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FROM RISK TO RESOURCE? E-WASTE MANAGEMENT AND THE CONCEPT OF CIRCULAR ECONOMY**

Abstract. *This paper investigates some ways in which risks concerning electronic waste (e-waste) are done and undone in relation to the concept of circular economy. In doing so, it points to the performative character of risk along with the power relations and subsequent processes of normalisation that underlie these processes of doings and undoings. The findings suggest that e-waste is assumed to pose risk when treated outside the EU, while it is largely understood as a resource when treated within the EU or Western countries. Here, difference is created as e-waste is subjected to spatial transfers, in this case (global) trade.*

Keywords: *risk, circular economy, e-waste, resources, global trade*

Introduction

This paper investigates some ways in which risks concerning electronic waste[1] (e-waste) are *done* and *undone* in relation to the concept of circular economy. In doing so, it points to the performative character of risk along with the power relations and subsequent processes of normalisation that underlie these processes of doings and undoings (Nygren and Olofsson, 2014; Montelius and Nygren, 2014). E-waste is distinct from other types of waste because it contains complex material compositions: both hazardous components such as mercury, beryllium and brominated flame retardants, *and* valuable materials and metals like gold and copper. Using the wording of Kärg Kama (2015), Waste Electrical and Electronic Equipment (WEEE) adheres to both the *logic of hazard* and the *logic of resource*. This article argues that the inherent ambiguity of e-waste as being hazardous *and/or*

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[1] *While batteries are not necessarily part of electrical and electronic equipment, we chose to also include batteries in our study as they are classified as hazardous waste at the same time as they also contain valuable materials and substances.*

a resource is intimately linked to and helps affect global trade patterns in which both waste and money are seen as global fluids (Fagan, 2002; Urry, 2005). The status of e-waste as a risk and/or as a resource then is (also) spatially contingent. Put differently, waste is "a global fluid, with risk and profitability associated with its movement [...]" (Fagan, 2002: 12). In relation to the concept of circular economy that currently pervades the European Union's waste-management policies (Hollins et al., 2017), the suggestion is that e-waste assumes a dual status as a risk and/or resource since its movements are subject to regulatory measures and moral concerns.

Previous research

Recent studies have considered the spatialities of waste, be it in relation to rituals of purification (Douglas, 1966), consumer activities (Hetherington, 2004), global trade patterns (Lepawsky and McNabb, 2010; Moore, 2012), or EU policies (Gregson et al., 2015; Kama, 2015). In doing so, they have shown the status of waste (as waste or as valuable) is subjected to transformation by being transferred between different spatial settings. In particular, the four latter studies also view risk as a factor that determines the ways in which waste is transferred. When considering the relationship between risk and spatiality, two studies should be mentioned: the commentary by Valeri November (2008) where she discusses the spatial dynamics of risk, and the anthology *The spatial dimension of risk*, edited by Detlef Müller-Mahn (2013). November (2008: 1523) convincingly argues that "the spatial dynamics of risk must be taken into account if we are to achieve a comprehensive understanding of risk". This implies a more detailed understanding of the ways in which risk also serves to transform spaces. Put differently, "space influences the implications of risk just as risks affect and alter spaces themselves" (November 2008: 1526). In a similar vein, Müller-Mahn (2013) contends that space plays an important role in what is regarded as a risk. By introducing the term *riskscape* "to indicate how individual actors and social groups develop personal visions of risk and translate them into spatial settings", Müller-Mahn (2013: xviii) also calls for understanding how space and risk interact. Not only does space serve as a framework for different kinds of risks; risk also actively transforms landscapes into riskscapes.

Theoretical framework

In order to reinforce the connection between waste and risk with respect to spatiality, this article draws on two theoretical approaches: *the doings and undoings of risk* (Nygren and Olofsson, 2014; Montelius and Nygren, 2014) along with money and waste as *global fluids* (Urry, 2005; Fagan,

2002). While these two approaches do not come from the same academic field, they complement each other by supporting the arguments made in this article, albeit from different angles. The initial sifting of the notion of risk through the lens of doing and undoing helps understand the altering status of e-waste as a risk and/or resource because it is subjected to international trade patterns. This, in turn, paves the way for Honor Fagan's understanding of both money and waste as global fluids. Within current capitalist systems, waste is seen ever more as a resource, specifically in relation to the concept of circular economy. We will return to the concept of circular economy later, but for now it is worth noting that amid all the current free market hype (eagerly pampered by the neoliberal discourse) waste as a global fluid is the subject of regulations on a policy level but, perhaps more notably, from a business perspective. Since waste is marketised, thus commodified and intimately linked to market fluctuations, the regulation of waste as a global fluid partly determines the fluidity of money. Hence, while e-waste is (conceived as) a resource, this particular waste fraction is neither sold at *any* price nor to *any*one. As will be shown, many of our informants held concerns regarding the risks (environmental risks as well as risks to human health) that e-waste is assumed to pose *when treated outside the EU*, while also largely understanding e-waste as a resource *when treated within the EU or within Western countries*. Here, the difference arises because e-waste is subjected to a spatial transfer; in this case, international trade.

In promoting understanding of the doings and undoings of risk, Katarina Giritli Nygren and Anna Olofsson along with Elin Montelius and Katarina Girtili Nygren draw on earlier work by Judith Butler, Pierre Bourdieu and Beverly Skeggs to demonstrate the performative aspects of risk. These authors suggest that risk is always *done* in relation to something else, and the practices of defining something as risky imply continuous power struggles. Acknowledging the doings and undoings of risk also takes "the position of the speaker into account" (Montelius and Nygren, 2014: 433). Given the purposes of this article, we note the doings and undoings of e-waste as a risk and/or as a resource is decisive for its movements. Since e-waste is part of international trade, it constitutes what Urry and Fagan would refer to as global fluids. Yet these global fluids are,as Fagan notes, subjected to governance. This is certainly evident given that our informants engaged in what we choose to refer to as the doing of e-waste as a risk and/or resource.

Turning to money and waste as global fluids, both "pose the issue of regulation in a global economy where the dominant discourse is deregulatory and in favour of 'free market' operations" (Fagan, 2002: no page). Introducing the three social topographies of space, of which global fluids constitute one part, Urry aims to investigate the complexity of global relationships. Here, he criticises the assumed dichotomy between macro and

micro, instead focusing on systems of networked or circulating relationships. While global fluids, similar to global networks such as multinational corporations like McDonald's and Coca Cola, travel along various routeways, they demonstrate no clear point of departure and, over time, tend to create their own cause of action. Global fluids are thus self-organising or autopoetic in that they harbour an inherent agency that global networks somehow lack.

While Urry employs money and the Internet to exemplify global fluids, he does not mention waste, something which Fagan also interprets as a sign of the general invisibility of waste in contemporary social theory and sociology. Informed by the work of Urry, Fagan suggests that waste, like money and the Internet, is indeed the new global fluid. Along with Fagan, we thus understand both waste and money as global fluids, that is "entities that are somehow not simply networked" (Urry, 2005: 246). In relation to the purposes of this article, the unruliness of global fluids is also a matter both EU directives and businesses seek to regulate at the same time because these phenomena can easily slip out of control. As Urry (2005: 246) states:

> *Global fluids travel along various routeways or scapes but they may escape, rather like white blood corpuscles, through the 'wall' into surrounding matter and effect unpredictable consequences upon that matter.*

Informed by the works of Urry and Fagan, this article seriously considers money and e-waste as global fluids together with the regulatory measures they stimulate. It thereby investigates the concept of circular economy as an arena in which these global fluids are subjected to regulations.

The concept of circular economy

The concept of circular economy is a recent buzzword, at least in the Western world. "[D]rawing analogies with material and energy flows in natural ecosystems" (Gregson et al., 2015: 220), it entails the promise of decoupling two, seemingly inextricably intertwined, phenomena: economic growth and the increasing use of resources. To realise this ambition, the focus is given to sustainability and extended product life through recycling and reuse. With some of its more recent roots in post-World War, industrialised countries, and disciplines such as industrial ecology, ecological modernisation, natural capitalism and Cradle-to-Cradle design, the idea(l) of the circular economy is today linked with neoclassical economic theories that understand natural assets as resources, commodities which can be ascribed with an economic value (Fitz-Henry, 2017), thereby also permitting trade of these

resources. One example is trade with emissions (Kama, 2014) such as carbon, realised, for example in the UN's REDD+ (reducing emissions from deforestation and forest degradation) programmes (Arora-Jonsson et al., 2015). Hence, today's circular economy combines environmental governance and neoliberal discourses. As such, it includes green consumer choices, green tax incentives, altered industry standards and improved collection and reuse (Hobson, 2016). While environmental concerns and the profit motive have traditionally been viewed as dichotomous concepts (Gareau and Lucier, 2018), recent research shows these terms are increasingly regarded as partly constituting each other. Current policies and regulatory frameworks, for instance, stress that a healthy environment is created *in and through* green consumption, which also corresponds to the current neoliberalisation of the environmental world polity (Gareau and Lucier, 2018).

Since 2015, the EU has adopted the concept of circular economy in its waste management policies. This means that its waste-management objectives are to be aligned with those of circular economy. In the concept of circular economy, "[t]he 'value' of waste is a key element [...]" (Hollins et al., 2017: 70). This concept thus reflects the shift from seeing waste as a problem to waste as a resource (Neyland and Simakova, 2012; Corvellec and Hultman, 2012; Hultman and Corvellec, 2012). Previous studies also outlined the EU's adoption of the concept in relation to e-waste (see, for comparison, Gregson et al., 2015; Kama, 2015). They show it largely builds on the *marketisation* of e-waste (conceiving waste as a resource) and the *internalisation* of this market (e-waste management is meant to take place within EU borders). As will be shown, these regulatory measures allow the companies managing electronic products as well as their material residues to accelerate and apply the brakes at the same time. Put differently, the marketisation of waste allows this particular waste fraction to be commodified while simultaneously the internalisation of the market determines the range of potential customers. We contend that this also affects the performance of risk in relation to e-waste. In what follows, we draw on the mentioned studies to investigate how risks with e-waste are *done* and *undone* as this waste category is being introduced to the market (according to the principles of circular economy) in terms of a resource, particularly as this market is internalised to the concern of members of the EU.

Methodological framework

This article relies on interviews with representatives of twelve different companies in Slovenia and in Sweden. These companies come from different sectors: the mining industry, production and distribution of electrical and electronic goods and services, collection and/or management of

electronic waste and stationary batteries, as well as reparation of obsolete electronics. What they share is their engagement in the circular economy and/or sustainability concept. The interviews were conducted from the late spring of 2018 until the early spring of 2019. The focus was on each company's work with respect to implementing the concept of circular economy, particularly as regards electronic goods and services as well as obsolete electronics. Questions concerned, for example, how the circular economy works in relation to customers and suppliers, potential difficulties and challenges as well as future plans and possibilities for improvement. We interviewed representatives of seven Swedish companies and five Slovenian companies. Nine interviews were held via Skype and three interviews were face to face. The interviews were recorded and subsequently transcribed. In order to protect the informants' integrity, their names as well as the names of companies were removed during the transcription. For the interviews with the Slovenian informants, English was used, sometimes combined with Slovenian, and for the interviews with the Swedish informants, Swedish was used. This required continuous dialogues between the authors during which common themes were identified and sections of particular interest were translated. The authors also pursued two interviews together, which further facilitated the joint discussion and selection of certain themes.

As part of gathering background information and preparing for the interviews, the authors investigated the webpages of different companies. This process also helped with the selection of the companies as the authors employed the search function that featured some companies' webpages. Searching for terms such as "circular", "circular economy" and "sustainability" gave the first impression of a company's work with circular economy and/or sustainability. Due to the authors' wish to keep the companies' and informants' names anonymous, this article does not refer to these webpages. Nevertheless, the initial investigation of these webpages served to enrich overall understanding of the companies, including their history and current ambitions. During the transcription, the authors also sometimes returned to these webpages for clarification.

Electronic waste (WEEE) – a complex waste fraction

E-waste is the fastest growing category of waste in the world, largely due to its proliferation, miniaturisation and ever shorter life span. According to the United Nations University (Baldé *et al.*, 2017), 44.7 million tonnes of e-waste was generated globally in 2016. The total amount of e-waste produced is rising exponentially due to multiple factors like consumer demand and high obsolescence rates of electrical and electronic equipment (Perkins et al., 2014). Since e-waste adheres to both the *logic of hazard* and the *logic*

of resource, it challenges the idea that its status as a risk is simply being replaced by that of a resource. Instead, we argue *that the status of e-waste as a risk is inextricably bound with its status as a resource*.

The dual status of e-waste as being *both* hazardous *and* valuable makes it quite a complicated waste fraction to recycle, also explaining why we chose to hone in on this fraction. The toxicity of e-waste (and the subsequent risks for the environment and human health) requires detailed and rigorous management, thereby making it an interesting case study when it comes to the concept of circular economy concept, particularly since its status as risky must be weighed against, or incorporated into, the (economic) benefits of recycling and/or reusing some of its more valuable parts.

The complex material compounds of e-waste were often mentioned by our informants as a factor that seriously limits the *recyclability* of this waste fraction. When asked about possible dilemmas with recycling e-waste, one informant: the head of WEEE and metal division at a recycling plant, compared it with the recycling of other waste fractions:

> *[W]ith rubber, you use old tyres for one product, but you cannot use the whole electronic for one product, because it is a mixture of material [...] the problem is the mixture.* (interview, 7. 9. 2018).

Two more reasons explaining why e-waste is the focus of this study concern its *reusability*. Within the concept of the circular economy, and according to the European Waste Hierarchy (EWH), priority is given to waste minimisation and reuse, followed by recycling and, ultimately, landfilling. In this regard, the difficulty of reusing electronics was illustrated by some informants who highlighted three factors: the increased energy efficiency of today's products, questions regarding the information security of ICT products and services and, especially with respect to refrigerators and cookers, difficulties in properly cleaning products. One of our informants, a representative for a company that among other things produces home appliances, mentioned the importance of also replacing old products like fridges:

> *[Previously], we were perhaps not as good with the technology, related to energy efficiency and security and things like that. Maybe there is also a time when we need to phase out old electronics and take care of them, and focus on producing better electronics thereafter, which is why it may not be wise to reuse electronics to the same extent as other products.* (interview, 28. 8. 2018)

When asking two informants, an environmental coordinator and the QEHS manager of a recycling company, about their thoughts on reusing

electronics, they mentioned information security as an aspect that might hinder reuse, particularly of ICT products and services:

> *If you want to send a product out to a secondary market, for example a computer or a telephone, it must be guaranteed that it is completely cleared of all information.* (interview, 20. 8. 2018)

Another two informants, a project manager and an environmental coordinator who represented a company which makes household appliances, gave the following response to the same question when discussing the upcoming possibilities for their customers to lease, rather than buy, electronic devices:

> *Interviewee A: [When it comes to the potential of leasing home appliances] we don't see potential refrigerators and cookers because [...] On these appliances, you have a lot of surfaces that come into contact with food and this demands a lot of ...*
>
> *Interviewee B: Yes, you need to deliver a really clean product to customers, if you are changing customers.* (interview, 10. 1. 2019)

The above quotes show that, while the EWH encourages reuse, followed by recycling, our informants mentioned certain complicating factors in relation to the recycling and reuse of electronic goods. The importance of cleanliness is indeed relevant, also with respect to, for example, second-hand clothes and furniture; although the first two reasons of increased energy efficiency and questions of information security are quite specific to electronic goods. In fact, our informants' acknowledgement of the difficulties of recycling and reusing e-waste reinforced our decision to focus on this waste fraction. As the recycling and reuse of electronic goods are not as straightforward as with other 'cleaner' waste fractions like glass, rubber and metal, we assumed that this also complicates the work based on the concept of circular economy.

E-waste regulations

Since the late 1980, e-waste (initially as part of hazardous waste) has been the subject of regulations on the national, European and international levels. These govern the acts of the collection, treatment and shipment of e-waste. On the international level, the Basel Convention controls transboundary shipments of hazardous waste. Currently, 170 countries have signed the Convention. The main focus is on transport from what are referred to as

Annex VII countries, that is OECD countries, the EU and Lichtenstein, to non-Annex VII countries, that is the other signatory states. The Basel Convention was adopted as part of the United Nations Environment Programme in 1989 and came into force in 1992. The Basel Ban Amendment, an extension of, or attempt to strengthen the Basel Convention, applies to any export made for any reason, including recycling. It has yet to come into force as it has not been ratified by enough members of the Convention.

The Waste Electrical and Electronic Equipment (WEEE) Directive (2012) applies to the EU member states. It entered into force in 2003, over 10 years after the Basel Amendment. Recalling that the EU has adopted the concept of circular economy in relation to its waste-management policies, the WEEE Directive is no exception, with its main purpose being to:

> *contribute to sustainable production and consumption by, as a first priority, the prevention of WEEE and, in addition, by the re-use, recycling and other forms of recovery [...]*

In relation to Kama's distinction between the logic of hazard and the logic of resource, it is noteworthy that the directives regulating e-waste management employ both logics, while tending to emphasise one or the other. While the WEEE Directive focuses on WEEE as a resource – on first one, it states that "[a] lack of recycling [of WEEE] results in the loss of valuable resources" – the Basel Convention stresses WEEE's status as hazardous. As the subtitle of the Basel Convention also indicates: "On the control of transboundary movements of hazardous wastes and their disposal".

Since the circular economy is a cornerstone of European waste-management policies, this article builds its case mainly around the WEEE Directive. While the WEEE Directive establishes collection, recycling and recovering targets for the EU member states, these states are also to some extent free to implement collection schemes and recycling procedures. Still, with both Slovenia and Sweden being EU members, the countries employ similar rhetoric when it comes to the management of electronic waste, something that became quite clear when reading the interview transcripts.

Risk and space

As our informants engaged in the doing of e-waste as a risk and/or resource, they were also performing what Lepawsky (2015) refers to as *geographical imaginaries* in which (sending e-waste to) certain countries were a cause for concern. It was mentioned that as e-waste management becomes internalised within the EU's borders in line with European waste policies, this waste fraction is largely understood as a resource. Upon exiting the EU,

however, its status as hazardous is emphasised. The following quote from the director of corporate responsibility of a metal company illustrates the internalisation of the e-waste trade:

> *[W]e buy essentially from European traders and US traders because it feels... it's safer then. I remember once, a [foreign] trader called and wanted to sell [e-waste] really cheap. [For us], this option does not exist* (interview, 12. 6. 2018).

The above statement illustrates that while e-waste is part of a global market, it is also an object with restrictions in that it is not sold or bought at any price.

The risks of trading with just anywhere are also described by the same informant:

> *[T]he scrap you buy, it's really important to find out where it's from. We are confident that when it comes to [name of electronic recycling company] as well as [name of another electronic recycling company], there is no child labour in the background, but if you are out in the open market, only trading electronic scrap, you can get electronic scrap, for example, from Ghana. And then it might be a child worker who sorts that iron scrap, or that electronic scrap. And we spend a lot of energy trying to ensure we avoid any such business, but much of this material comes through different traders, more or less serious, and here one has to be really careful.* (interview, 12. 6. 2018)

Our informant's use of the term "open market" is interesting because it marks a distinction between unregulated and regulated practices of the waste trade. Stressing the need to be careful, our informant also points to difficulties of retaining control with respect to the former, something which another informant, the head of sustainability of a company that repairs and refurbishes electronic goods, also explicitly articulates:

> *We have decided that we do not sell [refurbished electronics] outside of Sweden's borders because then you cannot control it, we cannot make sure it does not end up in the wrong place [...] on the beaches of Africa, for example. So that we try to circulate it in Sweden, which is quite unique.* (interview, 15. 10. 2018)

These quotes show us that e-waste is seen as a resource only insofar as it is recycled within the economic system of a single EU country, the EU, or other Western countries. The last quote in particular clearly shows that

space is constitutive of waste management as our informant mentions the risk of e-waste ending up "in the wrong place". This also shows that control is crucial to the doing of e-waste as a resource. That is, maintaining (attaining) control over the movements of e-waste is also part of its status as a resource. Saying this, the oscillating statuses of e-waste are not to be seen in terms of a linear chain of assumptions where e-waste attains the status of *either* a risk *or* a resource. On the contrary, and as the following quote from the head of sustainability of a recycling company also illustrates, the status of e-waste as a risk (if subjected to global trade) helps reinforce its status as a resource (if recycled within the internal EU market):

> *There is a huge flow going to Africa and other countries, illegally, with electronics, instead of taking care of this within Europe and getting paid and using the raw materials in the best possible way. You have probably seen pictures of the terrible handling in Africa.* (interview, 8. 6. 2018)

Reading the above statement, we notice the *mutual dependency* of the status of e-waste as a resource and as a risk. Put differently, in order for e-waste to be regarded as a resource, the understanding of its status as a risk must be *potentially* present. As this quote strikingly demonstrates, if e-waste is not considered as a resource *here* (within the EU), it will become a risk *somewhere else*.

Managing of e-waste as a moral activity

While contemplating our informants' responses, this section engages in the moral discourse that seems to frame the international trade in waste, as also mentioned by Gregson et al. in Kama. We already noted that EU policies tend to frame e-waste as a resource *only insofar as* it is recycled within the EU's borders (Gregson et al., 2015). This was equally the case with our informants. If exported to countries outside the EU, with the exception of other Western countries, our informants chiefly understood e-waste as a risk to the environment and to human health. The above quotes mention child labour as well as e-waste being found on the beaches of Africa as unsolicited scenarios, something that also positions the internalisation of e-waste management within a moral discourse. Reiterating risk as performative, we recall the work of Montelius and Nygren (2014: 432) and their suggestion that "morally infused discourses on risk can also be used as a means to create difference and distinction". As concerns the purposes of this article, the differences and distinctions that are made are spatially contingent because they are based on the geographical imaginaries of our informants. It is worth noting that the moral discourse which saturates our informants' responses

both challenges and reinforces the internalisation of e-waste management. This was clear when one informant, the director of corporate responsibility of a metal company, reflected on the activities of a Western mining company which also runs some plants in the global South:

> *[Name of company] is the co-owner of a mine in the Northeast DRC [Democratic Republic of Congo], more or less a war zone. They [also] have their businesses in Mali, in Senegal and on the Ivory Coast [...] They provide healthcare which otherwise does not exist; they provide education; they take responsibility for the environment; simply, they are doing a lot. And that's where I... I have been working in different places in the world for most of my life; I'm a bit touched actually. One asks the question: maybe it's not right to try to work around these countries, but maybe it's right to ... Kofi Annan once said, "The problem is not the presence of large multinational companies, the problem is the absence of them".* (Interview, 12. 6. 2018)

While the above quote challenges the spatial distinction between EU/Western countries and the rest of the world, it also reinforces the former's status since the mining company's activities, while geographically located in Africa, occur *within* the framework of this company. Engagement with the global South is thus important, not least morally, as our informant speaks about the company's provision of healthcare, education and engagement in the environment, apart from its status as an employer.

Informal and formal economies, the 'should nots' and 'cannots'

Thus far, we have proposed that the status of e-waste as a risk and/or as a resource is spatially contingent. More specifically in relation to the concept of circular economy, the internalisation of the e-waste trade facilitates the doing of e-waste as a resource, and vice versa. Having said that, space was not the only factor that triggered discussions among our informants regarding the status of e-waste as a risk and/or a resource. Below, we elaborate on two more factors that equally point to the ambiguous status of e-waste: the distinction between what are commonly referred to as *formal and informal economies* and concerns regarding unauthorised stakeholders' lack of knowledge and experience when it comes to recycling practices.

Informal and formal

We have suggested that the internalisation of e-waste management is positioned within a moral discourse, which serves to elucidate the spatial

distinctions between EU/other Western countries and countries outside of the EU. Yet, in relation to the interviews, it is noteworthy that the moral discourse implied a difference, not just between different countries, but also between what are commonly known as formal and informal economies. Like the last quote, which highlights the importance of the presence of large multinational companies in countries in Africa, the quote below from the head of sustainability of a recycling company upsets the simple division between the EU/other Western countries and countries outside the EU. Here, however, the focus is on the individual level:

> *If you as a private person come to a recycling centre in Germany and there is a small pickup outside and [the driver] says "Are you handing in your refrigerator? Instead of disposing it for free here [at the recycling centre], you can get 100 kronor [appr. 10 euros] from me". What would most people do then? That's how it works. It's like a kerbside market that passes under the radar [...].* (interview, 8. 6. 2018)

In this case, our informant's concern had less to do with *where* the trade initially took place, in this case Germany, and more to do with *the ways in which* this trade occurs. Hence, while the spatial transfer of e-waste occurs *within* EU countries, the informal character of this activity rendered it an object of concern. It is worth mentioning that our informant did not speculate further whether the refrigerator in the above quote might ultimately (and most likely) end up as part of the global e-waste trade, thus making it difficult to exclude space as an important factor. However, her emphasis on the actual trade itself offers an additional explanation of certain effects of e-waste trade regulations. As such, the concern expressed formed part of the creation of difference and distinction, not so much between *here* and *there* but between *formal* and *informal*. Here, it is important to recall that what are commonly referred to as formal and informal economies do not exist as separate spheres (Millar, 2018). Millar challenges the binary of the formal/informal economy, instead showing how they are blurred in everyday practice, which is equally shown by our informant. Accordingly, discussions on the informal economy are also a fundamental part of establishing borders for the economic sphere (Millar, 2018: 129); in this case, what counts as adequate practices of recycling. Yet this is embedded within a moral discourse, as already discussed.

Should nots, cannots

We have noted that inadequate practices of recycling by, for example, children or unauthorised others were a cause for concern for some of our

informants. As recycling takes place elsewhere, the status of e-waste as a risk was emphasised, and also embedded within a moral discourse. Particularly with regard to the latter, we propose that the inadequacy of these recycling practices relates to what will henceforth be referred to as the *should nots.* Simply, by highlighting the status of e-waste as a risk, children and unauthorised others *should not* pursue the recycling of e-waste as it is morally problematic. Saying this, it is to be noted that the recycling practices pursued by unauthorised others were inadequate also due to factors such as a lack of knowledge and experience. One informant, the head of a company which recycles lead acid batteries, pointed to this as he, rather than emphasising the *should nots,* was focused on what we will refer to as the *cannots*, i.e. the ignorance and lack of experience of unauthorised recyclers. As shown in the quote below, the cannots of unauthorised recyclers turn recycling practices into dangerous rather than profitable enterprises. Unlike the concerns raised by some other informants regarding the *should nots*, the unauthorised recycling practices our informant mentioned did not seem to comprise part of a moral discourse; instead, the focus was on the ignorance and lack of experience:

> *You know, also, if you want to [...] collect this dangerous waste, you must have some experience. With work, with collecting and so on, and yes, I think that some people just look at the profit and think how would we do [the recycling]. But it is very difficult because working with lead is dangerous, everyone knows that. You must have extra training for this, you must know how to change the clothes, how to wash your hands, how to work, what kind of masks to wear. All of these things, you must know, and if you don't know this, it could cause more damage than profit. And this is the problem, because it is not easy to work with lead. But we have been working with lead here for over 350 years now, almost 400 years, and we know how to work here. We have enough experience and we also have [the] technological knowledge. Someone else might just think, "ok, we will melt this lead and give this lead to the producer". No way. I said before that the [standards] in this industry [are] so high that you must know how to do it. You must know.* (Interview, 29. 1. 2019)

The above statements show that a lack of knowledge and experience might transform recycling of, in this case lead acid batteries, into risky, rather than profitable, enterprises. Recalling the above line of argumentation where we proposed that the status of e-waste as a resource and as a risk is mutually dependent, the above quote is interesting by showing that e-waste, simultaneously being a risk and a resource, is also intimately linked to the ways in which this waste fraction is treated. In this particular case,

lead acid batteries become a resource only insofar as one has the adequate knowledge and experience to recycle them.

Conclusion

This article has described some of the ways in which risks with e-waste are *done* and *undone* in relation to the concept of the circular economy. As was shown, many of our informants were concerned by the risks that e-waste is assumed to pose *when treated outside the EU*, while they also largely understood e-waste as a resource *when treated within the EU or Western countries*. Here, difference is created as e-waste is subjected to spatial transfers, in this case (global) trade. Saying this, the oscillating statuses of e-waste are not to be seen in terms of a linear chain of assumptions where e-waste attains the status of *either* a risk *or* a resource. On the contrary, this article has underlined the *mutual dependency* of the status of e-waste as a resource and as a risk because the status of e-waste as a risk (if subjected to global trade or to unprofessional treatment) helps reinforce its status as a resource (if recycled within the internal EU market or if treated professionally).

Drawing on the work of Gregson et al. and Kama, this article has shown that the (global) trade in e-waste is intimately linked to a moral discourse, which became especially clear when some of our informants expressed their concerns regarding child labour and environmental degradation. These concerns also served to elucidate the spatial distinctions between the EU/other Western countries and countries outside of the EU. Montelius and Nygren (2014: 434) assert that "the naming of something as a risk calls for certain forms of action [...]". Still, space was not the only factor that spurred discussions among our informants regarding the status of e-waste as a risk and/or a resource; one informant also pointed towards what is commonly is referred to as *formal* and *informal* economies. Concerns were also raised with respect to unauthorised stakeholders' lack of knowledge and experience when it comes to recycling practices.

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