combination of an actor group's core competencies and their skills within the ANIME process determines their bargaining power. Bargaining power determines an actor group's importance and leverage over other actor groups in the process of negotiating regulations. Due to the differences between firms and NGOs there exist a lot of unilateral schemes. Within these schemes the individual actor groups implement their own regulatory standards that are often parallel to other schemes and often compete with each other. It rarely leads to functioning collaborative schemes in which either actor groups work together or in which existing schemes are combined. To make collaborative schemes happen the state plays an important role because they have the ability to influence, encourage and assist the creation of (joint) RSS schemes at any stage of the ANIME process.*

3. RESEARCH METHOD

This study aims to provide a comprehensive overview of e-waste regulations in the United States. As mentioned in the introduction, the theoretical framework to analyze this is the Governance Triangle. Since the regulatory playing field of e-waste in the United States is not yet mapped, this study is meant to explore precisely that. This needs to be done by analyzing the three actor

groups mentioned in the Governance Triangle: states, firms, and NGOs. Furthermore, it is necessary to assess the existence of joint initiatives on regulatory standard setting on e-waste. Analyzing these four groups requires analyzing separate cases for each different group.

The use of cases means that the used research method is qualitative and not quantitative. Qualitative research has four main functions. (1) Exploring issues and elements that are relevant to, in this case, e-waste, (2) identifying important variables of a certain subject, (3) fine-tuning the exact meaning of variables, and (4) identifying the location-specific meanings and contexts of certain elements and variables.[63] This study does not aim to achieve goals 2 to 4, but it does seek to explore issues and elements that are relevant in regulatory standard setting (RSS) for e-waste in the US. This means looking for the unknown and discovering all aspects of RSS in US e-waste management based on the Governance Triangle. Exploratory research by studying cases is most suitable for doing this.[64] Exploratory research creates the basis for future research. It can help in shaping future studies on specific parts of the regulatory playing field of e-waste.[65]

Eisenhardt (1989) describes how to build theory based on case studies. However, her methodology also includes formulating hypotheses and drawing conclusions. This is not the goal of this study. This study wants to analyze the regulatory playing field of e-waste and see how the Governance Triangle operates within this playing field. According to Eisenhardt's methodological approach one first needs to define a research question, then select cases, followed by a choice of data collection methods, the actual collection of data, and finally analyzing data. The next steps work towards hypotheses and drawing conclusions, which is not the goal of this study.[66]

[63] Hennink, Hutter & Bailey, 2011, p. 56
[64] Ibid, p. 89
[65] Singh, 2007, p. 64
[66] Eisenhardt, 1989, p. 533

The research question, together with a specified problem statement, is defined in the introduction and is based on the importance of properly treating e-waste and the lack of federal legislation in the United States. To work systematically the Governance Triangle is used to give direction in the exploration of the regulatory playing field on e-waste. The research question is two-fold and not defined as a traditional question ending with a question mark: "The goal of this exploratory study is to provide an insight in the regulatory playing field of e-waste in the United States. Furthermore, it is also a practical assessment of the Governance Triangle and it can provide insights on its workings within a federation like the US". This is necessary, because a study like this needs to have a tentative research question that can handle flexibility.[67] Eisenhardt (1989) recommends determining a few important variables before conducting the research.[68] The Governance Triangle helped in providing this because the most important variables are the regulatory initiatives by states, NGOs, firms and through collaborations.

Case selection is the second step in the explanatory research process. Case selection is necessary to define the requirements for the research sample and to limit the size of the research. Random case selection does not fit this study, because the Governance Triangle already indicated which type of organizations need to be analyzed.[69] Because of the size of the country and the versatility of the regulatory playing field described in the Governance Triangle it is important to select a representative sample from each of the four aforementioned groups. To provide this representative overview there will be 6 to 8 cases selected for each different group. Because state legislation is implemented in approximately 50% of the states, all states, also the ones without legislation, are discussed in the appendix. Paragraph 4.1.1 contains a short overview of the main forms of legislation that can be found within the US states.

[67] Eisenhardt, 1989, p. 536
[68] Ibid, p. 536
[69] Ibid, p. 537

Exploratory research requires flexibility and inductive data collection.[70] The used sources will only be qualitative. For example, official policy papers, acts, bills, company policies, official state/NGO/firm websites, and websites that bundle information on e-waste (legislations). The inductive nature of data collection will result in a continuously evolving search for data and cases. This study will start at the ENVCAP and ERCC websites that contain information on e-waste legislation in each state. This will result in knowledge and data about more organizations involved in e-waste regulations. If this stream of new data will stop, specific search criteria will be used on the web. These search criteria can be "firm", "ngo", "e-waste", "policy", "electronics", "recycling", "drop-off", "take back", etc.

This data collection method means that the actual collection of data and the analysis of data will overlap. Analyzing newly discovered data can lead to new sources of data, that can also lead to more sources. This provides a head start in the analysis, but also leaves room for flexible data collection. This reduces the risk of a path-dependent analysis.[71] As mentioned before, the data collection will be focused on sources that provide information on how certain organizations act within the regulatory playing field of e-waste regulations.

Analyzing data is important and results in the ultimate goal of this study: describing the regulatory playing field of e-waste in the United States. The most important aspect in the actual data analysis is within-case analysis. This entails an in-depth analysis of a specific case.[72] For example, a very thorough description of regulatory e-waste activities by a company like Dell, or NGO like Greenpeace. There is no specific way of executing these analyses but the goal will always be to describe an organization's regulatory activities as thorough as possible. This

[70] Ibid, p. 538
[71] Eisenhardt, 1989, p. 539
[72] Ibid, p. 540

strategy makes it possible to compare cases and describe a general analysis of all cases within an actor group.[73]

In summary, *all actor groups will be assessed based on 6 to 8 cases. In-depth analyses of all individual cases provides the opportunity to perform cross-case comparisons. This makes it possible to zoom out and summarize the separate analyses in one meta-analysis of each actor group and ultimately the regulatory playing field on e-waste in the US.*

4. THE US REGULATORY PLAYING FIELD OF E-WASTE AND THE GOVERNANCE TRIANGLE

This paragraph is meant to offer an insight in existing US state regulations on e-waste, (regulatory) initiatives of firms that want to, or have to, take responsibility, and initiatives by NGOs . First, the activities within these three actor groups will be elaborated on in subparagraph 4.1. Second, the actions within the three actor groups will be related to the functioning of the Governance Triangle within the regulatory spectrum on e-waste in the United States in subparagraph 4.2.

4.1 E-waste regulation initiatives by states, firms, and NGOs

This subparagraph is a comprehensive overview of the existing state policies, NGO initiatives or firm initiatives on e-waste management in each U.S. state. The appendix provides a list of all states and their regulatory situation. This paragraph includes in which regulatory categories states are divided (4.1.1 States), and initiatives by NGOs (4.1.2) and firms (4.1.3). Subparagraph 4.1.4 contains joint initiatives within the field of e-waste.

[73] Ibid, p. 540

An important aspect to mention before analyzing the separate actor groups is the existence of e-recycling certifications. These certifications are handed out to recycling companies that responsibly treat e-waste. The two most commonly used certifications are R2 and e-Stewards. These will be elaborated on in paragraph 4.1.4 but they are also included in earlier paragraphs. In summary, The biggest difference between certified recyclers and uncertified recyclers is that certified ones do not dump e-waste in landfill and do not export their e-waste to developing countries. Furthermore, it is important to note that a law is currently being discussed in the US federal government. This law is called SEERA and it will be discussed in paragraph 4.1.4. This law is concerned with the export of e-waste to developing countries.

4.1.1 States

To assess the existing, or non-existing, policies on e-waste the ENVCAP Gateway to State Resource Locators was used. This website made it possible to quickly and efficiently find the status of e-waste management in each state. ENVCAP is the abbreviation of Environmental Compliance Assistance Platform and it is developed and maintained by the National Center for Manufacturing Sciences (NCMS)[74]. The NCMS aims to be a connection between industry, government and education which has to result in the improvement of U.S. industry[75]. Furthermore, the ENVCAP is funded by the EPA (Environmental Protection Agency) as part of the National Compliance Assistance Centers program. This program was started to help citizens and companies to easily understand existing environmental regulations[76]. Even though the ENVCAP is a reliable source, each of their findings are checked according to the legislative documents. The sources that back these findings are provided too. In the appendix, each state,

[74] ENVCAP, n.d.
[75] NCMS, n.d.
[76] Compliance Assistance, n.d.

including the District of Columbia (DC), is assessed in an alphabetical order on their type of e-waste management. Furthermore, table 2 in the appendix shows an assessment of political preference and e-waste legislation in states. It is an arbitrary measurement (because it is based on political tendencies) and it leaves a lot of factors undiscussed, but the results are striking. Traditionally Republican states have significantly less e-waste legislations than traditionally Democratic states.

This paragraph describes the main categories of initiatives within states. Based on a study by the Wharton University of Pennsylvania there are broadly three categories to be distinguished: no regulation, performance mandate, and convenience mandate. No regulation means that the state government did not implement any form of regulation on e-waste. In these states it is mostly the task of NGOs and firms to either implement their own forms of regulation, or to encourage states to implement it. The other two categories are both forms of extended producer responsibility (EPR). EPR requires producers to handle the environmental consequences of their products.[77] The states hope that it will not only lead to appropriate payments but also to environmentally friendly innovations.[78]

The performance mandate approach means that the recycling goal producers have to reach is a set percentage of what they produced in the previous year. If they fail to meet this they get charged extra. The other approach is called the convenience mandate strategy. This requires producers to make sure residents are able to return their e-waste. Producers pay fees to a centralized organization which takes care of it. It appears that the states that use the convenience

[77] Compliance Assistance, n.d.
[78] WUP, 2016

mandate strategy outperform the states that use the performance mandate on the matter of recycling e-waste.[79]

In general, according to the collection of state legislations on e-waste in the appendix, there are a few requirements states with e-waste legislation generally use for the producers of electronic products. (1) They are required to pay an annual registration fee, (2) they are required to take part in a recycling (take back) program or implement one themselves, (3) they are required to raise awareness with their customers, and (4) they will be fined (to a maximum of $100,000) if they fail to comply to points 1-3 and their products will be banned. Next to these reoccurring characteristics there are some more unique aspects of legislation by states. Not all of the states require e-recyclers to work according to R2:2013 or e-Stewards standards. This means, for example, that the export of e-waste is not completely prevented. These standards will be elaborated on in paragraph 4.1.4. Furthermore, not all states require manufacturers to be registered if they do not reach a certain amount of produced e-products. Additionally, the state of Utah has a completely different form of e-waste legislation. It requires firms to educate and inform their consumers on e-waste recycling and report annual results to the state department. This still results in improved recycling of e-products throughout the state even though remote areas are still not equipped with e-waste drop-off locations. It is important to note that a lot of states that implemented e-waste legislation use legislation that was already present in other states. Nevertheless, states were not able to create a form of e-waste legislation that could be widely supported and widely implemented by states.[80]

Not all states that have not implemented e-waste legislation are completely oblivious and ignorant in the importance of handling e-waste. Alaska and Alabama, for example, do not inform

[79] WUP, 2016; ERCC, n.d.
[80] WUP, 2016

citizens and business about the best practices of e-recycling, but a lot of other states without legislation do. Most states without legislation provide their constituents with the following info. (1) General information on e-waste, (2) information on why e-waste needs to be treated properly, (3) locations of e-recyclers, drop-off locations and mail-in programs, (4) a list of R2 or e-Stewards certified recyclers, and (5) encouraging citizens, businesses and (governmental) organizations to only cooperate with certified recyclers.

A lot of US states like to work together in think tanks and discussion forums. However, if they start a joint initiative like that, they also tend to include NGOs and firms. The Northeast Recycling Council (NERC), however, managed to create a non-governmental organization that can be considered a collaboration of states. They do have members that are firms or local governments, but these members are affiliate members and do not officially have a say in the organization. The only voting members are the 11 states. Therefore, the NERC is not discussed in the section about joint initiatives, but here.

Northeast Recycling Council (NERC)

The Northeast Recycling Council (NERC) is a non-profit organization that consists of 11 states in the northeast region of the United States: Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Maryland, Pennsylvania, Rhode Island, and Vermont. The NERC can be considered a very hybrid organization. It is a non-governmental organization (NGO) but its members are states.[81] Additionally, advisory members are businesses and local governments. Together with the NCER they manage the ERCC (Electronics Recycling Coordination Clearinghouse). Its mission is to "promote sustainable materials management by supporting traditional and innovative solid waste best practices, focusing on waste prevention,

[81] NERC, n.d.

toxics reduction, reuse, recycling and organics recovery (…) The NERC conducts projects that influence policy and affect change through research, technical assistance, demonstration projects, and education".[82]

In summary, *states do or do not implement legislation, and/or they unite in think tanks. In general, states with legislation focus on EPR or they at least require companies to use certified recyclers. Within EPR they either use the performance mandate or the convenience mandate. Within these mandates states do or do not require firms to use certified recyclers. If states provide no legislation they either do or do not provide citizens, businesses and organizations with information on treating e-waste. If they provide info they recommend take back programs from firms or they recommend finding a recycling company. Recommended recycling companies can either be certified, not certified, or states can be indifferent about this. An initiative that combines multiple states and operates as a think tank like the NERC produces information and support for citizens and businesses.*

The federal government has currently done three things. They left the creation of legislation to the states, provide advice to citizens, companies and organizations through US EPA, and they are discussing the SEERA bill that prevents the export of e-waste and improves national safety. The advice that is being offered through EPA can be an encouragement of using take back programs, recommending certified recyclers, and the creation of think tanks. Their think tanks provide information and support for citizens, businesses and (governmental) organizations.

[82] Ibid

4.1.2 NGOs

This paragraph describes some examples of NGOs and the roles they play within the regulatory process. There are NGOs that take part in collaborative schemes, NGOs that only promote awareness and NGOs that want to refrain from influencing regulations. The latter choose to do so because they do not want to hinder the creation of potential federal regulations. The NGOs that are included in this paragraph operate globally, as well as on the national and local level. All of these NGOs are involved in and concerned with the treatment of US e-waste.

Basel Action Network (BAN)

The Basel Action Network was named after the 1989 UN Basel Convention. This convention is meant to restrict the export of hazardous materials from developed to developing countries.[83] The BAN is a globally operating NGO primarily concerned with the export of e-waste. They are supporting members of several US initiatives on reducing e-waste like CAER and the global e-recycling certification e-Stewards. The BAN exercises its influences as "a trusted expert, compassionate advocate, and global partner for environmental justice". The Basel Action Network has its headquarters in Seattle (WA) and also operates on the national level. They use the 1989 UN Basel Convention as their guideline aiming for the removal of toxic materials and prohibition of e-waste export.[84] The US has not ratified the UN Basel Convention and therefore does not actively prevent the export of e-waste.[85] The Basel Action Network is a strong advocate with global influence on the implementation of e-waste regulations on country, local, and corporate level. They want to achieve their goals through "using interrelated policy, market

[83] Basel Convention, 1998
[84] BAN About Us, n.d.
[85] Basel Convention, 1998

solutions, and public engagement strategies that create systemic change".[86] This means they are focused on lasting adjustments of the treatment of e-waste through collaborations of all three actor groups.

The Electronics TakeBack Coalition (ETBC)

The ETBC is an independent NGO based in the US that focuses on making manufacturers of electronics take full responsibility for the products they produce. They try to achieve this through "effective public policy requirements or enforceable agreements". The strategy they promote is extended producer responsibility (EPR). ETBC's goal is to ultimately improve the next policy, promote the manufacturing of greener and cleaner electronics, and reduce the existence of toxic waste through implementing EPR, including it in the company's costs and discouraging the use of toxic materials.[87]

They refer to their form of EPR as IPR, individual producer responsibility. They want manufacturers to take responsibility for their own products, in either a physical or financial way. The ETBC strives for aggressive e-waste recycling and reuse legislations that will ultimately create an industry in which every firm needs to comply to the exact same regulations. Furthermore, they think it is necessary that firms work towards a system in which their products will be produced as green as possible. Additionally, they want recyclers and manufacturers to adhere to the following responsible recycling standards (1) reuse first, (2) try to achieve a production process without waste, (3) no export to developing countries, (4) no prison labor, and (5) proper working conditions for employees.[88]

[86] BAN Advocacy, n.d.
[87] ETBC, n.d.
[88] ETBC, n.d.

The ETBC presents the image of being a watchdog and it offers other actors several ways of holding firms accountable for their share in the e-waste problem. It is the kind of NGO that is feared by a lot of large companies because they have high morals, high standards and do not fear searching for publicity. The ETBC uses a system in which they grade electronics producers according to their ways of handling e-waste. This is a good initiative to hold firms accountable, but just as in the case of Greenpeace, their grades are not updated regularly.[89] The behavior of the ETBC is a textbook example of the influence NGOs can have on what in the Governance Triangle is discussed about firms resorting to self-regulation. They judge the requirements and standards of an NGO as too high and implement their own regulations to show their good will without having to comply to aggressive NGO standards.

The National Center for Electronics Recycling (NCER)

The NCER, founded in 2005, is a non-profit organization that wants to encourage and enhance the recycling of e-products in the US. Their activities are "(1) the coordination of initiatives targeting the recycling of used electronics in the United States, (2) participation in pilot projects to advance and encourage electronics recycling, and (3) the development of programs that reduce the burden of government through private management of electronics recycling systems. For example, in West Virginia, the NCER created awareness, reduced the amounts of e-waste entering landfills, and invigorated the local recycling industry through promoting an electronics recycling initiative.[90] The NCER is not actively involved in creating and implementing policy, nor does it collect or recycle e-products themselves. They have chosen this approach because they do not want to hinder the creation of regulations on the federal level. However, they do

[89] ETBC, n.d.
[90] NCER, n.d.

provide help for any (governmental) organization that wants to implement policy or collect and recycle electronic materials. To encourage this, they provide five guidelines that need to be part of a system that manages used e-products: (1) flexibility and competition, (2) efficiency through integration and cooperation, (3) avoid regulations that can hinder a future federal system, (4) more efficient recycling through firms should always be considered, and (5) federal and statewide consistency. Next to these guidelines, the NCER has published several reports and articles in which they provide states, firms, and NGOs with information on e-waste. Furthermore, they published a report in which they compared the awareness levels of consumers in states that have regulations and states that do not have regulations.[91]

Electronics Recycling Coordination Clearinghouse (ERCC)

The ERCC is an American "forum for coordination and information exchange, joint decision making on state electronics recycling laws". It is managed and maintained by the NCER and NERC. The ERCC has two member categories. Voting members (states with e-waste laws) and affiliate members (firms, non-profits, governmental organizations without laws, and trade associations). Their goal is to provide information, coordinate data, support the implementation of policy, encourage discussion, and work towards more similar laws in different states. They have also created an online registration website for firms that produce e-products and need to register with their states. The appendix shows that several states require electronics manufacturers to register with their environmental department.[92]

Founding members of the ERCC are California, Connecticut, Hawaii, Illinois, New York City, Maine, Minnesota, North Carolina, Wisconsin and New Jersey. Some of the affiliate

[91] Ibid
[92] ERCC, n.d.

members are BestBuy, Brother, the Consumer Electronics Association, Samsung, IMS Electronics Recycling, and Waste Management Recycle America.[93]

Electronic Resellers Association International (ERAI)

ERAI is an American NGO concerned with the flow of counterfeit products. To achieve their goal they are part of CAER, a joint initiative to ban e-waste export that will be elaborated on in paragraph 4.1.4. They are a supporter of SEERA, a potential federal law that was submitted earlier this year. This law will be elaborated on in paragraph 4.1.4 and its main goal is to prohibit the export of e-waste to prevent the production of counterfeit products and the import of those products in the US. [94] These products are often of poor quality and cause health and safety risks. On the matter of e-waste they promote SEERA and inform people and businesses about what they can do themselves to prevent the export of e-waste. It is, however, not their main goal because they are focused on "assisting buyers and sellers from all sectors of the supply chain in preventing loss by minimizing risk in the material purchasing and selling processes". Nevertheless, their efforts in promoting SEERA can cause a big shift in the sector of e-waste recycling.[95]

Greenpeace

Greenpeace is a globally operating NGO concerned with the environment. The e-waste problem is a part of the environmental problems addressed by Greenpeace. Therefore, Greenpeace is also involved in the treatment of e-waste on a global scale. Greenpeace claims people prefer greener products and they add that manufacturers show that it is possible to produce greener products.

[93] Ibid
[94] ERAI, About ERAI, n.d.
[95] ERAI, E-Waste, n.d.

They do encourage large firms to take the lead and implement greener policies. In order to do so they strongly encourage firms to show company advocacy. Greenpeace wants firms to be a part of the change in e-waste treatment. To support their thoughts and findings Greenpeace released a "Guide to Greener Electronics" that grades manufacturers of electronics based on their green behavior. This initiative holds companies accountable and confronts them with their environmental footprint. Greenpeace does not provide information on proper e-waste treatment, nor do they advocate specific policy changes. They want to reward the best practices and judge the worst ones in order to encourage companies to implement best practices. The idea of their ranking is good but the execution is poor, since it has not been updated since 2012.[96]

***In summary**, NGOs within the regulatory playing field of e-waste are generally involved in three types of activities: policy pressure, advocacy and advice. (1) They exercise policy pressure through encouraging EPR, supporting laws like SEERA, promoting certified e-recyclers, demanding green supply chains and creating their own standards. (2) Their advocacy activities are holding firms and governments accountable, seeking publicity, and providing lists of certified and uncertified e-recycling companies. An effective way of holding firms accountable is through presenting grading reports like the ETBC and Greenpeace used to do. (3) The advice offered by NGOs consists of partaking in joint initiatives aimed at creating laws, standards and recycling programs, supporting firms and governmental organizations in the implementation of responsible e-recycling, and providing citizens, businesses and governments with general information on e-waste and specific information on how to treat it. Furthermore, it is important to note that NGOs can also refrain from influencing policies. The NCER, for example, wants to prevent hindering federal legislation by implementing certain state policies.*

[96] Greenpeace, 2012

4.1.3 Firms

There are several companies within the US that are taking their own responsibility, that provide others with help in taking their own environmental responsibility, and/or that provide citizens with ways to get rid of their e-waste. This paragraph describes a few examples, which roles they play in the process of e-waste management and which roles they play in the regulatory process. Of course some firms are forced by regulations to change their behavior, but most firms in this paragraph operate nationwide or even globally. The reason for choosing these firms is that they represent the firms involved in or related to e-waste. A recycling company, tech/manufacturing companies and a large US retailer. It is also a mix of American, global, and global American companies.

e-Cycle

eCycle is an e-waste recycling company founded in 2005 that operates on the global level. They are mainly focused on buying back mobile phones and other mobile devices. Their results are a total amount of 15 million dollars paid back to their customers and the processing of at least 550,000 pounds of electrical and electronic waste that otherwise would have ended up in landfills. e-Cycle is an officially certified e-Stewards recycler. More on the e-Stewards organization can be found in subparagraph 4.1.4 Joint initiatives. e-Cycle's mission is "to protect our clients by providing easy, profitable and responsible solutions to secure data, recover wireless assets and safeguard the environment, while remaining a fulfilling workplace for our employees". They primarily operate as a business to business/government company that helps other firms and (governmental) organizations to preserve and improve their sustainability reputations. Well

known organizations that cooperate with e-Cycle are Pepperidge Farm, Newark Public Schools, AstraZeneca and Mercy Medical Center.[97]

It is important to note that e-Cycle is a company focused on e-recycling. It is not a company that produces e-products. It is, however, indirectly influencing the behavior of other recyclers by being e-Stewards certified. As mentioned in the next subparagraph, the e-Stewards certification is widely adopted by large e-recyclers. e-Cycle recycles the mobile e-products of companies and governmental organizations to help them meet their sustainability goals.[98]

Sony

Sony was one of the first firms to implement their own policies around treating e-waste. In almost half of the US states they have drop off centers to bring unwanted or end-of-life Sony products. It is Sony's goal to enable their customers to dispose of their e-waste and help the environment in doing so. To provide their customers with these drop-off centers they use the services of IMS Electronics. A recycling company focused on collecting and recycling e-waste. This company meets several environmental certifications and operates according to R2:2013 guidelines[99]. These guidelines will be discussed in subparagraph 4.1.4 Joint initiatives. Sony consciously chose to be ahead of their competition in the process of implementing self-regulation on e-waste. This helps their reputation and it stimulates their competition to also implement similar self-regulation.[100]

Based on a 2015 reporting template by EPA Sony scores a 100% recycling rate of e-waste recycled by recycling firms that operate according to R2:2013 or e-Steward certifications[101].

[97] e-Cycle, n.d.
[98] Ibid
[99] IMS Electronics, n.d.
[100] Sony, n.d.
[101] EPA, 2015

Dell

Computer company Dell created a producer responsibility policy in which they formulate their own behavior in e-waste management, what they require from other stakeholders within their supply chain, and what they expect governments to arrange. Dell acknowledges governmental regulations on e-waste management, complies with them and actively want other stakeholders to comply to them too. Dell also expects governments and states to raise and create e-waste awareness and to actively help firms and consumers. Dell believes fees for processing e-waste should not be imposed on consumers, but on producers. However, they do think it should be able for producers to include these costs in their product price. Dell supports the development of legislation and regulation but they expect standards to operate on a global level to guarantee a level playing field. Dell only works with recyclers that operate according to certified standards by for example R2:2013, e-Stewards or NSES.[102]

Dell is a member of the global StEP, Stop the E-Waste Problem, initiative. This initiative consists of firms, universities, governments and NGOs that are focused on finding solutions for the e-waste problem. To meet their standards and the standards Dell developed on their own they have seven ways of helping their customers in disposing their e-waste. (1) Helping businesses with end-of-life e-products, (2) enabling consumers to drop their electronic products at their local Goodwill[103], (3) cooperating with Staples[104] to provide consumers with a place to bring used printer supplies, (4) mail products to a recycling location, paid for by Dell, (5) trade electronics for a Dell gift card, (6) encourage people and organizations to donate their used products, and (7) leading by example. Dell characterizes itself as the leader within their industry.[105] On the matter

[102] Dell, 2017; Dell, n.d.
[103] Goodwill is an American second hand store
[104] Staples is an American office supply store
[105] Dell, n.d.

of legislation and self-regulation they show an environmental conscience that is close to that of an NGO.

LG (Lucky Goldstar/Life's Good)

LG is a partner of the e-Stewards enterprise. This organization sets standards and provides certifications for e-recyclers that operate according to their standards. The next paragraph offers further elaboration on e-Stewards. LG offers drop-off sites in all US States and provide customers with free shipping labels if there are none close by. LG consciously implements their policies based on local regulations but also provides unregulated regions with their services. Their goal is to continuously work on a greener future. To do so LG has very strict standards for the recyclers they work with. (1) E-waste cannot be incinerated or dumped in a landfill, (2) e-waste cannot be exported, (3) e-waste cannot be processed through prison labor, and (4) e-recyclers need to be certified by ISO 14001, R2, or e-Stewards standards.[106]

Next to their efforts on e-waste recycling, LG is also involved in producing greener products that have a lower environmental impact during the entire life cycle of their products.[107]

Best Buy

BestBuy is a large electronics retailer that operates throughout the entire US. It takes any kind of electronic product. The appendix shows that a lot of states without regulations on e-waste refer to this company as a location to drop-off electronic products.[108] Since they started the collection of electronic products they reportedly collected 1 billion pounds of e-waste which makes them the biggest collector within the entire United States. Their goal is to reach 2 billion pounds by the

[106] LG, n.d.
[107] Ibid
[108] Best Buy, n.d.

end of 2020. If customers drop off their e-waste at Best Buy they also get coupons for saving money at Best Buy.[109] For the processing of e-waste Best Buy works with RecycleNation. RecycleNation provides a database with all possible recycling locations in the US.[110]

Best Buy provides their recyclers with their own recycling standards. Their guidelines are very much in line with recycling standards provided by e-Stewards, R2:2013, and NSES. The NSES are standards formulated by a joint initiative and will be elaborated on in the next paragraph. Important features are that recyclers (1) cannot incinerate or use landfill, (2) have to assess whether materials are reusable, (3) secure sensitive data, (4) minimize environmental impact, and (5) e-waste is not exported to developing countries. Best Buy only works with recyclers that are certified by a third party like e-Stewards or R2:2013.[111] Walmart, another large American retailer, uses the same policy as BestBuy, but the main difference is that Walmart only offers it to its members. It is also not clear if Walmart has specific standards for its recyclers.[112]

Apple

Apple is one of the most popular brands in the world, and it is an original American company. With that image and reputation the company is an easy target for NGOs involved in e-waste activism. Apple is active in several fields of environmentally beneficiary projects. Their website shows a lot of effort on behaving environmentally responsible, but criticism from the Electronics Takeback Coalition and Greenpeace is that they are not transparent in what they actually do.[113]

Apple products can be dropped off at any Apple store or consumers can request a free shipping label to mail in their used products. The return of some devices can be rewarded with an

[109] Ibid
[110] RecycleNation, n.d.
[111] Best Buy, n.d.
[112] Santa Barbara County RRWMD, n.d.
[113] Greenpeace, n.d.; ETBC, n.d.

Apple gift card. For several states with e-waste legislation they redirect their customers to the free recycling programs organized by the state.[114] Apple formulated an own goal which aims to reach a supply chain that does not require any resource mining anymore. They want to be able to produce their products from the waste their supply chain collects. [115] This requires their supply chain to comply to the standards Apple wants them to comply to. This is a long and tedious process, but a large company like Apple can be able to change an entire industry. However, as Greenpeace and the ETBC already diagnosed: Apple is not transparent in the way their process is advancing. A nifty innovation is their disassembly line called Liam. This is a line of robots that is able to disassemble the iPhone on high speed. This innovation is constantly being developed and continuously aims to disassemble more parts of the iPhone for recycling.[116]

***In summary**, the types of firms involved in the e-waste industry are manufacturing firms, recycling firms and (electronics) retailers. The only firms that are direct subjects to state legislation are manufacturing firms and recyclers. Retailers take their environmental responsibility, are involved in joint initiatives, and prefer certified recyclers. They might however, experience pressure form NGO's. Manufacturing firms in the US either experience state regulations (performance or convenience mandate) or they implement self-regulation. It needs to be assessed if the latter is caused by regulations in other states, by NGO pressure, or a combination of both. Self-regulation or state regulation lead to the availability of e-waste drop-off points or the possibility of a free mail-in program. Furthermore, some firms end up creating and implementing their own standards, being part of a think tank, or positioning themselves as an advocacy party for change in their industry.*

[114] Apple Renew, n.d.
[115] Apple Environment, n.d.
[116] Apple Environment, n.d.

Recycling firms can have no regulation, be subject to state regulations, be self-regulated, help other firms with recycling or be part of a coalition like CAER. Recycling companies that self-regulate often comply to R2:2013 or e-Stewards standards. If there is state regulation on e-recyclers the use of those certifications is not always required. The CAER (Coalition for American Electronics Recycling), that will be discussed in the next paragraph, has a lot of members that are smaller companies. These companies are, however, only recyclers that all implemented R2:2013 and/or e-Stewards standards. The e-waste actions of small e-recyclers or producers of e-products in states that do not regulate their e-waste remain unknown.

4.1.4 Joint initiatives

This paragraph contains joint American and global initiatives on improving the treatment of e-waste. The following initiatives were chosen because they cover a lot of companies, states, organizations and aspects of the e-waste problem. Aspects like recycling, production, safety and the environment.

Sustainable Electronics Recycling International (SERI) R2:2013

R2:2013 is an abbreviation of "The Responsible Recycling (R2) Standard for Electronics Recyclers". It is used throughout the world and has a lot of firms that implement these standards. It is an example of a regulatory initiative that was created by NGOs, states and firms. It is, however, a regulatory standard solely focused on the recyclers of electronic products. It does not apply to the producers of e-products and therefore does not seek to directly change their policy.[117] It does, however, provide electronics recyclers with certifications if they manage to comply to their standards.

[117] SERI, 2014, p. 1-2

The R2:2013 guidelines are created through a collaboration of all three actor groups within the Governance Triangle. The initial founder of this partnership is the United States Environmental Protection Agency, EPA. R2:2013's goal is to guarantee proper ways of e-waste recycling. The developmental process of R2:2013 took three years and consisted of delegates from governmental organizations, including EPA, recyclers, customers and NGOs. Currently R2 is used in more than 20 countries, including the US.

The most important requirements for recyclers of e-waste who want to receive an R2:2013 certification are: (1) documentation of activities (2) certification throughout the certified period on at least one of the three (environment, health, and safety) standards approved by SERI (3) allow internal audits (4) aim for reuse or recovery (5) refrain from incinerating e-waste or dumping it in landfill (6) comply to existing import and export laws (7) regularly update legal compliance (8) knowledge and expertise to treat e-waste and (9) manage hazards for on-site personnel.[118] The reason for the development of the following joint initiative, e-Stewards, is point 6. R2:2013 standards do not seek to actively challenge the transportation of e-waste to developing countries.

e-Stewards

The e-Stewards organization operates globally and provides support and knowledge for enterprises, recyclers and consumers. The organization originates from the Basel Action Network and gained importance and impact when the R2 standards were abandoned. Environmental organizations were not able to identify themselves any longer with the R2:2013 standards and felt

[118] SERI, 2014, p. 3-8

the need for a new standard. Their main concern was to prevent the export of e-waste to developing countries.[119]

Organizations that are an offical e-Stewards enterprise pay an annual fee, except for local governments and non-profit organizations. As an e-Stewards enterprise there is easy access to official e-Stewards recyclers, knowledge and publicity. The official e-Stewards recyclers need to go through a process of 10 steps with a lot of monitoring and control before they officially receive the e-Stewards certification. All recyclers are required to be ISO 14001 certified. This means they have to comply to very strict environmental measures to guarantee "enhancement of environmental performance, fulfilment of compliance obligations, and achievement of environmental objectives".[120] Their involvement with consumers is largely based on providing knowledge. If consumers want to be part of the e-Stewards community they can officially pledge their allegiance to the e-Stewards standards[121].

Several cities, counties and companies are part of the e-Stewards Enterprises community. All these companies comply to the e-Stewards certification standard. Examples are the City of Seattle, LG, Lockheed Martin, Samsung, Santa Clara County, and the University of Washington. These institutions have all implemented e-Stewards standards and adhere to their mission statement. "The e-Stewards initiative defines and promotes responsible electronics reuse and recycling best practices worldwide".[122]

[119] e-Stewards, n.d.
[120] ISO 14001, 2015
[121] e-Stewards, n.d.
[122] Ibid

Coalition for American Electronics Recycling (CAER)

The Coalition for American Electronics Recycling (CAER) focuses on the importance of proper e-waste recycling to improve safety. Their biggest issue with wrongfully treating e-waste is that it provides other countries with knowledge of the way technology is designed in the US.[123] Approximately 50 to 70% of US e-waste is transported to developing countries like China.[124] It leads to counterfeit products that are of poor quality and that can put, for example, the armed forces in harm's way. The technologies used by the armed forces, and civilians, that are possibly threatened are "critical infrastructure, defense systems, and consumer products".[125] The counterfeit products are created by extracting components from the exported e-waste, which results in weaker performance and inevitable product failure.[126] This makes proper e-waste handling vital for the security of the US.[127] Additionally, the safety aspect makes laws on e-waste more attractive than when the sole focus is on improving the environment. Combined with the projected threat of China as the main producer of these weak products makes it a coalition that fits well within the current political climate. Positive externalities mentioned by CAER and others are "jobs, an improved investment climate, high-value exports, data security, and sustainability".[128]

The CAER consists of more than 140 firms and NGOs that work together to create regulations and pressure Congress to pass their bills. Therefore, this is not a complete hybrid, but a partial one that only includes firms and NGOs. Next to the CAER members there are some supportive groups including the Silicon Valley Leadership Group that consists of some of the

[123] Pentland, 2015
[124] Babu, Parande & Basha, 2007, p. 308
[125] CAER, 2017
[126] Pentland, 2015; e-Cycle, 2013
[127] Committee on Armed Services United States Senate, 2012, vi-viii
[128] CAER, 2017; Peters-Michaud, 2013

leading tech companies in the world like Apple.[129] However, none of the members of CAER is a multinational. The ultimate goal of CAER is for Congress to pass regulations that oblige e-waste to be processed within the United States without being shipped to countries like China. On February 8, 2017 "The secure e-waste export and recycling act" (SEERA) was introduced in congress with bipartisan support. This act is important because it prohibits the export of non-working e-waste to developing countries, which increases the processing of non-working e-waste within the US, which reduces the production of counterfeit electronics, which increases the safety of US citizens and the US armed forces.[130] There are guidelines which products are deemed to be non-working e-waste and which products are exempted from this bill. If the bill passes congress it will not be active until one year after. To enforce this law, violators will be subject to penalties like fines and jail time.[131]

The Responsible Electronics Recycling Act (RERA)

The Responsible Electronics Recycling Act (H.R.2791) was a bill focused on prohibiting the export of e-waste to developing countries.[132] It was formulated by CAER but since it was the first of its kind it requires more elaboration. The RERA is largely the same as SEERA. However, in the lobbying process for RERA the report of the Committee on Armed Services was just available. CAER needed time to assess that report and discuss with its stakeholders to ultimately create SEERA. RERA died in Congress in 2014 after it was already unsuccessfully introduced in 2011.[133] The Responsible Electronics Recycling Act was just like SEERA focused on prohibiting

[129] Silicon Valley Leadership Group, n.d.
[130] H.R.917, 2017
[131] CAER, n.d.
[132] H.R.2791, 2013
[133] S.2090, 2014

the export to developing countries to oblige e-recyclers to process e-waste within the United States.[134] This initiative is included in this paragraph because it was formulated by CAER.

Product Stewardship Institute (PSI)

The Product Stewardship Institute is a partnership of corporate and non-corporate entities, as well as governments and educational institutes. PSI was founded in 2000 and wants to encourage and create regulations that let firms take responsibility over their own products. Product stewardship means that companies that create products are also responsible for their produce if consumers no longer want to use these products. Product stewardship is therefore very similar to producer responsibility. PSI has been and is involved in the creation of many producer responsibility bills and seeks to bring the public and private actors together in creating producer responsibility regulations.[135]

PSI has helped 15 states in developing EPR and product stewardship policies. These states are Colorado, Connecticut, Florida, Illinois, Iowa, Maine, Massachusetts, Michigan, Missouri, Nebraska, New York, Oklahoma, Rhode Island, Texas and Vermont. Their operations mainly consist of bringing actor groups together, providing developmental and technical support, promoting EPR regulations, and conducting research. Organizations involved in PSI are for example Amazon, U.S. Green Chamber of Commerce, Yale Center for Industrial Ecology, and the American Beverage Association.[136]

[134] S.2090, 2014; e-Cycle, 2013
[135] PSI, n.d.
[136] PSI, n.d.

The National Strategy for Electronics Stewardship (NSES)

The NSES is part of the United States Environmental Protection Agency and aims to work towards increased sustainability in the coming decade. Its members are governmental organizations, firms, NGOs and citizens. Its goals are to encourage environmentally friendly products, put the federal government in a leading position, enhance the effectiveness of e-waste management and decrease the negative consequences of the export of U.S. e-waste to developing countries[137].

NSES provides certifications to electronics recyclers that meet their standards. As mentioned before Sony is one of the companies that bases their choice for recyclers on the certifications provided by NSES. Additionally, Sony also works with e-recyclers that possess R2:2013 or e-Stewards certifications.[138]

***In summary**, all joint initiatives strive for better regulatory circumstances for the treatment of e-waste and they largely want to achieve similar things, but there are also differences. Some initiatives are led by governmental organizations, while others were clearly founded by NGOs and/or firms. Furthermore, it is important to note that some joint initiatives aim to create and influence policies, while others function more like think tanks and encourage a specific kind of improved e-waste treatment.*

Within these joint initiatives we can identify four main goals of joint e-waste regulation. (1) Extended producer responsibility that focuses on the producers of e-products, (2) an export prohibition of e-waste to guarantee the safety of products, armed forces and ultimately the people, (3) an export ban of e-waste to reduce the strain on the environment and prevent the

[137] EPA, n.d.
[138] EPA, 2015

ongoing transportation of harmful toxic materials to developing countries, and (4) improving the manufacturing processes to guarantee an environmentally friendly life cycle for e-products.

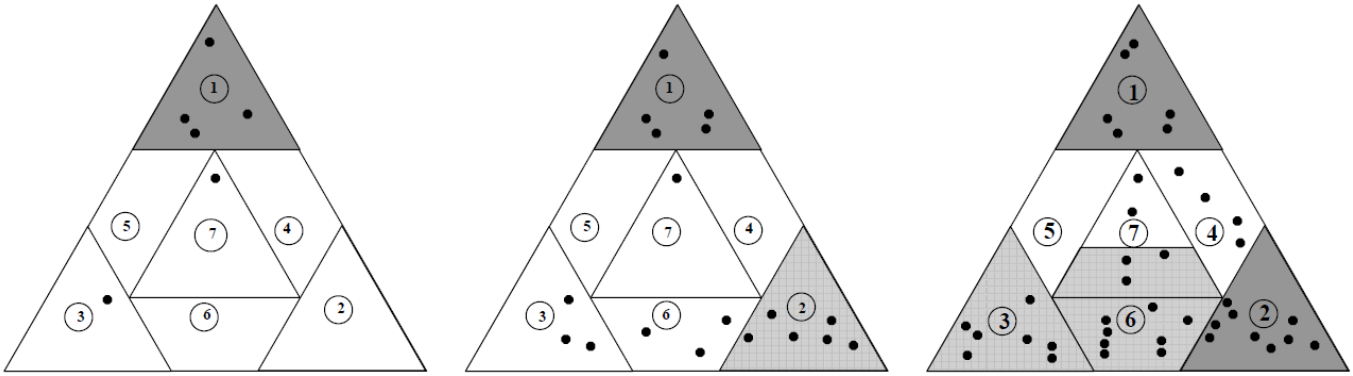
4.2 E-waste management initiatives in the US and their relation to the Governance Triangle

This paragraph relates the findings on the activities by states, firms, NGOs and joint initiatives on e-waste regulations to the theoretical framework of the Governance Triangle. The similarities and discrepancies with the schematic depiction and the evolution of the Governance Triangle will be assessed first. Subsequently there will be attention for the ANIME process and the four core competencies. Finally, bargaining power, parallel schemes, and the background role of the state in e-waste regulations will be analyzed.

Schematic depictions

First of all, the regulatory zones from figure 1 that operate within the regulatory playing field of e-waste are the unilateral regulatory zones: 1 (states), 2 (firms), and 3 (NGOs). Zones 6 (NGOs and firms), and 7 (all three actor groups) are also active within regulatory standard setting on e-waste. The only zones that are not present are zone 4, in which states and firms work together on the creation of regulations, and zone 5, in which states and NGOs work together. States implement regulations and firms have to obey them, they do not create regulations together, but they do work together in think tanks and joint initiatives with all three actor groups. Furthermore, it is important to repeat that the Governance Triangle is focused on transnational regulations. Due to the high level of regulatory independence of states, especially on e-waste, it is possible to use this framework in the US, but the federal government is also situated in zone 1.

If we look at the evolution of the Governance Triangle in figures 2a-c it is interesting to see that regulatory standard setting on e-waste in the US predominantly occurs according to figure 2c. This means the analysis by Abbott & Snidal (2008) was mostly right. It tells us that the regulatory situation of e-waste in the US is congruent with their prediction and that the assumptions of actor group behavior are accurate. Most regulation occurs because states implement it or because firms resort to self-regulation (zones 1 and 2). NGOs are active in establishing regulatory standards, but often firms choose to implement a softer approach than that of NGOs (zones 3 and 2). This is also in line with the findings of Abbott & Snidal (2008). In the bottom half of regulatory zone 7, where NGOs and firms work together and states are a little bit involved too, certification standards are created and implemented. The only discrepancy with the Governance Triangle is that the density of zone 6 seems to be lower in the field of US e-waste. NGOs and firms predominantly work together in think tanks. Not so much on specific regulatory standards.



Figures 2a-c: The evolution of the Governance Triangle

ANIME and the four core competencies

The regulatory process called ANIME consists of the five stages one has to go through to ultimately create a regulatory standard: Agenda setting, Negotiation, Implementation, Monitoring and Enforcing. Table 1 combines the four core competencies (expertise, operational capacity, independence and representativeness) of the three actor groups within the Governance Triangle to the ANIME process. It is hard to relate this theoretical approach to the practice of e-waste management. Addressing the four core competencies requires more in-depth analysis of the three actor groups. It is, however, possible to say some relevant things about the involvement of each actor group at the ANIME stages.

At the Agenda setting stage it is mostly NGOs and States that are involved. After the federal government decided to refrain from implementing e-waste legislation and leave it to the individual US states several states added e-waste legislation to their political agenda. Furthermore, NGOs concerned with e-waste put e-waste legislation on political and corporate agendas through their advocacy and by pressuring firms. An interesting addition that surfaced during the analysis of e-waste regulations in the US was that some firms are involved in Agenda setting. Their motivation is to create a level playing field for all firms within the same industry. This encourages competitors to join, it improves the perception of their industry, and it does not cause them competitive disadvantages.

According to Abbott & Snidal (2008) the negotiation stage is a process that involves business (firms) and norms (states and NGOs). In the e-waste spectrum negotiation mostly includes all three actor groups if, for example, recycling standards are being discussed. State legislation is mostly discussed by states and sometimes NGOs. Self-regulation by firms is mostly the result of NGO pressure, but in the case of the US it can also be caused by the fact that some states have regulations which makes it easier for firms to use one policy for states with or without

regulations. The negotiation and creation of law propositions like SEERA mostly takes place in the bottom half of zone 7 where NGOs and firms negotiate with little influence of states and the federal government.

The implementation stage involves the application of regulatory standards. This is primarily done by firms. The only addition is that in some states governmental organizations are self-regulated by only using recycling firms that are R2 or e-Stewards certified. This subsequently means recycling firms are encouraged to regulate and required to implement these standards.

The monitoring stage involves all three actor groups in the Governance Triangle. In the regulatory playing field of e-waste in the US this is no different. However, if there is state legislation, firms are often required to get their policies and actions externally audited. A lot of NGOs also require firms to do this. Grading reports by the ETBC and Greenpeace were often critical about the lack of transparency in some of the larger companies.

The final stage, enforcement, is only and can only be done by states and NGOs, except for regulatory standards that are formulated, created and set by an entire industry. This is no different within regulatory standard-setting on e-waste. If states implemented legislations, they also enforce this. In other states and industries NGOs are very keen on keeping track of firms that do not comply to the required standards.

Bargaining power

To determine bargaining power an assessment of the four core competencies is needed. Since this needs a more specific and more narrow analysis it is impossible to conclude something about the practice in e-waste regulation as opposed to the theory of the Governance Triangle. Based on the meta-analysis in this exploratory research it can be said that there are no actor groups that are

necessarily weak. The federal government operates on the background and almost 50% of the states did not implement legislation. But not being involved does not mean being weak. Furthermore, NGOs exercise pressure and are involved in a lot of joint initiatives. The same counts for firms who often choose to implement their own standards to meet state and NGO requirements, but also to include their own preferences in self-regulation.

Parallel schemes

A problem mentioned in the Governance Triangle and also observed in regulatory standard setting on e-waste in the US is the existence of parallel schemes. States implement forms of legislation, that have high similarities but differ on small features. Combining regulatory schemes could possibly lead to more compliance, easier monitoring and more centralized support. Certifications like R2:2013 and e-Stewards resulting from joint initiatives have a lot of similar features but include or exclude small aspects in comparison to the other. For example, both are being used as required standards for electronics recyclers, but the R2:2013 standard does not prohibit the export of e-waste to developing countries. Firms often choose self-regulation. Their forms of self-regulation tend to look a lot alike. Working together would probably increase efficiency and reduce costs. NGOs present different regulatory requirements for manufacturers, recyclers, states, and the federal government. But also these different standards have very similar aspects. Combining them would probably increase reach, influence and awareness. Furthermore, the practice of regulatory standard setting on e-waste management in the US shows that parallel schemes do not only have to be present between unilateral regulation schemes. Joint initiatives can also form different regulatory standards that are parallel. Examples are the similarities of R2 and e-Stewards standards.

Parallel schemes are an inconvenience that generally cause lower efficiency than could be achieved if schemes would be combined. There exists, however, a lot of competition. Especially between different firms and between different NGOs. To do something about inefficiency caused by the existence of parallel schemes it is necessary for the federal government to get more involved in regulatory standard setting on e-waste.

Background role of the state

Individual US states have a foreground role when they implement legislation. Some states without legislation take a background role by endorsing certified e-recyclers, recommending specific e-waste collection programs, or providing citizens, businesses and other (governmental) organizations with advice on e-waste treatment. The federal government decided to be absent in the regulatory process of e-waste by leaving e-waste legislation to the states. Through EPA they manage to influence some aspects of certain policies, but this is very marginal. The biggest remaining issues with e-waste are the use of landfill, incinerating e-waste, and exporting e-waste to developing countries. By implementing SEERA and requiring recyclers to comply to e-Stewards standards, the federal government is able to keep regulations to a minimum, but still tackle the biggest problems of e-waste. The main difference with the Governance Triangle is that individual states sometimes do position themselves in the background, the federal government positions themselves at the very back of the background. This is not in line with the essential background role of states in the Governance Triangle.

In summary, *the observed practice of regulatory standard setting on e-waste in the United States is largely similar to the Governance Triangle. First of all, the schematic depiction and evolution of the Governance Triangle is very accurate. Additionally, it is important to analyze the four core*

competencies and bargaining power in future research to fully address the workings of the Governance Triangle in e-waste regulations in the US. As mentioned in the Governance Triangle, parallel schemes are also a problem in regulatory standard setting on e-waste. It can be solved, but until now the federal government did not take the essential background role as described and expected within the Governance Triangle. Main differences are that zone 6 is less dense in the practice of e-waste regulations and that e-waste RSS schemes also feature parallel schemes between different joint initiatives.

5. CONCLUSION AND FUTURE RESEARCH

This study aimed to provide an insight in the regulatory playing field of e-waste in the United States and to present a practical assessment of the Governance Triangle on e-waste regulations within the US. During the evolving process of gaining knowledge on the regulatory playing field in the United States it became clear that (federal) government legislation and regulation is not the only, and not necessarily the best, solution for regulatory standard setting on e-waste in the US. Next to regulatory (in)activities of individual states and the federal government, firms, and NGOs and joint initiatives are important actors within the regulatory playing field.

The federal government decided to refrain from implementing e-waste legislation and throughout the years approximately 50% of the US states decided to implement legislation themselves. These legislations have different characteristics and different levels of regulatory impact. Currently, the federal government is processing SEERA, a law preventing the export of e-waste to developing countries. NGOs are involved in three activities: policy pressure, advocacy and advice. Their main goals depend on their mission and their relation to other actors. The actor group of firms within regulatory standard setting on e-waste has three main categories: manufacturers, recyclers, and retailers. These firms implement self-regulation or are subject to

state legislations. Joint initiatives are generally focused on improving regulatory circumstances. Their specific goals can, however, be different from each other. Some want to create and influence policy, some operate like think tanks, and some encourage a specific way of treating e-waste. Recycling standards like e-Stewards and R2:2013 originate from joint initiatives.

In conclusion, the regulatory playing field of the US involves individual US states, NGOs, and firms. The federal government is not involved, except through EPA. The biggest problems with e-waste remain the use of landfill, incinerating e-waste, and exporting it to developing countries. Even though individual states are involved in the regulatory process, and firms, NGOs and joint initiatives add their value too, the federal government is vital in really establishing change in the field of e-waste. In combination with R2:2013 and e-Stewards standards it is necessary for the federal government to implement SEERA and prohibit the export of e-waste. Large manufacturers can use recyclers that comply to aforementioned standards, but there still remains a large group of recyclers who do not comply. Federal law can change this. A ban on landfill and incinerating e-waste can be solved in a law too, but the federal government can also fulfill its background role, endorse firms that ban both ways of treating e-waste, and encourage change without implementing legislation.

The Governance Triangle was the theoretical framework for assessing the regulatory environment of e-waste in the US. It turned out that, even though US e-waste regulation is not a transnational process, the theory supporting the Governance Triangle was very accurate. The schematic depiction and evolution of the Governance Triangle were almost completely similar. The main difference is that zone 6, collaborations purely between NGOs and firms, is not as actively present within the regulatory process concerning e-waste in the US as it is in the Governance Triangle focused on regulatory processes in general. Furthermore, it is striking that the existence of parallel schemes and its inherent inefficiency is as much present in US e-waste

regulations as it is in the Governance Triangle. Additionally, the main conclusion of this thesis remains that it is essential for the federal government to fulfill its background role as an orchestrator on the matter of e-waste regulation. The Governance Triangle indicates its importance and the lack of regulatory decisiveness in the US also requires more federal involvement. The lack of involvement in regulatory standard setting at the federal level prevents the implementation of responsible e-waste recycling throughout the United States.

Future research

An exploratory study like this has the positive externality that it provides a lot of recommendations for future research. Suggestions for future research are actually some of the most important results of exploratory studies. A lot of aspects of regulatory standard setting on e-waste became clear, but there are also lot of aspects that need more elaboration. The below questions are examples related to such aspects.

- Self-regulation of firms is an interesting study object. A lot of large manufacturers, recyclers and retailers implemented self-regulation. It is, however, questionable if they did so because of NGO pressure, because they are intrinsically motivated, or because of e-waste legislations in other states. The latter could cause firms to implement the same standards required in regulated states for their activities in non-regulated states.
- Electronics recyclers also need more further study. Some are R2:2013 certified, some are e-Stewards certified, and some are ISO 14001 certified. Then there are also a lot, mostly small, recycling companies that have no certification. What encourages recyclers to comply to certification standards? And what is the main difference between smaller and larger recyclers?

- Recyclers and manufacturers are mostly certified based on R2:2013, e-Stewards and ISO 14001 standards. This is done by third party organizations. Not by the firms themselves and not by the organizations that created these standards. It would be interesting to know more about these third party organizations.
- To stay in the recycling industry: R2:2013 does not prevent e-waste from being exported to developing countries. This makes it a less environmentally responsible standard than, for example, e-Stewards. Why did SERI not include this in their standards and why is R2:2013 considered to be a proper standard?
- The appendix includes a small and arbitrary analysis of the implementation of e-waste legislation and politics. It indicates that Republican states implement a significantly lower amount of e-waste legislation than Democratic states. What is the relationship between political preference and e-waste legislation?
- In several states it is still possible to dump e-waste in landfill or to incinerate it. These are the most polluting ways of treating e-waste. What are the reasons that certain states and/or local governments still use these methods?
- This study mostly focused on the activities of large firms in regulatory standard setting in the field of e-waste. However, there is more in-depth analysis needed to analyze the activities of smaller firms. How do small firms behave differently in the field of e-waste treatment as opposed to larger firms?
- The Governance Triangle provided the theoretical framework to analyze the regulatory situation on e-waste in the US on a meta-level. This study would be limitless if all actors within all actor groups were involved in the analysis. Nevertheless, it is still relevant to conduct studies that explore the activities of actors within the separate actor groups. One

study completely focused on NGOs would yield a lot more information on the mechanisms and motivations, than this broader study.

- This study had to base large parts of its analysis on policy papers and websites created by firms, NGOs and states. It is, however, unclear what actually happens and gets done. Therefore, it would add a lot of knowledge to conduct a critical analysis of what states, firms, and NGOs want to achieve, claim to achieve, and what they actually achieve. This is similar to reports by Greenpeace and the ETBC. However, they have not updated their reports in the past 4 years or longer.
- One of the most interesting suggestions for future research is what happened in Virginia. The state of Virginia used to have a landfill ban for e-waste. In 2016 that law got amended and changed into this: counties are obliged to dump e-waste in landfills unless they can prove there are more cost efficient ways of treating e-waste.
- In addition to the suggestion for a more thorough study of the Virginia landfill ban, it is interesting to assess the importance of financial considerations. When are norms more important than the financial aspect? When is environmental responsibility more important than cost efficiency?
- The state of Utah has no typical kind of e-waste legislation. They are focused on educating on e-waste and recommending responsible ways of treating e-waste. Can the form of e-waste legislation in Utah be an option for states that are reluctant to implement "real" e-waste legislation?

6. DISCUSSION

This paragraph is meant to discuss the strengths and limitations of this exploratory study. Furthermore, this section addresses the societal and scientific relevance. In general, the study provides a comprehensive overview of the regulatory playing field of e-waste treatment in the US. Its biggest limitation is that there is much more to learn on a more detailed level, but that was also not what this study was meant for. Its scientific relevance is mostly that it provides many keystones for future research and it shows that the Governance Triangle is also applicable to regulatory processes in the US. The societal relevance is mostly that it addresses a worldwide issue that can potentially harm a lot of global, as well as US, citizens.

Strenghts

This thesis managed to achieve what it promised to do. The Governance Triangle was elaborated on in a very thorough way, just as on the most important elements of the regulatory behavior from and within the three actor groups. This made cross-case comparison possible and provided decent analyses to be related to the Governance Triangle. Additionally, it provided several suggestions and many more guidelines for future research. Furthermore, in the very complete and thorough scientific landscape, it is important to conduct a study that has unique features. The combination of e-waste regulations and the governance triangle is unique and provides interesting insights in the Governance Triangle as well as in the regulatory process for e-waste treatment. Subsequently, the contemporary character of this study makes it a highly applicable piece for scholars, NGOs, firms and governmental organizations. Finally, this study is generalizable and provides meta insights, but it also discusses several cases that offer specific insights.

Limitations

The contemporary character of this study is both a strength and a limitation. Due to the fact that firms, NGOs and governmental organizations are continuously busy with e-waste regulations this study might be outdated soon. Nevertheless, it will always offer interesting insights in the workings of the Governance Triangle. Additionally, it is quite bold to generalize based on 6 to 8 cases for each actor group, even though it is a very appropriate sample. Unlimited sampling would lead to more specific information, but it would also lead to an enormous study. Furthermore, the exploratory character of this study required to use unconventional sources like laws, bills, acts, policy papers, and official websites of governmental organizations, firms, NGOs, joint initiatives and the federal government. Due to this, the amount of scientific sources in the analysis of the regulatory playing field is very low, but that is unavoidable. Finally, the theoretical framework of the Governance Triangle could only be based on one source and it was hard to assess more qualitative aspects of the Governance Triangle like the four core competencies. This requires more specific research.

Societal relevance

The societal relevance is that this study has attention for environmental issues and the increased problem of e-waste, predominantly in the US. The findings can possibly raise awareness for the consequences of bad e-waste treatment and lead to future improvements. Furthermore, this study suggests increased federal involvement in e-waste regulations and the implementation of SEERA to reduce the hazard of counterfeit products. The implementation of this law will increase the safety of the US armed forces and that of US citizens.

Scientific relevance

The biggest reason why this study is scientifically relevant is because it managed to construct a comprehensive overview of the regulatory process on e-waste treatment in the US. Additionally, it provides a lot of suggestions and knowledge for future research by other scholars. Furthermore, it relates the regulatory overview to the Governance Triangle. This shows that the Governance Triangle is also applicable to regulatory processes in the US and that its main elements are also present in practice.

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7. APPENDIX – State legislations

The 26 states (10R/16D) with e-waste legislation are California (D), Connecticut (D), District of Columbia (D), Hawaii (D), Illinois (D), Indiana (R), Maine (R), Maryland (D), Michigan (R), Minnesota (D), Missouri (R), New Jersey (D), New York (D), North Carolina (R), Oklahoma (R), Oregon (D), Pennsylvania (D), Rhode Island (D), South Carolina (R), Texas (R), Utah (R), Vermont (D), Virginia (D), Washington (D), West Virginia (R), and Wisconsin (D).

The 25 states (20R/5D) without legislation are Alabama (R), Alaska (R), Arizona (R), Arkansas (R), Colorado (D), Delaware (D), Florida (R), Georgia (R), Idaho (R), Iowa (R), Kansas (R), Kentucky (R), Louisiana (R), Massachusetts (D), Mississippi (R), Montana (R), Nebraska (R), Nevada (D), New Hampshire (R), New Mexico (D), North Dakota (R), Ohio (R), South Dakota (R), Tennessee (R), and Wyoming (R).

The added letters R and D indicate the political direction states tend to go over the recent decades in federal as well as state elections. This is an arbitrary measurement and does not aim to conclude anything about e-waste lawmaking and political preference. Nevertheless, it is interesting to look at. Table 2 provides a schematic depiction. Of all 51 states 30 (59%) tend to vote Republican and 21 (41%) tend to vote Democrat. Of all 51 states 26 (51%) have e-waste legislation and 25 (49%) do not. Of all 30 Republican states, 20 (67%) have no e-waste legislation and 10 (33%) do. Of all 21 Democrat states, 5 (24%) have no legislation and 16 (76%) do. Of all 26 states that have e-waste legislation, 16 (62%) are Democrat and 10 (38%) are Republican. Of all 25 states that do not have e-waste legislation, 5 (20%) are Democrat and 20 (80%) are Republican.

		State E-Waste Legislation		
		Yes	No	
Political preference	R	10 (33%) (38%)	20 (67%) (80%)	30 (59%)
	D	16 (76%) (62%)	5 (24%) (20%)	21 (41%)
		26 (51%)	25 (49%)	51 (100%)

Table 2: State E-Waste Legislation and political preference

1. AL – Alabama

The state of Alabama has no regulation on e-waste. Alabama also does not provide firms and consumers with information on how to treat e-waste.[139]

2. AK – Alaska

Alaska has no regulation on e-waste. Alaska also does not provide firms and consumers with information on how to treat e-waste.[140]

3. AZ – Arizona

The state of Arizona has regulation on e-waste that focuses on extended producer responsibility. Producers are obliged to take part in a statewide program for e-waste collection. It only counts for large electronic products and for example does not cover mobile phones. The category of this

[139] ERCC, n.d.; ENVCAP, n.d.
[140] ERCC, n.d.; ENVCAP, n.d.

form of extended producer responsibility is the performance mandate. Firms need to take back a percentage of their total produce.[141]

4. AR – Arkansas

Arkansas has no regulation on e-waste. They do, however, provide firms and consumers with information on how to treat their e-waste properly. They forward them to e-waste recyclers that operate within the state.[142]

5. CA – California

The state of California has regulation on e-waste. California was the first state to ever implement e-waste regulations. Their policy consists of a fee that is paid by consumers and which will be transferred to a statewide e-waste recovery and recycling fund. This policy is supported by a reimbursement system, recyclers and collectors receive money for their activities, and a disposal ban.[143]

6. CO – Colorado

Colorado has no regulation on e-waste. They do provide consumers, firms, local governments and landfill operators with information on how to treat their e-waste. Their website provides others with a list of recyclers including the certifications they do or do not possess.[144]

[141] HB 2614, 2010
[142] ADEQ, n.d.
[143] SB-20, 2004; DTSC, n.d.
[144] CDPHE, n.d.

7. CT – Connecticut

The state of Connecticut has regulation on e-waste. Manufacturers need to comply to a mandatory recycling program financed by their return share. It provides recycling for consumers who bring 7 items or less to collection points. This type of extended producer responsibility fits in the category of convenience mandate. Firms are coerced to make it possible for consumers to drop off their waste.[145]

8. DC - District of Columbia

Manufacturers of e-products have to pay an annual registration fee and they have to pay a fine if collection rates are not met. They can either arrange recycling individually or collectively, as long as they meet their standards based on weight. Manufacturers are obliged to use recyclers that operate according to recycling certifications that are approved by the Mayor.[146] These are certifications like R2, e-Stewards or NSES.

9. DE – Delaware

The state of Delaware has no regulation on e-waste. They do offer citizens and businesses the opportunity to drop off their electronic goods at the Delaware Recycling Center against a set fee of $0,15 per pound and a minimal fee of $10. The DSWA, Delaware Solid Waste Authority, works with ReCommunity Recycling to treat e-waste. It is not clear if ReCommunity works according to certified standards.[147] ReCommunity is not a member of the Coalition for American Electronics Recycling.[148]

[145] PA 07-189, 2007
[146] D.C., n.d.; ERCC, n.d.
[147] DSWA, n.d.
[148] CAER, n.d.

10. FL – Florida

Florida has no regulation on e-waste. They do, however, offer several webpages that include helpful information for citizens and businesses to responsibly recycle their electronic waste. The state of Florida recommends using a recycler that is officially certified.[149]

11.GA – Georgia

Georgia has no regulation on e-waste. Georgia also does not provide consumers and firms with information on how to treat their e-waste.

12. HI – Hawaii

The state of Hawaii has regulation on e-waste. Manufacturers of covered electronic devices (CEDs) need to pay an annual fee of $5,000 and implement recycling plans. This is an example of EPR but it does not necessarily mean that companies have to act according to a convenience mandate or a performance mandate. A recycling plan can be to provide consumers with options to hand in their e-waste at locations of certified e-recyclers, or to process at least a set percentage of the produced goods in the previous year.[150]

13. ID – Idaho

The state of Idaho has no regulation on e-waste. However, they do provide consumers and businesses with information on how to treat their e-waste. They offer the options reuse, donate,

[149] DEP, n.d.
[150] SB-2843, 2008; ENVCAP

recycle, and dispose. Fortunately, the 'dispose' option is not encouraged, but unfortunately the state of Idaho does not tell its constituents to look for certified recyclers.[151]

14. IL – Illinois

Illinois has regulation on e-waste. Manufacturers of e-products are required to finance and implement a recycling program to accept e-waste from consumers.[152] This is an example of the convenience mandate. Manufacturers are obliged to provide their consumers with locations where they can drop off their products.

15. IN – Indiana

The state of Indiana has regulation on e-waste. In the first year of the program manufacturers need to recycle 60% of the weight of their produced e-products. In the second year 80%. If these companies fail to reach that goal after two years they need to pay an additional fee for every pound less than that 80%. Manufacturers and collectors need to be registered with the state department and furthermore an e-waste disposal ban is in place. This form of EPR is the performance mandate. Manufacturers need to achieve a certain goal in order to prevent getting penalized.[153]

[151] Idaho DEQ, n.d.
[152] SB2313, 2008
[153] HEA1589, 2009; ENVCAP

16. IA – Iowa

Iowa has no regulation on e-waste. The state does, however, provide consumers and businesses with information on the importance of treating e-waste. Their website contains a list of certified recyclers.[154]

17. KS – Kansas

The state of Kansas has no regulation on e-waste. The state does provide consumers and business with information on the importance of properly treating e-waste. Furthermore, they provide a list of permitted recyclers and they give grants to people and/or organizations that want to organize an e-waste collection program in their county.[155]

18. KY – Kentucky

Kentucky has no regulation on e-waste. There is a regulation in the process of being denied or accepted. This law has the following characteristics. Producers of e-products need to register with the Department for Environmental Protection, pay a registration fee and implement a recycling program. Furthermore, there is a ban of e-waste in landfill.[156]

19. LA – Louisiana

The state of Louisiana has no regulation on e-waste. Louisiana does encourage consumers and businesses to use the services of certified electronics, but they do not promote using any specific recycler. Furthermore, they offer citizens a list with other options than buying a new product and

[154] DNR, n.d.; ENVCAP
[155] Kansas E-Waste, n.d.; ENVCAP
[156] Kentucky Legislature, SB160, 2017

disposing of the old one. They also refer to recycling pages of big electronics producers like LG, Apple and HP.[157]

20. ME – Maine

Maine has regulation on e-waste. Manufacturers, consumers and municipalities share responsibility. Manufacturers need to provide municipalities with consolidation centers for e-waste. Furthermore, manufacturers pay for shipping and recycling and they pay a fee for the amount of e-products they produce. This is an example of an EPR scheme according to the convenience mandate.[158]

Maine prohibits companies that do not comply to their e-waste law from selling their product in Maine. Their e-waste webpage provides a list of products that do not fit their standards.[159] It is striking that their list does not include any products of large multinationals. As seen in the analysis of e-waste management initiatives and the way it is related to the Governance Triangle, these companies experience more pressure from NGOs than smaller ones. It also indicates the importance of state regulation and enforcement to also coerce smaller firms in treating e-waste properly.

21. MD – Maryland

The state of Maryland has regulation on e-waste. Manufacturers need to register with the department of the environment, provide counties with collection systems and submit an MDE-approved take back plan. Maryland does not necessarily require recyclers to comply to R2:2013

[157] Lousiana DEQ, n.d.; ENVCAP
[158] LD 1156, 2009; ENVCAP
[159] Maine DEP, n.d.

or e-Stewards standards. Not complying to Maryland's standards leads to a civil penalty of $10,000 and an administrative penalty of $10,000 for each violation with a limit of $100,000.[160]

22. MA – Massachusetts

Massachusetts has no regulation on e-waste. Massachusetts' e-recycling webpage advises consumers to donate their e-products, sell or give them to companies or make use of public initiatives. The Executive Office of Energy and Environmental Affairs also refers citizens to companies that implemented thorough e-waste collection systems. Some of these companies can be found in paragraph 4.1.3.[161]

23. MI – Michigan

The state of Michigan has regulation on e-waste. Manufacturers are required to pay an annual registration tax of at least $2,000 and they are required to establish a program for taking back used e-products. Firms are required to make it convenient for customers to dispose of their e-waste. Therefore, this is an example of the convenience mandate. Recyclers are required to be certified according to a standard that at least include the ISO 14001 requirements.[162]

24. MN – Minnesota

Minnesota has regulation on e-waste. Manufacturers must register, pay a fee and recycle a set percentage of e-waste. This is an example of the performance mandate strategy. Firms must achieve set goals. They need to report their results annually. The recyclers they can cooperate with in achieving their goals must behave according to certifications of third parties like e-

[160] HB488, 2007; MDE, n.d.
[161] Massachusetts Energy and Environmental Affairs, n.d.; ENVCAP
[162] ERCC, n.d.; House Fiscal Agency, Michigan, 2008; Kane, Lindquist & Peterson, 2008

Stewards and R2:2013. Other recyclers cause a manufacturer to be fined in the same way as Maryland.[163]

25. MS – Mississippi

The state of Mississippi has no regulation on e-waste. Nevertheless, Mississippi is active in educating its citizens and businesses and helping them to responsibly treat their e-waste. They offer comprehensive lists of the actions people can take and which recyclers are R2:2013 or e-Stewards certified. Mississippi did pass a law that requires all state agencies to only use certified recyclers.[164]

26. MO – Missouri

Missouri has regulation on e-waste. Before producing computers, manufacturers are obliged to provide the state department with recovery plans for their products. Furthermore, it must be clearly visible who produced the products.[165] The state of Missouri supports its citizens and businesses through the E-cycle Missouri program designed by a multi-stakeholder group. Missouri provides its constituents with a list of recyclers and to what extent they meet certain requirements. Only e-recyclers on the fourth level of their requirement standards need to be officially certified according to R2:2013 or e-Stewards standards.[166]

[163] Minnesota Statutes, 2016
[164] Mississippi DEQ, n.d.
[165] ERCC, n.d.
[166] e-Cycle Missouri, n.d

27. MT – Montana

The state of Montana has no regulation on e-waste. Their e-waste and e-recycling webpage does provide information on the potential harm it can bring to the environment. They also pay attention to the consequences of exporting e-waste and disposing it in landfill, and they acknowledge the importance of tackling the e-waste problem. Due to the lack of reliable recycling companies in the State of Montana they do not believe it is helpful to implement legislation at this moment.[167]

28. NE – Nebraska

Nebraska has no regulation on e-waste and does not provide its citizens, businesses and (governmental) organizations with information on how to treat e-waste responsibly.[168]

29. NV – Nevada

The state of Nevada has no regulation on e-waste. The Nevada e-waste and e-recycling page does offer citizens and firms with information on why and how to treat their e-waste. They suggest donation, buy-back programs, visiting retailers like Best Buy, or sending products back to firms if they offer a program. Companies like Dell and LG provide this service. Furthermore, their webpage provides a list of recyclers that are certified according to R2 or e-Stewards standards.[169]

30. NH - New Hampshire

The state of New Hampshire has no regulation on e-waste. The website of their Department of Environmental does discuss e-waste and the importance of treating it well. However, they do not

[167] Montana DEQ, n.d.; ENVCAP
[168] ERCC, n.d., ENVCAP, n.d.
[169] Nevada Recycles, n.d.

offer any guidelines or endorse recyclers that are either R2 or e-Stewards certified. They do refer to websites of recycling initiatives by EPA, NEPSI, or NERC.[170]

31. NJ - New Jersey

New Jersey has regulation on e-waste. Firms have to pay an annual registration fee of $5,000 and implement a recycling system for obsolete electronic products. This is an example of the convenience mandate. Firms need to enable their customers to dispose of their electronic products. New Jersey obliges firms to have their products recycled in a responsible way. This means it has to be in compliance with state regulations and that products cannot be exported.[171]

32. NM - New Mexico

The state of New Mexico has no regulation on e-waste. New Mexico also does not provide firms and citizens with information on how to treat their e-waste. They forward visitors to the EPA.gov website.[172]

33. NY - New York

New York has regulation on e-waste. A statewide disposal ban prevents every citizen, firm and organization of getting rid of e-waste in any environmentally unfriendly way. Firms that produce e-products are required to pay an annual registration fee, make recycling convenient for their customers and to submit a recycling plan. It depends on the company size what the annual costs

[170] New Hampshire DES, n.d.
[171] A3572, 2008; New Jersey DEP, n.d.
[172] New Mexico ED, n.d.

are. New York State, however, does not require their recyclers to act according to R2 and e-Stewards standards. Although this is encouraged.[173]

34. NC - North Carolina

The state of North Carolina has regulation on e-waste. Their law requires producers of e-products to pay for the recycling costs, implement a recycling plan, or recollect at least a set percentage of their products. This is a hybrid form of the performance and convenience mandate. Firms can basically choose. There are no guidelines for specific recyclers, but landfill is banned.[174]

35. ND - North Dakota

North Dakota has no regulation on e-waste. They do encourage treating e-waste properly and they provide voluntary programs for recycling e-waste. North Dakota does not endorse any type of recycler or recycling standard.[175]

36. OH – Ohio

The state of Ohio has no regulation on e-waste. Ohio does provide citizens and business with information on e-waste and a list of e-recyclers. The list contains information on certifications, but Ohio does not endorse specific recyclers. Their website also contains other ways of disposing of e-waste.[176]

[173] ENVCAP, n.d.; ERCC, n.d.; New York DEC, n.d.
[174] SB 1492, 2007
[175] North Dakota DOH, n.d.; ENVCAP, n.d.; ERCC, n.d.
[176] Ohio EPA, n.d.

37. OK – Oklahoma

Oklahoma has regulation on e-waste. They use the convenience mandate approach and require manufacturers to implement a decent recycling program. Customers need to be aware of where to bring their electronic products and how to dispose of them. Oklahoma does not necessarily require recyclers to operate by R2 or e-Stewards standards.[177]

38. OR – Oregon

The state of Oregon has regulation on e-waste. Firms pay a centralized organization that arranges the recycling process. Additionally, they are obliged to recycle a set amount of e-waste. Furthermore, firms need to properly show they are the producers of a product. Recycling firms need to adhere to ISO 14001 standards or similar.[178]

39. PA – Pennsylvania

Pennsylvania has regulation on e-waste. Firms that produce e-products need to create a statewide recycling program. Individual firms need to establish a program for their specific products. Furthermore, consumers need to be informed about how and where to dispose their products. Landfills are banned as locations for e-waste. Pennsylvania does not oblige firms to use R2 or e-Stewards certified e-recyclers, but they do provide lists of recyclers that operate accordingly.[179]

40. RI - Rhode Island

The state of Rhode Island has regulation on e-waste. Rhode Island requires firms to implement their own take-back program or to take part in the take-back program organized by the state.

[177] Oklahoma DEQ, n.d.; ENVCAP, n.d.; ERCC, n.d.
[178] ERCC, n.d.; Oregon DEQ, n.d.
[179] ERCC, n.d.; ENVCAP, n.d.; Pennsylvania DEP, n.d.

Firms are obliged to pay an annual registration fee of €5,000 and will be penalized if they not comply to the state's standards. Recyclers have to meet at least the standards of the R2:2013 certification.[180]

41. SC - South Carolina

South Carolina has regulation on e-waste. Their initial law banned e-waste from landfills. After revising this initial law more requirements for firms were added. Residents are obliged to dispose of their e-waste at recycling locations. The state offers them three options: take-back programs, drop-off at retailers like Best Buy and Walmart, or state collection programs. Businesses are encouraged to recycle or donate their products.[181]

42. SD - South Dakota

The state of South Dakota has no regulation on e-waste. South Dakota also does not provide information on e-waste. They do include a list on their Electronics Recyclers webpage, but do not endorse any of them.[182]

43. TN – Tennessee

Tennessee has no regulation on e-waste. The website of the Tennessee Department of Environment & Conservation does not have any form of information on the treatment of e-waste.[183]

[180] State of Rhode Island and Providence Plantations, 2013; ERCC, n.d.
[181] ERCC, n.d.;
[182] South Dakota DENR, n.d.
[183] Tennessee DEC, n.d.

44. TX – Texas

The state of Texas has regulation on e-waste. Producers are required to offer consumers a free take-back program. Firms need to get their own program approved or they need to prove that they take part in a joint collection program. Texas does not require recyclers to adhere to R2 or e-Stewards certification standards.[184]

45. UT – Utah

Utah has regulation on e-waste. However, their way of regulating it is much different than that of other states. They do not require firms to recycle their products, but they do require them to (1) educate, (2) provide information on recycling location, and (3) write a report on their recycling efforts every year. The main result from this unorthodox way of implementing e-waste legislation is a significant increase in recycling initiatives and efforts by manufacturers. Even though this resulted in several drop-off locations, there are still places that are not equipped with decent e-waste collection systems.[185]

46. VT – Vermont

The state of Vermont has regulation on e-waste. Disposing electronics products in landfill is prohibited and the state offers recycling programs for free. Firms are required to pay an annual registration fee and quarterly implementation fees. Recyclers need to be R2 or e-Stewards certified.[186]

[184] Texas CEQ, n.d.; ERCC
[185] ERCC, n.d.; Utah DEQ, n.d.
[186] ERCC, n.d.; Vermont DEC, n.d.

47. VA – Virginia

Virginia has regulation on e-waste. Firms need to provide consumers with a free recycling program and they need to make it visibly clear that they are the producers of a certain product. Virginia requires recyclers to work according to R2 or e-Stewards standards.[187]

48. WA – Washington

The state of Washington has regulation on e-waste. They created an extended producer responsibility program that enables citizens, businesses and other (governmental) organizations to recycle their e-waste free of charge. Manufacturers must pay an annual registration fee, recycle a set amount of e-waste and will be fined if they fail to comply. Washington state requires recyclers and processors to act according to R2 guidelines.[188]

49. WV - West Virginia

West Virginia has regulation on e-waste. Like many other states mentioned before West Virginia implemented legislation focused on annual registration fees and the creation of electronics take back programs. The money that results from this grants counties and cities in West Virginia the possibility to create and implement recycling programs. Consumers must be made aware of these options. In 2016 West Virginia repealed the landfill ban. Counties can only use other ways of recycling if they are proven to be more cost efficient.[189]

[187] Virginia DEQ, n.d.; ERCC, n.d.
[188] ERCC, n.d.; Washington DE, n.d.; Washington State EPRP, 2007
[189] ERCC, n.d.; West Virginia DEP, n.d.

50. WI – Wisconsin

The state of Wisconsin has regulation on e-waste. Firms have to meet set percentages of what their produced the previous year. Recycling is meant to be free for citizens, businesses and schools, but some recyclers still request a recycling fee. Collectors receive products from citizens, businesses and schools and need to be registered with Wisconsin E-Cycle. If a recycler only takes products from businesses it is not necessary to register with Wisconsin E-Cycle. Working according to R2:2013 standards or e-Stewards standards is not obliged.[190]

51. WY – Wyoming

Wyoming has no regulation on e-waste. The website of the Wyoming Department of Environmental Quality also does not provide any information on treating e-waste.[191]

[190] ERCC, n.d.; E-Cycle Wisconsin, n.d.
[191] Wyoming DEQ, n.d.