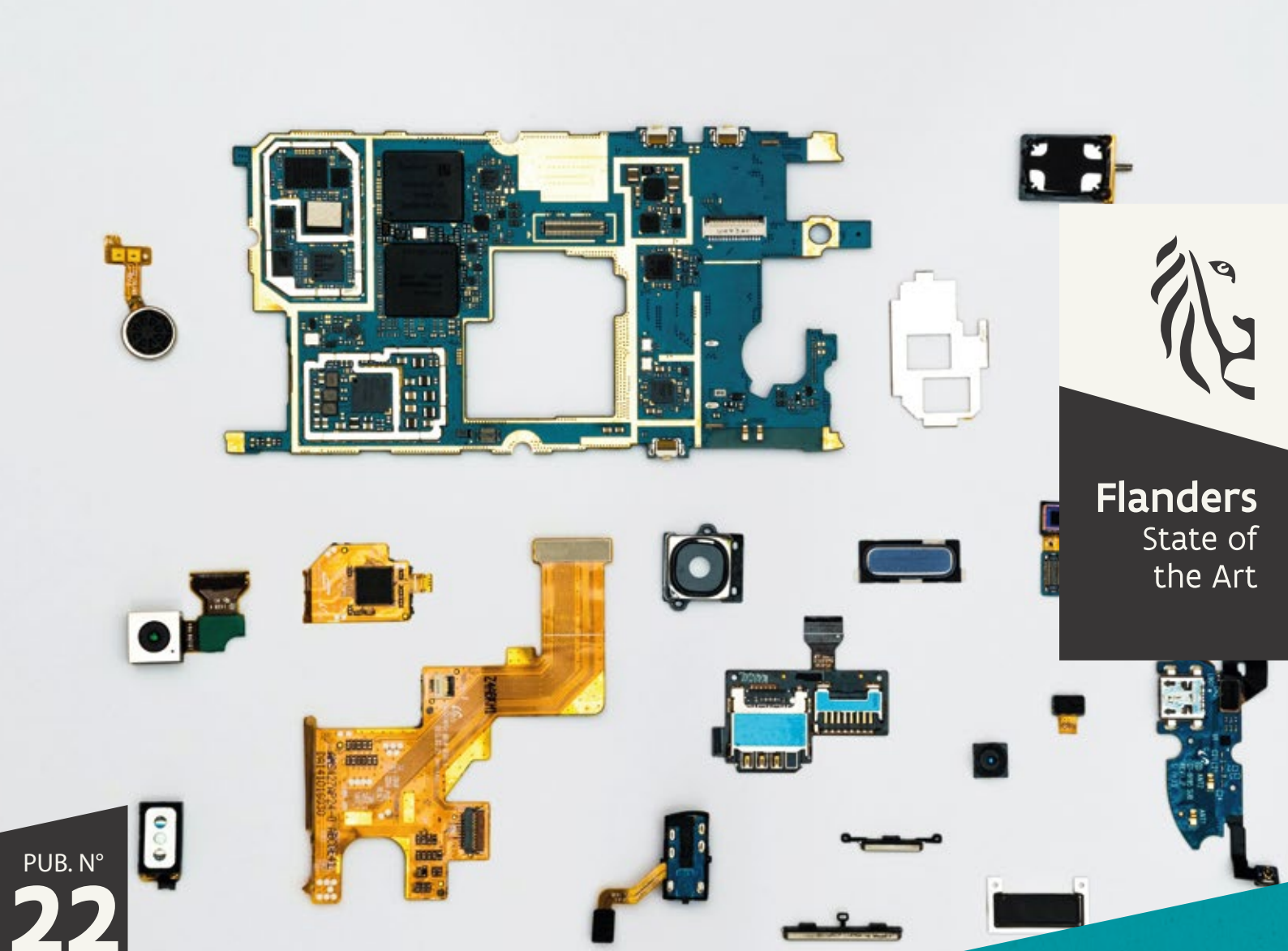

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# Narratives of repair: electronic consumer devices in the circular economy

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# Narratives of repair: electronic consumer devices in the circular economy

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# Summary

**This report focusses on different discourses on the repair of electronic consumer devices in Flanders. It identifies four discourses, revealing different political choices for policymakers. Two particular discourses are likely to become successful, giving shape to pathways of incremental change and narrow labour market measures. The report therefore suggests to open up the debate on repair, facilitating dialogue between different perspectives and accelerating transformative repair.**

As a result of the current environmental crisis, **sustainability is high on the political agenda**. Therefore, the European Union and the Flemish government, amongst many others, are developing ambitious circular economy policies and initiatives. Yet much remains to be done in terms of achieving long-term sustainability objectives, the circular economy is still in its infancy and its 'inner circles' (e.g. rethink, repair, refurbish and remanufacture) are underdeveloped.

To explain the **slow uptake of repair** as a circular strategy, the literature focusses on so-called barriers, the role of user perspectives and public perception, and broader conditions such as infrastructure and legislation. However, the literature does not take into account that accelerating the uptake of repair and enabling its transformative potential requires new ways of interpretation, in which problems and solutions are redefined.

This report therefore focusses on the **divergent interpretations of repair**, which may help to understand its slow uptake. It examines how a variety of actors interpret repair by applying the method of discourse analysis to a case study of the repair of electronic consumer devices in Flanders. By doing so, the report highlights the political and societal debate on repair. Specifically, it distinguishes four discourses that struggle over defining repair, namely 'empowering consumers, citizens and independent companies to repair electronics', 'repair and recycling on an equal footing', 'repair as a market opportunity' and 'the social objectives of repair over economic efficiency'.

The report then discusses the **commonalities between the four discourses** such as informing consumers, involving the social economy and the crucial role of labour and pioneering projects. These commonalities may be used by policymakers, although they largely consist of small steps toward a circular repair economy.

The four **discourses also fundamentally diverge**, particularly in terms of political choices about the pathways of change and labour market challenges. Concerning transition pathways, the report argues that is likely that two discourses, advocated by established actors such as manufacturers, retailers and recyclers, are becoming most successful in defining repair and in shaping a pathway of incremental change. The same actors are also proposing specific, narrow labour market measures, mainly assigning roles to public actors who are expected to close the so-called skills gap and to workers in the form of upskilling. Hence, the report adds a new understanding to the literature on the slow development of transformative repair.

The identified pathways of **incremental change and narrow labour market measures** may not sufficiently address the Government of Flanders' circular economy ambitions, the current

environmental pressures and the slow uptake of repair. On top of that, the two discourses shaping incremental change have blind spots, which are partially highlighted by the two other discourses.

**For policymakers and practitioners in Flanders**, the report therefore proposes an approach that considers policymaking in complex and multi-actor settings. This reflexive approach helps to open up discussions between the four, competing discourses, allowing reflection, deliberation and participation between multiple actors and supporting the (re)construction of interpretations and development of shared perspectives and, over time, the acceleration of transformative repair. Hence, policymakers may support pioneering projects, promoted by the four discourses, that apply a reflexive governance approach.

# Samenvatting

**Dit rapport focust op verschillende discoursen over het herstel van elektronische consumentenapparaten in Vlaanderen. Het identificeert vier discourses die verschillende politieke keuzes voor beleidsmakers met zich meebrengen. Twee specifieke discoursen worden wellicht succesvol, en geven vorm aan een stapsgewijs transitiepad en beperkte arbeidsmarktmaatregelen. Het rapport stelt daarom voor om het debat over herstel te openen, specifiek om dialoog tussen de verschillende perspectieven te stimuleren en transformatieve vormen van herstel te versnellen.**

Door de huidige milieucrisis staat **duurzaamheid hoog op de politieke agenda**. De Europese Unie en de Vlaamse regering ontwikkelen ambitieuze circulaire economie beleidsmaatregelen en initiatieven. Toch moet er nog veel gebeuren om duurzaamheidsdoelstellingen te bereiken, staat de circulaire economie nog in de kinderschoenen en zijn de 'inner circles' (bv. rethink, repair, refurbish en remanufacture) onderontwikkeld.

Om de **trage ontwikkeling van repair** als circulaire strategie te begrijpen, richt de literatuur zich op zogenaamde barrières, gebruikers en het publiek, en contextuele aspecten zoals infrastructuur en wetgeving. De literatuur houdt er echter geen rekening mee dat het ontwikkelen van repair en het mogelijk maken van het transformatieve potentieel ervan, nieuwe interpretaties vereist die problemen en oplossingen herdefiniëren.

Dit rapport richt zich op de **uiteenlopende interpretaties van repair**, die kunnen helpen om de trage ontwikkeling van repair te begrijpen. Het onderzoekt hoe verschillende actoren repair interpreteren aan de hand van discoursanalyse en een gevalstudie over het herstel van elektronische consumentenapparaten in Vlaanderen. Op die manier belicht het rapport ook het politieke en maatschappelijke debat over repair. Het onderscheidt vier discoursen die worstelen met de definitie van repair, namelijk 'empowering consumers, citizens and independent companies to repair electronics', 'repair and recycling on an equal footing', 'repair as a market opportunity' en 'the social objectives of repair over economic efficiency'.

Het rapport bespreekt vervolgens de **overeenkomsten tussen de vier discoursen**, zoals het informeren van consumenten, het betrekken van de sociale economie en de cruciale rol van arbeid en innovatieve projecten. Beleidsmakers kunnen deze overeenkomsten gebruiken, hoewel ze grotendeels bestaan uit kleine stapjes in de richting van een circulaire repair economie.

De vier **discoursen verschillen ook fundamenteel** over de politieke keuzes gelinkt aan transitiepaden en arbeidsmarktuitdagingen. Wat de transitiepaden betreft, argumenteert het rapport dat twee discoursen, die worden bepleit door gevestigde actoren zoals fabrikanten, retailers en recyclers, waarschijnlijk het meest succesvol worden in het definiëren van repair en het vormgeven van een stapsgewijs transitiepad. Dezelfde actoren stellen ook specifieke, beperkte arbeidsmarktmaatregelen voor, waarbij ze vooral een rol toebedelen aan overheden om de zogenaamde skills gap te dichten en aan werknemers in de vorm van upskilling. Het rapport voegt dus een nieuw inzicht over de trage ontwikkeling van transformatieve vormen van repair toe aan de literatuur.

Bovendien bieden de **stapsgewijze transitiepaden en beperkte arbeidsmarktmaatregelen** wellicht onvoldoende antwoord op de circulaire economie ambities van de Vlaamse Regering, de milieucrisis en de trage ontwikkeling van repair. Daarnaast hebben de twee discoursen die incrementele verandering vormgeven blinde vlekken, die gedeeltelijk worden belicht door de twee andere discoursen.

Voor **beleidsmakers in Vlaanderen** stelt het rapport daarom een benadering voor die beleid in een complexe en multi-actor context situeert. Deze reflexieve benadering helpt om het debat tussen de vier, concurrerende discoursen te openen, waardoor interactie en participatie tussen meerdere actoren en interpretaties mogelijk wordt. Dit laat bovendien toe om interpretaties te (re)construeren en gedeelde perspectieven te ontwikkelen en, op termijn, transformatieve vormen van repair te ontwikkelen. Kortom, beleidsmakers kunnen innovatieve projecten, bepleit door de vier discoursen, steunen die een reflexieve benadering toepassen.

# 1 Introduction

As the atmosphere is warming, biodiversity loss is accelerating and forests and oceans are being polluted and destroyed, a shift to **sustainability is high on the political agenda**. The European Commission published the European Green Deal (2019), which is an ambitious action plan and a set of policy initiatives to cut emissions by at least 55% by 2030 and to be climate neutral in 2050. One of the initiatives is the new Circular Economy Action Plan that focusses on sustainable resource use (EC, 2020). In the Flemish government's coalition agreement, the circular economy (CE) is also introduced as an important element to meet climate and energy targets, particularly emphasising the design of products to increase their repairability, reusability and recyclability, amongst other topics such as product-as-service and sharing (Government of Flanders, 2019).

Despite these novel initiatives, however, **much remains to be done** in terms of achieving long-term sustainability objectives and fundamentally transforming key societal systems (EEA, 2019a; UN Environment, 2019). The CE is still in its 'infancy' (EEA, 2019b) and, in its Circularity Gap Report, The Circle Economy states that 'the news is not just bad, it is worse' (2020, p. 15). For Belgium in particular, the OECD concluded that existing and planned CE initiatives have to be turned into stronger results, addressing reductions in material consumption, and material and carbon footprints (2021). Although Flanders' 'cyclical material use rate' increased from 16% to 21% between 2014-2018, initial analyses show that this mainly results from increased recycling (CE monitor, 2021). Furthermore, reuse and repair are high on the political agenda but they still largely are a 'niche activity' for most product groups except cars (EEA, 2017). Generally, CE strategies such as the recycling and recovering of resources have received increasing attention, whereas the 'inner circles' of the CE such as reductions in material consumption or repair have received less attention in CE policies, programmes and initiatives.

The scholarly literature on repair as a CE strategy explains this **slow uptake of repair** as the result of barriers, user perspectives and broader conditions such as infrastructure, policy and legislation. Some scholars analyse the barriers to repair, focussing on low consumer demand, high labour taxes, absence of take-back schemes and inappropriate product design (e.g. Cooper & Salvia, 2018; Ghisellini, Cialani, & Ulgiati, 2016; Kissling et al., 2013; Riisgaard, Mosgaard, & Zacho, 2016; Sabbaghi, Cade, Behdad, & Bisantz, 2017). Other scholars state that it is crucial to understand users, participants and public perception to accelerate the repair economy, addressing, amongst other things, technical, emotional, economic and social aspects (e.g. Diddi & Yan, 2019; Kuah & Wang, 2020; Nazlı, 2021; Ylä-Mella, Keiski, & Pongrácz, 2015). Third, in addition to the so-called barriers and user perspectives, scholars note that the upscaling of repair is limited by broader, usually contextual conditions such as legislation, policy, infrastructure and social dimensions (e.g. Graziano & Trogal, 2019; Hobson, 2020; Spring & Araujo, 2017; Svensson-Hoglund et al., 2021). However, in explaining the slow uptake of repair, this literature typically does not take into account that accelerating the uptake of repair and enabling its transformative potential requires new ways of interpretation, in which problems and solutions are (re)defined.

In this report, we therefore focus on the **divergent interpretations of repair**, which may help to understand the slow uptake of transformative repair. Currently, the most prominent interpretations of the CE neglect strategies such as repairing, remanufacturing and repurposing,

which limits transformative sustainability change induced by these strategies (Corvellec, Stowell, & Johansson, 2021; Ghisellini et al., 2016; Reike, Vermeulen, & Witjes, 2018). Furthermore, the dominant framings of repair typically understand it as a technocratic instrument to deliver circular business objectives to rational consumers, in which governments facilitate the creation of markets (Graziano & Trogal, 2017; McLaren, Niskanen, & Anshelm, 2020; Spring & Araujo, 2017). Yet McLaren and his colleagues (2020), for example, also consider three dimensions of repair contestation, namely sustaining or transforming, backward or forward-looking and personal or political, resulting in four understandings of repair that vary in terms of their potential to be transforming. Given that new interpretations play a crucial role in transformative change (Bosman, Loorbach, Frantzeskaki, & Pistorius, 2014; Geels & Verhees, 2011; Smith & Kern, 2009), a narrow, instrumentalist interpretation of repair may only lead to the partial, slow uptake of repair, limiting a profound shift to a circular repair economy. Here, more empirical work is needed to examine the divergent, competing interpretations of repair, which helps to understand how these interpretations limit the uptake of transformative repair.

Against this backdrop, this report asks how actors interpret repair and then explores how we can understand these interpretations from a transition governance perspective? To answer these questions, we selected the repair of electronic consumer devices in Flanders as a case study for a discourse analysis, focussing on diverging interpretations. The case is useful because, globally, waste electrical and electronic equipment (WEEE) is the fastest growing solid waste stream (Forti, Balde, Kuehr, & Bel, 2020); recycling is typically preferred over the reuse and repair of electronic and electrical devices (Shittu, Williams, & Shaw, 2021); upscaling the repair of consumer electronics is challenging (Svensson-Hoglund et al., 2021); and, finally, multiple actors, such as manufacturers, the social economy and the repair movement, are involved in the repair of electronics (Kort, Vink, & van Rijn, 2021; Repair&Share & De Transformisten, 2021), which are likely to interpret repair in different ways. In all, the case helps to investigate the divergent interpretations of repair, highlighting different political and societal choices, which also helps to understand the limited uptake of transformative repair.

The report proceeds as follows. The second section introduces the CE, considering both policy and science, and repair as a CE strategy, particularly focussing on the different strands of literature that explain the limited uptake of repair. The third, methodological section first discusses discourse studies as an analytical framework that will help to understand how repair is interpreted, and then describes the research techniques and the case study. The fourth section presents the empirical analysis, namely four discourses on the repair of consumer electronics in Flanders. In section 5, we discuss the analysis from an empirical and theoretical perspective. Before concluding the report in section 7, the sixth section discusses the implications of the analysis for policymakers and practitioners.

# 2 The circular economy and the slow uptake of repair

This section first provides a brief introduction to the conventional understanding of the CE in policy and scientific circles (2.1.1), also emphasising that the progress towards a CE is limited

(2.1.2). Subsequently, it turns to repair as a CE strategy, focussing on three strands of literature that explain the slow uptake of repair: so-called barriers (2.2.1), user perspectives (2.2.2) and broader aspects such as legislation and infrastructure (2.2.3). However, the section then argues that this literature overlooks the transformative potential of repair, which require new ways of interpreting repair (2.2.4). Empirically, we therefore contend that more work is needed on the diverging interpretations of repair, whilst, theoretically, this may help to understand the slow uptake of transformative repair.

# 2.1 The circular economy

## 2.1.1 The concept and policy

The **concept of the CE** received increasing attention from scientists over the last decade (Homrich, Galvão, Abadia, & Carvalho, 2018; Korhonen, Honkasalo, & Seppälä, 2018). Generally, it proposes closing the loops of material and energy cycles by reducing waste and reusing and recycling resources and products. It also provides an alternative model to the linear take-make-dispose system of waste management, addressing its negative environmental, economic and social effects. Numerous visions and strategies have been related to a CE, perhaps best summarised by the so-called 9R framework (Kirchherr, Reike, & Hekkert, 2017). The framework distinguishes among nine strategies of circularity, in which the strategies ranked highest (refuse, rethink and reduce) equal, as a rule of thumb, most environmental benefits because fewer or no resources are required to produce new products. By contrast, in the lowest-ranked strategies (recycle and recover), resources are still required to produce new products or materials. A CE thus comprises, amongst other things, refusal to produce or consume new products, sharing certain products among consumers or citizens, ecologically designing products to increase reparability, refurbishing old products and the recycling and recovery of certain resources.

In addition to academic attention, there is widespread interest in the **CE among policymakers** as well. In the European Union (EU), the concept has gained traction over the past decade, particularly due to the activities of the Ellen MacArthur Foundation and the European Commission (Bocken, Olivetti, Cullen, Potting, & Lifset, 2017; Kovacic, Strand, & Völker, 2020; Lazarevic & Valve, 2017). The former organisation was created in 2010 and inspires business, academia, policymakers and institutions to accelerate the transition to a CE. In 2013, the Foundation published its first report titled 'Towards the circular economy: economic and business rationale for an accelerated transition'. Here the influential 'butterfly diagram', mimicking the ecosystem, was published. In the report, the CE is defined as:

> 'An industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models.' (Ellen MacArthur Foundation, 2013, p. 7)

A few years later, an influential communication of the European Commission titled 'Closing the loop – An EU Action Plan for the circular economy' was published, as a follow-up to earlier communications. The definition in this report is reproduced in numerous policy documents and reads thus:

> ‘The transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimised, is an essential contribution to the EU's efforts to develop a sustainable, low carbon, resource-efficient and competitive economy.’ (EC, 2015, p. 2)

The Ellen MacArthur Foundation has played an important role in framing the CE as an opportunity for business models, innovation and environmental protection. From 2015, the European Commission aligned with this approach by emphasising the role of a competitive economy, resource efficiency and business opportunities. Recently, the Commission also published a new Circular Economy Action Plan (EC, 2020).

### 2.1.2 Two criticism of the circular economy

Although the CE is becoming increasingly significant in policy, it has been questioned over the past few years from at least two, intertwined perspectives. On the one hand, the **current economy is far from circular**. For example, The Circle Economy published ‘The Circularity Gap report’, highlighting that the global economy was only 9,1% circular in 2018 and 8,6% in 2020. The report laments that ‘the news is not just bad, it is worse’ (p. 15) and identifies the main reasons as high rates of material extraction, the ongoing stock build-up (in buildings and infrastructure) and increasing but still low levels of material efficiency, extending and intensifying use and end-of-life recovery (The Circle Economy, 2020). Similarly, the European Environment Agency notes that the CE is still in its ‘infancy’, as only approximately 10% of the materials used in the EU are recovered and reused (EEA, 2019b). By the same token, industrial ecologists started measuring the CE in biophysical terms by accounting biophysical flows of materials: in 2005, the degree of circularity (measured as the share of recycled materials in the total processed materials) was approximately 6% in the world (Haas, Krausmann, Wiedenhofer, & Heinz, 2015) and, in 2014, 9,6% in the EU (Mayer et al., 2019).

On the other hand, political and social scientists have observed that the **CE only leads to incremental changes** in policy, institutions, infrastructure and ideas. For instance, when the EU’s CE Package is viewed in the light of historical trends (1970-2018), it becomes clear that policies are patched or layered onto the existing policy, mirroring conceptual recycling and predominantly leading to continuous incremental change. It is hence concluded that ‘successfully disrupting deeply entrenched, unsustainable patterns of production and consumption requires, in our view, altogether more radical approaches to EU policy design than CE proponents currently acknowledge’ (Fitch-Roy, Benson, & Monciardini, 2019, p. 996). Similarly, it is found that while the EU (re)produces a holistic CE discourse, the policies remain stuck in end-of-pipe solutions, leading to little changes to address core socio-ecological challenges (Calisto Friant, Vermeulen, & Salomone, 2020a), which was confirmed in a study on incremental steps towards a CE in Dutch wastewater policy (Ampe, Paredis, Asveld, Osseweijer, & Block, 2021). In the German packaging sector’s shift to a CE, Machteld Simoens & Sina Leipold (2021) observe that public and private stakeholders are apprehensive of radical change, which created a lock-in situation between opposing narratives that was, eventually, resolved by pursuing incremental instead of radical change. Further, in transitions towards more sustainable waste management, Lily Pollans (2017) shows that actors interested in new ways of waste disposal lack access to decision-making processes, whereas the established mode of waste disposal is protected by institutional and physical fragmentation, professional norms,

financial incentives and vested interests. Her findings are similar to other works on barriers to the implementation of the CE in cities (Campbell-Johnston, ten Cate, Elfering-Petrovic, & Gupta, 2019; Yalçın & Foxon, 2021) and the EU (Kirchherr et al., 2018). Hence, although the expectations arising from the CE are high in terms of the potential for fundamental change, the majority of research on the topic finds that a shift towards a CE is characterised by slow changes in policy, institutions, infrastructure and ideas.

## 2.2 The slow uptake of repair

In line with the findings on incremental change towards the CE, the slow uptake of repair is explained by at least three strands of literature, focussing on barriers, user perspectives and broader aspects. These three strands of literature are described in the following sections, after which we turn to transformative interpretations of repair in section 2.2.4.

### 2.2.1 Barriers

First, some scholars focus on the so-called **barriers to repair**, in addition to the drivers for repair, to understand the slow uptake of repair. It is observed that the implementation of the CE is mainly focussed on recycling rather than reusing, repair and remanufacture, which is reinforced by challenges such as the absence of take-back mechanisms for products, limited reuse of products after their original use, low consumer demand towards the reuse of products and materials and, in reference to Groothuis (2015), high labour costs (income tax, payroll tax and social contributions) instead of high natural resources and consumption taxes (Ghisellini et al., 2016). Cooper & Salvia (2018) identify the following barriers: inappropriate product design such as the potential for disassembly, use of irreversible closures, low-quality materials, non-standardised parts, glues and welding and insufficient information; the propensity and ability to repair such as people's trust in repair, price considerations and asymmetry in repair knowledge; and the context of repair consisting of the availability of repair services, economic choices and socio-cultural norms. Furthermore, Danish companies are inclined to the local repair of smartphones because of economic advantages, opportunities to provide additional services and their acquired technical knowledge, whereas the limited access to spare parts and a legally determined long warranty period limit the uptake of repair (Riisgaard et al., 2016). Along these lines, generic barriers were identified for the reuse of electrical and electronic equipment, which comprised, amongst other things, the difficulty in accessing sufficient volumes of good quality used products; lack of supporting, incentivising and enforcing legislation; competition from (un-licensed) recyclers; and lack of trust of the manufacturers of electronic devices (Kissling et al., 2013). Additionally, economic obstacles to the repair of consumer electronics are analysed, particularly the labour cost is high and the level of needed repair is typically not clear before a laborious troubleshooting is performed, requiring a demand-based repair service pricing model (Sabbaghi et al., 2017). These contributions thus highlight that the upscaling of repair is hindered by a host of usually practical barriers.

### 2.2.2 Users, acceptance and awareness

Second, scholars state that it is crucial to analyse **users, acceptance and public awareness** to understand the slow uptake of repair. For instance, users' repair motivation may be dissected into three aspects: technical aspects such as lack of skills, time and accessible product design and spare parts; emotional aspects such as negative stigma and lack of confidence; and value aspects such as financial and aesthetic considerations and the condition of the product. These

motivations and choices may all maintain the still existing user perception of the take-make-dispose model, hindering a transition to closing materials loops and product repair (Nazlı, 2021). In a survey used to administer a questionnaire to participants of clothes mending events in the United States, it is found that consumers' engagement in clothing repair is minimal as a result of the high costs associated with clothing repair, not having the necessary skills and the time consumption of the activity (Diddi & Yan, 2019). Further, although the environmental consciousness of consumers in five Asian countries is high, the consumer acceptance and purchase rate of recycled and remanufactured products is low because consumers perceive these products as less reliable and of low quality. To promote the uptake of CE practices, policymakers and businesses should develop marketing strategies that address concerns of trust, cost and innovation (Kuah & Wang, 2020). Additionally, mobile phone consumers' unrealistic expectations of new features, valid guarantee time and low prices limit the economic viability of re-use markets of mobile phones. To facilitate the uptake of re-use, consumer awareness-raising measures are necessary concerning storing habits and retailers' take-back schemes, which may improve WEEE recovery efficiency (Ylä-Mella et al., 2015). In all, this strand of literature contends that users and public perception play a role in increasing the uptake of repair.

### 2.2.3 Broader, contextual conditions

Third, to understand the slow uptake, still other researchers point to the **broader conditions** in which the repair activities take place such as individuals entwined within various contexts, legislation, policy, infrastructure and valuation schemes. Kersty Hobson (2020) observes that the consumer-user in the CE and repair is often framed as one that passively accepts or rejects new business models. Yet the adoption of new repair practices is bounded by social, material and cultural configurations, which create barriers to transformation. Heather Rogers and her colleagues also take issue with highly technocratic repair narratives, neglecting repair as a relational act embedded in daily life. The results of the survey not only generate a demographic, contextualised profile of repair economy participants, drawing attention to gender, value orientations, age and education but also show a (stylised) tension between repair as an act of necessity and that of luxuriated choice (Rogers, Deutz, & Ramos, 2021). Further, products made with reused/remanufactured materials are able to compete with a new product from a similar category in terms of consumer demand. Yet to add circular offers to current production, original equipment manufacturers need policy guidelines on clear information about the amount of circular content in a product (Hunka, Linder, & Habibi, 2021).

To these broader contexts in which consumers navigate, Sahra Svensson-Hoglund and her colleagues, for example, add that repair opportunities are limited by intellectual property, consumer, contract, tax and chemicals law as well as by the product design and the current market and policy context in which original equipment manufacturers operate (Svensson-Hoglund et al., 2021). In the introduction of a special issue on repair, it is observed that technical objects are often 'hard-wired' or embedded into (logistical) infrastructure. Without acknowledging such a perspective and the changes required in infrastructure, repair may help to sustain rather than reduce environmentally damaging practices (Graziano & Trogal, 2019). By using the product biography approach, it is also demonstrated that products are assemblages of materials, which undergo multiple qualifications and valuations among various actors through their useful lives. Specifically, the automotive and IT industries are developing producer-centric business models that reconfigure parts of the supply networks along relatively

narrow specifications (e.g. modifying product designs with reuse and remanufacturing in mind at the outset), excluding broader relationships and conceptualisations (Spring & Araujo, 2017). Hence, to explain the slow uptake of repair, these scholars focus on a host of broader, contextual conditions such as legislation, policy, infrastructure and social dimensions.

### 2.2.4 Transformative interpretations of repair

The three above-mentioned strands of literature on the slow uptake of repair do not explicitly take into account that enabling the transformative potential of repair requires **new ways of interpretation**, (re)defining problems and potential solutions, which is a perspective that has expanded rapidly in the last years with regards to the CE (e.g. Bauwens, 2021; Calisto Friant, Vermeulen, & Salomone, 2020b; Genovese & Pansera, 2021; Kirchherr, 2021). Considering new ways of understanding repair, it is observed that the dominant framings of the CE usually interpret it as a tool or an instrument to deliver circular business objectives and profitability. Yet such an instrumentalist and incremental understanding of the CE and repair – usually neglecting practitioners of repair such as women and people of colour – overlooks values of integrity, care and legibility and thus the potentially transformative role of repair in a CE (McLaren et al., 2020). Along these lines, the transformative potential ascribed to the CE is questioned because the dominant interpretation is not as new as frequently claimed. Here it is illustrated that the 'outer circles' have already been reached across various geographies, while the 'inner circles' such as repairing, remanufacturing and repurposing require more attention from policymakers, businesses and academics to induce transformative sustainability change (Reike et al., 2018). Collective repair practices such as repair cafés and the right to repair also provide new interpretations of repair in relation to the three specific issues of expanding proprietary systems, pedagogical sites (e.g. learning skills and commoning knowledge) and sociality or conviviality. Here the transformative opportunities of collective repair are considered in the context of the dominant throwaway paradigm (Graziano & Trogal, 2017). Hence, despite the popular rhetoric of repair, this literature indicates that the transformative potential of the CE and repair is overlooked by dominant, technocratic interpretations.

When taken together, we contend that more empirical and theoretical work is needed on repair as a strategy in the CE. From an empirical perspective, the diverging interpretations of repair are understudied. In turn, focussing on these competing interpretations may help to understand the slow uptake of repair from a transition governance perspective. Therefore, the next section presents a framework to analyse diverging interpretations, and our research techniques and the case study.

# 3 Methodology

The previous section first introduced the CE and then turned to three main explanations for the slow uptake of repair by focussing on so-called barriers, user perspectives and broader aspects such as legislation and infrastructure. Yet it also indicated that these three explanations do not explicitly take into account that enabling the transformative potential of repair requires new ways of interpreting repair, in which problems and solutions are (re)defined. Therefore, this section presents a framework that seeks to analyse diverging interpretations, describing the

field of discourse studies and the analytical framework applied to the empirical material (3.1), the research techniques (3.2) and case study (3.3).

# 3.1 Analytical framework

## 3.1.1 Discourse studies and environmental governance

To analyse diverging understandings of repair, we use **discourse studies** as an analytical tool, implying that we contend that texts, conversations and, more broadly, ideas, interpretations and understandings matter in social practices and processes. Since the 1970s, various approaches to discourse analysis have been developed in the field of social sciences by linguists, sociologists, philosophers and policy analysts, amongst others (van Dijk, 2007; Keller, 2013; Wodak, 2008; Yanow & Schwartz-Shea, 2006). The approach builds on a basic agreement in social sciences that 'the relationship[s] between human beings and the world are mediated by means of collectively created symbolic meaning systems' (Keller, 2013, p. 2). The 'core' of the approach is 'the systematic and explicit analysis of the various structures and strategies of different levels of text and talk' (van Dijk, 2007, p. xxvi). Hence, discourse studies are concerned with texts and conversations, the (re)production of these in broader meaning systems, the actors involved, the underlying patterns and the influence on social processes (Keller, 2013), focussing on how different aspects of the world are interpreted in diverging ways by various actors and how these interpretations constitute particular projects of change.

In **environmental policy analysis**, discourse studies have become an increasingly established framework (Leipold, Feindt, Winkel, & Keller, 2019; Sharp & Richardson, 2001) for at least three reasons. First, given the impact of the so-called argumentative turn in social sciences (Fischer & Forester, 1993), language, narratives and discourses gained influence in environmental policy analysis because they actively shape policy, strategies, practices, problems and possibilities (Feindt & Oels, 2005; Hajer & Versteeg, 2005). Second, environmental problems are typically characterised by systemic interdependencies, path-dependency, long time horizons, multiple spatial scales and vertical and horizontal layers of governance across diverse societal systems. Therefore, ecosystems and social systems are highly complex, leading to multiple interpretations by numerous actors of the problem and potential ways forward (Dryzek, 2005; Meadowcroft, 2007). Third, along the lines of deliberative democracy, an analysis and acknowledgement of diverging and typically conflicting interpretations may help in facilitating sustainability transformations by providing feedback on policy practices that may be used in reflexive activities by policy communities. It may, for example, address linkages between what is being said and what may happen, adding to the understanding of why policy results in changes that are not always anticipated (Dryzek & Niemeyer, 2008; Feindt & Weiland, 2018). Overall, these three remarks illustrate the relevance of discourse studies for environmental governance.

Using discourse studies to analyse environmental problems, scholars have focussed on distinguishing different types of discourses as well as on their influence on change trajectories. Concerning the **types of discourses**, four broad narratives of green transformations were, for instance, identified, namely state-led, citizen-led, market-led and technology-led. Each narrative embodies a different perspective on what sustainable means, whose sustainable counts and what is to be changed how, when and why, suggesting diverging pathways to

sustainability that require particular political and societal choices (Scoones, Leach, & Newell, 2015). A range of environmental discourses are also categorised along the dimensions of small and large changes and maintaining or redefining current political-economic institutions (Dryzek, 2005). Similarly, a typology of CE discourses was recently developed, classifying circularity visions according to their position on social, technological, political and ecological issues (Calisto Friant et al., 2020b).

In addition to identifying discourses, the field also investigates how **discourses influence trajectories of change**, particularly by shaping specific policies, strategies and investments. For example, a two-step procedure is introduced to evaluate the influence and dominance of discourse, using the concepts discourse 'structuration' and 'institutionalisation' (Hajer, 2006). Further, innovation trajectories are shaped by so-called 'imaginaries' about the future (Sovacool et al., 2020) and by struggles over legitimacy (Geels & Verhees, 2011), which are fuelled by diverging ideas, language and arguments. In analysing visions and expectations, it is also demonstrated that established actors discursively frame the energy transition to align it with their interests. Yet alternative frames may challenge such dominant frames, which leads to tensions and uncertainties amongst the established actors, potentially inducing change (Bosman et al., 2014). Discourses are also influenced by prevailing institutional contexts, frequently leading to narrow interpretations of environmental policy (Smith & Kern, 2009), which then give shape to specific trajectories of change (Ampe, Paredis, Asveld, Osseweijer, & Block, 2019). These scholars thus highlight that tackling the 21st century's most significant challenges will not only require new technologies, business models and consumption patterns but also radical, new ways of interpreting and understanding environmental and societal problems and their potential solutions.

In sum, discourse studies are regarded as a powerful tool in social sciences, the approach is particularly useful to understand the complexity and competing interpretations of environmental policy. Therefore, we contend that using discourse studies as an analytical tool helps to explore our research questions about the diverging interpretations of repair, which may also help to understand the limited uptake of transformative repair. In what follows, we describe how discourse analysis is used as an analytical tool in this report.

### 3.1.2 Discourse studies as an analytical tool

As the previous section makes clear that discourse analysis is a broad field, this section specifies how it is used as a tool or method in this report. We use Maarten Hajer's (1995) seminal work, who developed the following **definition of discourse:** 'a specific ensemble of ideas, concepts, and categorisations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities' (p. 44). A discourse thus represents aspects of an environmental phenomenon that might be represented differently by particular actors and their projects of change. It may make certain elements appear as fixed or normal, requiring no further action, while other elements appear as problematic and require changes, raising intriguing questions of 'What can be thought within its structures? Where does it hit its conceptual limits? In what sense does it open up solidified relations of power?' (p. 4). Hence, the power to define thus not only includes particular understandings but also excludes specific aspects from the debate, and it influences what particular social groups see, think and do.

Whilst Hajer's (1995, 2006) work suggests analysing discourses along with the concepts of storylines, their context and political influence, this report especially pays attention to what is being said by whom by using Hajer's middle-range concepts of storyline (hereafter referred to as narrative) and discourse coalition. **Narratives or storylines** are 'a condensed statement summarising complex narratives, used by people as "short hand" in discussions […] The essence of a narrative is that it has a beginning, middle, and an end [but] mostly people do not tell the whole story but use short cues' (2006, p. 69), allowing actors to reduce complexity, ignore ambiguity and expand their own understanding of a problem and the potential solutions. When analysing narratives, scholars have thus focussed on categories of causal relationships, threatening consequences, problem-dimensions, solution-options, the involved actors, positioning of self and others and the related responsibilities (Keller, 2013) and, more generally, on the understanding of problems, solutions and consequences (Ampe et al., 2019; Scoones et al., 2015; Simoens & Leipold, 2021). As stories enable actors to reduce complexity, they help actors to organise social interaction and especially to collaborate on particular political projects. Narratives thus function as 'discursive cement that keeps a discourse-coalition together' (Hajer, 1995, p. 65). Accordingly, a **discourse coalition** is a group of actors that shares the usage of a specific set of narratives over a particular period of time, developing their own problems, potential solutions, goals and values.

By using the concepts of narratives and discourse coalition in our analysis, we aim to answer the research question about how actors interpret repair. To do so, we focussed on the definition of problems and potential solutions (i.e. narrative) used by particular groups of actors (i.e. discourse coalition) concerning the uptake of the repair of electronic consumer devices in Flanders. The objective is to highlight different interpretations or discourses, particularly the diverging political and societal choices to be made, which may also help to explain the slow uptake of repair from a transition governance perspective.

## 3.2 Research process and techniques

In the process of selecting a case, choosing a conceptual and analytical approach, collecting and analysing empirical material, we used an abductive approach, which is embedded in an **interpretive methodology** (Schwartz-Shea & Yanow, 2012). In abductive reasoning, 'an (often surprising) single case is interpreted from a hypothetic overarching pattern, which, if it were true, explains the case in question […] During the process, the empirical area of application is successively developed, and the theory (the proposed overarching pattern) is also adjusted and refined' (Alvesson & Sköldberg, 2009, p. 4). As such, prior knowledge about the CE and the governance of transitions as well as preliminary field observations helped to obtain a rough idea of diverging interpretations concerning the repair of electronics in Flanders, particularly the differences between, for example, the social economy, repair movement and manufacturers. In turn, these preliminary interpretations were regularly adjusted by alternating between the literature, frameworks and different types of empirical material (see Appendix for a list of the interviews and documents).

Regarding the **empirical material**, we conducted 16 (online) interviews and joined five meetings of a project on the repair of electronics in 2021. The interviewees were selected by snowball and purposive sampling (Yin, 2016) and included actors related to the repair of electronics in Flanders such as the repair movement, manufacturers, retailers, recyclers and public

administration. The in-depth interviews lasted between 60-120 minutes. They began with personal histories and roles concerning electronics and the CE, repair and recycling, after which we gradually focussed on our analytical framework, particularly on the problems related to the need for repair and to its uptake, and the potential solutions. In doing so, we were guided by the perspective of the interviewees, although we also asked them for alternative views to test our own assumptions and construct counter-discourses. We also participated in five meetings of a project focussing on the repair of electronics in Flanders by bringing manufacturers, retailers, NGO's and academics together. At this time, we also selected the most relevant documents collected during the fieldwork, which helped to contextualise the interviews.

Concerning the **analysis of the empirical material**, immediately after each interview, the first author of this report copied and digitalised the handwritten field notes and then transcribed selected parts of the conversations. These extensive but partial transcripts were then coded with a software program, whereas the selected documents were used to complement the information obtained from the interviews. At the beginning of the coding process (July 2021), the material was organised by using the categories of 'problems' and 'potential solutions', leading to diverging views and arguments. After a few weeks (August 2021), four broad categories of interpretations started to emerge, which were then outlined in a preliminary draft. The draft was then developed and complemented by additional interviews and by delving into the documents, which eventually led to the identification of four discourses and the related narratives and coalitions (see section 4). In all, we contend that these methods were sufficiently technical to support the argument of the report.

In October 2021, we stopped the collection of empirical material because no additional information relevant to answering the research questions was obtained from the interviews and documents. The introduction (section 1), methodology (section 3), empirical analysis (section 4) were sent to all the interviewees for feedback. Ten respondents, (re)producing the four different discourses in our analysis, read the draft and replied. The comments confirmed and nuanced the empirical analysis of the discourses and counter-discourses. Some respondents also provided ways to interpret the results, usually along the lines of the discourse they (re)produce.

## 3.3 Introduction to the case: the repair of electronic consumer devices in Flanders

A large part of the **actors involved in the repair of electronic consumer devices** was identified in two recent studies. In Flanders, a report of an NGO suggested that important roles are played by the manufacturers of the devices, retailers, authorised service centres, independent repairers, the social economy (i.e. social enterprises focussed on labour market insertion) and repair cafés (Repair&Share & De Transformisten, 2021). The consultancy company Rebel Group identified similar actors in the Netherlands (Kort et al., 2021). From our empirical analysis (see section 4), a few additional actors emerged. Specifically, in the policy approach called extended producer responsibility and the Waste from Electrical and Electronic Equipment (WEEE) Directive, the EU, the Public Waste Agency of Flanders and the Producers Responsibility Organisation (PRO) called Recupel are involved. The EU also matters as a result of initiatives such as the Ecodesign Directive and the recent Circular Electronics Initiative. In what follows,

we describe these actors and their activities as an introduction to our case on the repair of electronic consumer devices in Flanders.

The **manufacturers** of electronic devices are brands such as BSH, Miele, Samsung, Philips and Groupe Seb. Obviously, the core business of these companies is selling devices. Yet some of these companies also provide repair services in and out of a minimum two-year legal guarantee for the broken devices. The product is then repaired in the customer's home, repair centre of the manufacturer or an **authorised service centre**. The latter are authorised by the manufacturers and are typically known as so-called professional repairers. To repair the products in their own centres or in the consumer's home, the idea is that these repairers are provided with straightforward access to replacement parts, repair manuals and training of the manufacturers. The majority of devices are transferred to the centres by manufacturers or retailers. Yet, in addition to sales, a few **retailers** are gradually developing their own repair centres, which are then authorised by certain brands. Overall, the majority of the devices repaired by the repair centres of manufacturers, authorised repairers or retailers are still in the two-year guarantee, although consumers may also pay for repair by one of these actors out of the guarantee period.

Out of the two-year guarantee of the EU's Directive on the sale of consumer goods and associated guarantees, independent repair, the social economy and repair cafés take the stage. **Independent shops** repair the broken devices of consumers, which is paid for by the consumer instead of the manufacturer as the items are repaired out of guarantee. As they are not authorised, the access to low-priced original replacement parts, repair manuals and training are less straightforward compared to authorised repairers, although (paid) access may be requested from the manufacturers. Consequently, these shops are slowly disappearing and specifically focussing on devices for which the price of repair is relatively cheap for the consumer compared to purchasing a new product. The repair centres of the **social economy** are also involved in the repair of electronic devices. The centres receive a limited amount of reusable and repairable devices from retailers, manufacturers or citizens, whilst waste devices are also delivered by household waste recycling centres and the subcontractors of the PRO that collect WEEE. Finally, being part of a broader repair movement, **repair cafés** are typically operated by non-profit organisations and volunteers, and are freely accessible to citizens and consumers to repair broken devices.

The activities of the aforementioned actors are also related to broader frameworks of the EU, namely the WEEE Directive and extended producer responsibility, in which the Public Waste Agency of Flanders and the PRO called Recupel play a role. **WEEE** became law in 2003, setting collection, recycling and recovery targets for all types of electrical and electronic goods, whereas it also prioritises preventing the creation of WEEE. It imposes the responsibility for the disposal of these goods on the manufacturers and distributors of the devices (i.e. extended producer responsibility), which implies that they have to establish an infrastructure for collecting the waste that makes returning WEEE free of charge for consumers. In Flanders, the **Public Waste Agency** uses the Flemish legislation on sustainable management material cycles and waste (in Dutch: Vlaams reglement betreffende het duurzaam beheer van materiaalkringlopen en afvalstoffen, VLAREMA) to negotiate a so-called take-back agreement (in Dutch: milieubeleidsovereenkomst and, from 2021 onwards, aanvaardingsplichtconvenant) with the manufacturers and distributors, resulting in an agreement for WEEE that lasts between

five and eight years. The new agreement (2021-2029) puts more focus on repair and reuse, particularly by investing six million euros in the CE. Evidently, the **PRO** is responsible for collecting and processing WEEE for free, which is funded by a so-called Recupel contribution. The contribution consists of an amount added to the price of new electronic devices, which is levied upon consumers' purchase of new devices but paid by the manufacturers or producers (i.e. it is not incorporated into the product price as a cost). The collection and treatment of WEEE are carried out by various subcontractors of the PRO.

In 2005, the EU established the **Ecodesign Directive** to set mandatory ecological requirements for energy-using products, which was revised in 2009 to extend its scope. In 2021, new Ecodesign measures entered into force for newly sold washing machines, dishwashers, refrigerators, displays, servers and power transformers, excluding, for instance, smartphones and ICT. The regulations concern ecological efficiency requirements and the provision of maintenance information and safety-related replacement parts to so-called professional repairers (as opposed to volunteers, end-users or consumers), who have the technical competence and comply with the applicable regulations in a member state such as an official registration system. In Belgium, two sector federations that represent manufacturers and distributors of electronic appliances are collaborating with their members and stakeholders to develop a definition of professional repair. From 2015 onwards, the Directive has increasingly been linked to the European Commission's initiatives on the CE, particularly the new **Circular Economy Action Plan** announces a Circular Electronics Initiative that would promote: longer product lifetimes by introducing regulatory measures for electronics and ICT under the Ecodesign Directive; the right to repair and a right to update obsolete software; regulatory measures on chargers; and the improvement of the collection and treatment of WEEE, amongst other actions.

# 4 Empirical analysis: four discourses on the repair of electronic consumer devices in Flanders

In this section, we present the **empirical analysis of the case** on the repair of electronic consumer devices in Flanders, particularly focussing on how actors interpret repair. We identify four discourses: empowering citizens, consumers and independent repair companies to repair electronics (4.1); repair and recycling on an equal footing (4.2); repair as a market opportunity (4.3); and the social objectives of repair over economic efficiency (4.4).

Every discourse and the related coalition interpret repair differently. Therefore, we first describe the narrative, which consists of the problems, related to the need for repair and to its uptake, and the potential solutions. We then turn to the discourse coalition that (re)produces

the narrative. For every discourse, we also provide a box with highlights, summarising the discourses. At the end of the section, the four discourses are schematically displayed in Table 1. In section 5, the empirical analysis is discussed from an empirical and theoretical perspective.

## 4.1 Discourse 1: empowering consumers, citizens and independent companies to repair electronics

**Highlights**

- The narrative identifies the following problems: environmental impact, the strict business model of manufacturers, restricted access to repair services and throw-away economy.
- As solutions, the narrative suggests empowering different actors to open up the restricted access to repair, informing consumers with labels, restoring the distant relationship between objects and citizens and broadening the debate on financing repair.
- In Flanders, the discourse coalition consists of the repair movement and the largest consumer organisation.

According to this narrative, **multiple problems are related to repair**. The point of departure for the narrative is the environmental and ecological footprint across the lifecycle of consumer electronics. These products are usually produced outside of the EU and in the Global South, and the detrimental effects on the environment are not taken into account by the EU and manufacturers, whilst e-waste is one of the fastest-growing waste streams in Europe and the cost of processing this waste stream is insufficiently included in the PRO's policy. This situation is fuelled by the strict business model of the manufacturers of electronics, implying the selection of the cheapest parts, components and production processes, which frequently leads to premature obsolescence of electronic devices and thus more waste instead of repair. Typically, the repairability of consumer electronics is limited because of the design of products, the restricted access to repair manuals and the unavailability or high price of replacement parts. The manuals and parts are usually only available to the manufacturers of electronics and authorised service centres, who are said to use the argument that they are the only ones that can repair electronics in a 'safe' and 'professional' manner. The situation is further influenced by the advertisements of manufacturers and retailers, continuously emphasising sales and the newness of products, as well as by the prevailing recycling logic of the PRO. Yet the discourse also acknowledges that the activities of manufacturers are intertwined with the role of consumers, particularly the throw-away economy and culture, consumers pursuing the easiest and cheapest choice, i.e. throw-away instead of repair, and the distant relationship of consumers and citizens with objects such as electronics.

To address these problems, the proponents of this narrative prefer the repair over the increased recycling of electronics and propose **four potential solutions** to accelerate repair. First, the narrative wants to empower citizens, consumers and independent companies to repair electronic devices. It proposes to open up the restricted access to repair beyond manufacturers and authorised services centres, particularly by giving independent repair technicians, non-for-profit organisations and anyone who owns electronics long-term access to (cheap) replacement

parts and repair manuals. Here the general aim is to create as many repair facilities and shops as possible. Along these lines, the repairability of products is influenced by their design and the advocates of this narrative support the recent initiatives concerning the right to repair in the EU. They welcome the new Ecodesign measures that force the manufacturers to ensure that most parts and manuals are available to professional repairers and allow them to dismantle the devices by using conventional tools. However, the new regulations are also criticised and should quickly be expanded, particularly to include smartphones, computers and other small devices, as well as a broader range of professional repairers.

Second, the narrative proposes the increased introduction of labels to inform consumers (e.g. the repair-index of Belgium's federal Minister of Climate and Environment) about the products they purchase. Such a label contributes to the transparency of the value chain of electronics, providing information on, for instance, repairing the device by using conventional tools, major use of adhesives, the replaceability of the battery and the lifespan of the components.

Third, as the narrative problematises the throw-away economy and culture, it acknowledges the role of repair in replacing the strong desire for constantly purchasing new objects. Repair cafés, for instance, hold the radical potential to restore the distant relationship and connection between objects and citizens or consumers.

Finally, belonging to the discourse's coalition, the repair movement in particular not only confirms that repair is expensive but also raises the intriguing question of who is responsible for paying for the uptake of repair of electronic devices and the related training, suggesting that this puzzle should be part of a broader societal debate about human dignity and ways to inhabit the earth. Here it is suggested that the social economy's low wages, lower labour tax rates (and higher material tax rates) and a higher PRO contribution or eco-contribution (depending on the repairability of the device) can play a substantial role in accelerating the repair of electronics in Flanders, which can further be explored in pioneering projects according to the proponents of this narrative.

This discourse is primarily produced and reproduced by the narratives and practices of a **discourse coalition** that consists of organisations related to the repair movement. Additionally, the biggest consumer organisation of Belgium that typically advertises the best and cheapest deals for consumers, leading to increased competition between manufacturers, is increasingly aware of the negative effects of consuming. Accordingly, it is developing strategies on empowering consumers to make more sustainable choices such as repairing instead of throwing away.

## 4.2 Discourse 2: repair and recycling on an equal footing

**Highlights**

- The narrative identifies the following problems linked with repair: the impact on the environment and value chains, societal pressure, the low collection rates of WEEE, vested interests and the labour costs and skills related to repair.

- The narrative pursues the following solutions: using less primary and more secondary resources in production processes, extending the lifetime of products (e.g. through repair under specific conditions) and expanding the (selective) collection and recycling of electronics.
- In Flanders, this discourse is advocated by a coalition of the PRO, recyclers, the manufacturers of electronics and two federations representing companies related to electronic appliances.

At least **five concerns** are identified by this narrative. First, indicating the need for repair, the pressure on the environment caused across the lifecycle of electronics constitutes a major problem. Here the manufacturers are not only worried about the scarcity of virgin materials that are used in the production process but also about chemicals such as CFCs used in their products. The recyclers of electronics and the PRO note that the impact on the environment has been central to their activities since the start of the extended producer responsibility approach in 2000. Tied in with the first problem, a second issue is the increasing societal and political pressure regarding the environment, sustainability and a CE. For instance, Fridays for Future, the Ellen MacArthur Foundation and the ongoing initiatives of the EU such as the Green Deal and the CE package increase the awareness of the necessity for changes among the actors in the value chain of electronics. In Flanders, the social economy, the regions and the new take-back agreement between the Public Waste Agency and the PRO also put more emphasis on the CE. Third, although this narrative supports increased repair, it also emphasises a closely related problem: only approximately 50% of WEEE is collected by the PRO in Flanders, of which 80% is recycled to resources and 10% is incinerated for energy recovery. It implies that the EU's 2019-target of a collection rate of 65% was not met and that it is unclear what happens to the other half of WEEE, which is a problem that demands action from the PRO. Fourth, the narrative asserts that large shifts to a CE are constrained by vested interests. Specifically, it points to the investments in technical infrastructure such as the shredders of recyclers, the warehouses and value chains of manufacturers that lead, for instance, to the low availability of replacement parts for repair, the cost efficient business models (induced by competitive markets) and, generally, prevailing 'systems, procedures and ways of reasoning' (Interview 7). Finally, the labour costs related to the CE pose a problem. The narrative considers repair as expensive because of the labour intensity, labour costs, transportation costs for large appliances and, contending that most electronics considered for repair do not have any market value as they are old and inefficient, the low return on investment. It also holds that job offers are available in the recycling and repair sector but the required skills are getting increasingly complex as a result of the advanced design of electronic devices, making it hard to attract potential employees.

As a consequence of these problems, this narrative proposes **three solutions** related to a waste hierarchy, in which repair and recycling are put on an equal footing. The first step within their hierarchy is using less primary and more secondary resources in the production processes of electronics. Here the PRO takes centre stage as it focusses on collecting and particularly recycling WEEE. In collaboration with recyclers and compounders, the narrative expects the PRO to carry the responsibility to increase the quantity and quality of the recovered secondary resources by using innovative technology, which can then be used in the production process of the manufacturers of electronic devices. As primary resources are usually cheaper than

secondary resources, the recyclers involved in this narrative argue for incentivising the manufacturers to use secondary resources in their processes. Specifically, as the oil price falls, virgin plastics become cheaper and the recyclers' revenue from recycled plastics drops, frequently leading to incineration instead of recycling, which is a mechanism that should be adjusted by European market instruments.

Second in the narrative's waste hierarchy is extending the lifetime of electronic devices, for which repair is considered. Here two main strategies are pursued, which generally identify and address the narrative's problems concerning the environmental and societal pressure, vested interests and labour costs. On the one hand, pioneering projects that focus on reverse logistics, product-as-service systems and collaborating with the social economy, amongst other topics, are considered as experiments to do things differently, particularly for the PRO and the manufactures. On the other hand, increased repair is suggested as a strategy, although this is envisioned under specific conditions within the narrative's waste hierarchy. Specifically, repair and recycling are put on an equal footing by the narrative. It argues that the recycling of electronics typically generates a lower environmental impact in comparison to the repair of electronics, particularly as replacement parts are not produced anymore and the environmental performance of the devices collected and recycled is low. Additionally, if electronic devices are repaired, the repair needs to take place in an efficient (i.e. no repair for old devices), safe and competitive (i.e. competition law and level playing field) way, which are aspects that manufacturers, authorised service centres and professional repairers cover in their repair activities and that are largely in line with the EU's Ecodesign measures. According to the narrative, this not only helps manufacturers to protect their brand and avoid liability (e.g. in the context of devices repaired by the social economy and repair cafés) but also to offer repair as a new service in their business cases, which they explore in the above-mentioned pioneering projects. The strategy thus allows the manufacturers, professional repairers, PRO and recyclers to maintain their (market) position. The narrative further states that the behaviour of consumers related to repair needs to change, inducing change in the demand for repair and, accordingly, in business models. It also notes that the capacity of the social economy is limited, which could be increased by the government (and usually not by increasing the PRO's contribution) to resolve the problem related to high labour costs. Hence, the repair of electronics is considered a feasible strategy under highly specific conditions by this narrative.

Third, as recycling is considered as at least as important as repair (i.e. equal footing), the third step in the narrative's waste hierarchy then suggests expanding the (selective) collection and high-quality recycling of electronics, which is the core business of the PRO and the recyclers. As only 50% of WEEE is collected, more work is needed on the collection and the reporting channels of WEEE to uncover the potential of the so-called 'urban mine' of old electronic devices. Increasing the selective collection is also considered for electronic devices that are relatively new, repairable and valuable, which then could be repaired by the social economy under certain conditions, as mentioned. Furthermore, to optimise the recycling process to produce high-quality secondary resources, the narrative urges the EU to create a level playing field, although the specific conditions of this level playing field are up for discussion: the recyclers emphasise design for recycling policies, requiring investments from manufacturers, whereas the manufacturers typically prefer policies or targets for recyclers, requiring action from the latter.

The narratives and practices that reproduce this discourse are supported by a powerful **discourse coalition**. It consists of the manufacturers of electronic devices, the recyclers of electronic devices, the PRO and two federations, representing companies related to electronic appliances, that are core members of the PRO's board.

## 4.3 Discourse 3: repair as a market opportunity

**Highlights**

- The following problems are connected to repair according to this narrative: environmental impact, resource scarcity and the related political pressure; the economic and recycling logic of manufactures, recyclers and the PRO; and labour market skills shortages.
- To create market opportunities for repair, the narrative suggests changing the roles of the repair sector, manufacturers, PRO and governments; increasing public expenditures to close the skills gap; and developing pioneering projects to make repair attractive for consumers.
- The discourse coalition consists of authorised repair centres, independent repairers, retailers and the Public Waste Agency, whilst one federation representing companies related to electronic appliances is additionally reproducing the second discourse.

The narrative identifies **three problems** appertaining to repair. First, there is a concern over the environmental impact across the lifecycle of electronic consumer devices such as the production process, the transport and the e-waste related to the throw-away culture. It indicates why the accelerated uptake of repair is needed, which is further emphasised by focussing on the scarcity of resources, the related price volatility and the reshoring of the EU's supply chains. Accordingly, the political and societal pressure for a shift to repair is mounting: for example, under France's *loi anti-gaspillage,* a repairability index came into force at the beginning of 2021, whilst a few months later the new Ecodesign regulations of the EU were introduced. Second, resembling the first and fourth discourse, this narrative takes issue with the economic and recycling perspectives of the manufacturers, recyclers and PRO. For instance, the manufacturers are trapped in a model of increasingly selling one-off devices; make replacement parts expensive; use adhesives and cheap parts; and play around with guarantee conditions to avoid increased repair. According to this narrative, the PRO and recyclers also advocate for more recycling and fewer regulations, whilst the collectors of WEEE typically operate as scrap dealers, having adverse effects on the repairability of the devices. When taken together, purchasing new devices is usually cheaper and easier for consumers than repairing broken devices. Third, the authorised repair centres, independent repairers, retailers and federation note that the growth of the repair sector is restricted by labour market skills shortages: the repair of electronic devices is expensive, particularly the recruitment and training of employees because the required technical and soft skills are scarce and hard to obtain.

For this narrative, these three problems give rise to **three solutions**, which are shaped by the narrative's main objective, namely that the repair of electronic devices provides a market opportunity for retailers developing repair schemes and independent and authorised repairers.

First, a host of changes is needed in the roles of various actors: the repair sector, PRO, manufacturers and EU. Concerning the repair sector, slow professionalisation needs to accelerate, particularly by closing the gap between repair cafés and professional repair. The conditions for being a professional repairer must be relaxed and not only set by the manufacturers of electronic devices themselves but, for instance, by an umbrella organisation. In line with the first and fourth discourse, the PRO is envisaged to take responsibility for repair: increased selective collection, highly specific recipients for WEEE, a higher PRO contribution that may be dependent on the repairability of the device to fund repair and, generally, prioritising repair over recycling. Here the new take-back agreement between the Public Waste Agency and the PRO is said to take the first incremental steps (e.g. by funding CE projects outside of the traditional collection and recycling activities). However, more efforts are needed from manufactures to design their devices for repair and to provide low-priced replacement parts and manuals. To realise this goal, the EU is expected to develop more stringent and extended design and guarantee regulations. The Public Waste Agency also counts on these regulations, particularly to gradually reinforce Flemish legislation on sustainable management of material cycles and waste, allowing them to emphasise waste prevention, reuse and repair in the negotiations on the take-back agreement with the PRO and their members.

Second, to close the so-called skills gap, public expenditures could lead to new collaborations between employment agencies, vocational universities, centres focussing on vocational training (for self-employment) and the social economy. These partnerships are then expected to result in competency profiles, degrees and training concerning the repair of electronics.

Third, as the narrative's proposals challenge existing ways of saying and doing, it argues that all the aforementioned solution strategies should be explored in pioneering projects by all the stakeholders. Such projects allow the validation of potential market opportunities, business models and financing instruments of electronic consumer devices' repair, making it a more attractive option for consumers.

This discourse is mainly brought about by a **discourse coalition** of authorised repair centres, independent repairers and retailers that offer repair services. By defining problems and solutions in this way, they maintain or expand their business models. The Public Waste Agency also reproduces large parts of this narrative but they do not engage in the labour market-debate as it is outside of their scope of responsibilities. Furthermore, the federation representing companies related to electronic appliances alternates between this discourse and the second discourse, particularly deviating from the discourse identified here with regards to a higher PRO contribution and strict measures for the manufacturers of electronic devices (i.e. the companies represented by the federation).

## 4.4 Discourse 4: the social objectives of repair over economic efficiency

**Highlights**

- The fourth narrative contends that the increased uptake of repair is crucial for an ecologically safe and socially just space for humanity, although it is hindered by the complexity of devices and a recycling logic and economic efficiency.

- The narrative proposes changing the PRO, designing for repair, developing pioneering projects (to explore collaborations and an employee-centred approach to labour) and establishing an umbrella organisation for professional repair.
- The organisations involved in the social economy form the core of this discourse's coalition.

For repair, **three problems** are identified by this narrative. First, along the lines of the previous discourses, the environmental impact of electronic devices is problematised by this narrative. As the devices contain a lot of conflict minerals such as critical metals and rare earths, it is crucial to keep the devices in the material loop as long as possible, particularly a host of devices that still function – and only need a brief screening instead of extended repair – end up in recycling facilities. Second are the high prices of new, instead of repaired, large electrical appliances such as washing machines, which typically cannot be afforded by people living in poverty. Third, according to this narrative, the uptake of repair is limited because of the circular practices of the manufacturers of electronic devices, the PRO and the Public Waste Agency predominantly adhere to recycling and economic efficiency, only leading to minor adjustments in their business models. Here, specific problems emerge such as the decreasing repairability of electronic devices resulting from increasing product complexity and the use of adherents; the high price of replacement parts needed for repair; although diminishing, the confidence of manufacturers in the social economy's repaired products is low; and, finally, the collection of electronic devices is not selective and not done in a careful way to maintain the repairability of the devices.

Given these problems, the narrative proposes **five solutions**. First, resulting from the predominant recycling logic within the PRO, far-reaching changes are necessary. It is the role of the PRO to carefully collect and select discarded electronic devices, separating broken devices from repairable or nearly new devices. Although the social economy is allowed to access the collection points of the PRO, thousands of, for example, washing machines are usually stored in one collection point, which makes manually selecting the repairable devices difficult. Making small adjustments to the recipients for collecting smaller devices, the PRO could also help the social economy in repairing electronic devices. The social economy acknowledges that improving how electronic devices are collected and selected is expensive (e.g. transport costs, new recipients, labour costs …), further suggesting that the PRO, including the Public Waste Agency, may use its power to shape and adjust the agreements with the subcontractors that collect and select the devices. Along the lines of the first discourse primarily advocated by the repair movement, this narrative also indicates that a higher PRO contribution or eco-contribution can play an important role in upscaling and particularly financing the repair of electronics.

Second, related to the recycling logic and complexity of the devices, the narrative notes that the design for repair deserves more attention from the manufacturers to increase the repair instead of the recycling of the devices. Specifically, belonging to the discourse's coalition, the social economy argues that accelerating design for repair may expand, over time, the number of repairers and their representation in WEEE-debates, leading to a stronger repair logic and an increase in repairable devices. Yet the narrative is also cautious in making this suggestion as more repairers may also compete with the social economy's repair centres in the short run.

Third, in line with the first and second identified discourse, the social economy wants to collaborate with the manufacturers, PRO and Public Waste Agency in developing pioneering projects because it recognises that a shift in recycling logics and the design for repair require fundamental change in the core of these organisations.

Fourth and relatedly, concerning the labour market skills for repair, the narrative aims to explore partnerships with the aforementioned organisations. Specifically, digging beneath the surface of issues such as increasing employment quota in the social economy, improving STEM education and developing vocational training, the narrative explores intriguing questions. For example, it asks whether manufacturers could pay the social economy to train certain employees to repair electronics, who are then, later on, employed by the manufacturer. Here it is also indicated that the social economy's employee-centred instead of the private sector's profit-centred approach to repair and skills may dissolve the perceived skills gap on the labour market.

Finally, the (professional) repair sector, including independent repair and authorised service centres, requires an umbrella organisation to pursue their objectives according to this narrative. Overall, the narrative contends that these proposals may lead to the increased uptake of the repair of electronics, employment in the social economy, environmental gains and poverty alleviation by providing less-expensive electronic devices to the customers of second-hand stores.

The **discourse coalition** consists of organisations that represent the social economy and the social economy's centres that repair electronic devices.

*Table 1: schematic summary of the four discourses*

| | Problems | Solutions | Discourse coalition |
|---|---|---|---|
| **Discourse 1:** empowering consumers, citizens and independent companies | - Environmental impact<br>- Strict business model, restricted access to repair, advertisements, recycling logic<br>- Throw-away economy and culture | - Open access to repair and design for repair<br>- Labels informing consumers<br>- Restore distant relationships with objects<br>- Who pays? Debate about training, the social economy, (labour and material) taxes, PRO and eco-contribution, facilitated by projects | Repair movement and the consumer organisation |
| **Discourse 2:** repair and recycling on an equal footing | - Impact on the environment and value chain<br>- Societal pressure<br>- Low WEEE collection rate<br>- Vested interests: infrastructure, business models, ways of reasoning<br>- Labour costs and skills | - Increased use secondary resources<br>- Explore repair in projects, under certain conditions (e.g. efficient, competitive and safe; consumers need to change; increased government funding for social economy's labour)<br>- Increase selective collection of WEEE | The PRO, recyclers, manufacturers, two federations (representing electronic appliances) |
| **Discourse 3:** repair as a market opportunity | - Environmental impact, resource scarcity and political pressure<br>- Economic and recycling perspective of manufacturers, recyclers and PRO<br>- Labour market, skills shortages | - Roles of actors: professionalise repair sector; PRO increases collection, contribution and design for repair; strict rules of governments<br>- Public expenditures close the skills gap<br>- Projects, making repair attractive for consumers | Authorised repair centres, independent repairers, retailers, the Public Waste Agency and a federation (representing electronic appliances) |
| **Discourse 4:** the social objectives of repair over economic efficiency | - Environmental impact<br>- Poverty alleviation<br>- Recycling logic and economic efficiency | - Changes in PRO, selective collection, contribution<br>- Design for repair<br>- Pioneering projects<br>- Exploring collaborations and employee-centred approach to labour<br>- Create umbrella organisation for (professional) repair | Social economy and the social economy's centres that repair electronics |

# 5 Discussion

By identifying four discourses, the previous section answered the first research question about how actors interpret repair. We identified the 'empowering consumers, citizens and independent companies' discourse (hereafter empowering discourse, see 4.1), the 'repair and recycling on an equal footing' discourse (hereafter repair & recycling discourse, see 4.2), the repair as a market opportunity discourse (hereafter market opportunity discourse, see 4.3) and the 'social objectives of repair over economic efficiency' discourse (hereafter social economy discourse, see 4.4). The four discourses highlight diverging interpretations of repair, particularly revealing some of the political and societal choices to be made by policymakers.

By using the empirical analysis from section 4, we now answer the second research question about how to understand these interpretations from a transition governance perspective, exploring a novel way of explaining the slow uptake of transformative repair in three steps. First, we address the commonalities between the four discourses, which may be used by policymakers and practitioners for taking potential, yet small steps forward (5.1). Second, however, we illustrate that the four discourses diverge significantly in terms of fundamental political and societal choices concerning repair (5.2). Therefore, we then focus on transition pathways to a circular repair economy and the politics of labour, training and education (5.3). Before concluding the report in section 7, we discuss the implications of these findings for policymakers and practitioners in section 6.

## 5.1 Small steps forward: commonalities between the four discourses

**Highlights**

- Given the current environmental problems, repair is a promising way forward for the CE.
- Strict business models, economic efficiency and recycling logics limit the uptake of repair.
- Consumer may play a role in accelerating repair.
- The (selective) collection of WEEE may be increased and finetuned to accelerate repair.
- The repair centres of the social economy could play a significant role in the uptake of repair.
- Except for the repair & recycling-coalition, all welcome more stringent rules concerning design for repair to accelerate repair.
- Labour, skills and training are crucial in the accelerated uptake of repair.
- Pioneering projects or experiments, involving multiple stakeholders, may help to advance repair.

The empirical analysis illustrates that there are several **common features** between the four discourses, which may be used for taking small steps forward. At least **two problem definitions are shared** by the four discourses. First, in view of the current environmental crisis, the four discourses all recognise that the circular strategy of repair is a promising strategy. Second, to different extents, the four discourses acknowledge that the strict business model and the vested interests of manufacturers as well as the dominant logic of recycling and economic efficiency pose a problem for accelerating repair.

The discourse coalitions further have **six solutions in common** that may be explored and then used by decision-makers and practitioners. First, the role of the consumer is addressed by the empowering discourse, repair & recycling discourse and market-opportunity discourse. The discourses suggest, respectively: introducing labels (e.g. a repairability index) to inform consumers, who are embedded in a broader context of a throw-away economy; increasing the consumer demand for repair to induce changes in business models; and making repair a more attractive and typically cheaper option for consumers.

Second, the repair & recycling discourse, market opportunity discourse and social economy discourse agree upon increasing and finetuning the (selective) collection of WEEE. Expecting an increase in repairable devices, the two last-mentioned discourses want the PRO to do so by developing highly specific recipients for WEEE and increasing the PRO or eco-contribution, which could be realised by adjusting the agreements with the subcontractors of the PRO and properly implementing the take-back agreement.

Third, the empowering, repair & recycling and market opportunity discourse all ascribe a significant role to the repair centres of the social economy, also suggesting additional public expenditures for the social economy. For instance, the low wages may play a role in increasing the number of repaired devices (see 4.1); under certain conditions set by the manufacturers, increased repair could be explored in the centres (see 4.2); and the repair centres are introduced as a partner that may help to close the so-called skills gap (see 4.3). In turn, the social economy discourse (see 4.4) welcomes an increase in the supply of repairable electronic devices, which may lead to additional employment opportunities.

Fourth, except for the repair & recycling discourse that argues for design for repair under certain conditions, all discourses welcome more stringent rules concerning design for repair. They expect the manufacturers to design products with a focus on repairability, which may lead to an increase in repair and, for the social economy, more work. The market opportunity discourse in particular highlights the interplay between design for repair and longer guarantee periods.

Fifth, the four discourses all address labour, skills and training: the question is raised about who is responsible for paying for the uptake of repair and the related training (empowering discourse); the labour costs and intensity of repair are high but it is desirable to explore the role of the social economy in new projects, potentially funded by public expenditures (repair & recycling discourse); similarly, labour market skills shortages may be addressed by collaborating with the social economy and their focus on training (market opportunity discourse); whilst the social economy discourse also considers to cooperate with manufacturers and retailers. Along these lines, all discourses except the repair & recycling discourse suggest expanding the role of professional repairers, indicating that these should also be represented in an umbrella organisation. Yet the discourses also compete concerning labour training and skills, which we address in section 5.3.

Sixth, overarching the aforementioned shared objectives, all the discourses are in favour of exploring repair as a strategy in pioneering projects or experiments that bring together relevant stakeholders such as manufacturers, retailers, recyclers, policymakers, the social economy and

the repair movement. Overall, these commonalities between the four discourses may be used by policymakers and practitioners for taking potential steps forward, although this contrasts with the fundamental changes required for tackling current environmental challenges, which are explored in the next sections.

## 5.2 Fundamental differences between the four discourses

In addition to commonalities, the analysis demonstrates that the **discourses fundamentally differ** in terms of political and societal choices, which also indicates that every discourse has blind spots in relation to the other discourses. Therefore, this section describes the four discourses' struggles over transition pathways and labour market challenges. In the next section (5.3), we then explore these differences from a governance perspective on transitions to a circular repair economy.

First, concerning **transition pathways**, the empowering discourse, promoted by the repair movement and the consumer organisation, argues that fundamental changes are needed in the current repair (and recycling) model. It proposes to empower consumers, citizens and independent companies to repair electronics and challenges the recycling logic and strict business model of manufacturers and the throw-away economy and culture. Consisting of the PRO, manufacturers and recyclers, the coalition of the repair & recycling discourse seeks to maintain their current (market) position, considering recycling as at least as important as repair (i.e. equal footing). They relate this position to their own interpretation of the waste hierarchy, which suggests using more secondary resources, repairing under specific conditions and improving WEEE collection. Advocated by authorised repair centres, independent repairers, retailers and the Public Waste Agency, the third discourse is mainly triggered by the market opportunities of repair, for which the roles of various actors need to change (e.g. repair sector, PRO and public administration) to create a repair market, close the so-called skills gap and make repair an attractive consumer choice. The social economy discourse, finally, argues for a shift in the role of the PRO, more design for repair, an employee-centred approach to labour and an umbrella organisation for the repair sector.

Second, although all discourses share a concern over **labour market challenges** and the roles of labour, training and skills related to repair (see 5.1), the analysis underscores competing interpretations of these challenges. The repair & recycling discourse discusses the high labour costs and intensity related to repair and considers exploring this problem in collaboration with the social economy in pioneering projects, which could then be upscaled through public expenditures. In turn, the market opportunity discourse identifies a so-called skills gap, which could be closed by collaborating with the social economy and public expenditures in vocational universities and centres focussing on vocational training (for self-employment). Interestingly, in addition to considering collaborating with manufacturers and retailers, the social economy discourse directs attention to an employee-centred approach to labour and training. Furthermore, the empowering discourse asks who is going to pay for the training and education related to the increased uptake of repair, musing about, for instance, lower labour taxes and higher material taxes.

The two remarks about transition pathways and labour market challenges underscore fundamental differences between the political and societal choices made by the four discourses or interpretations, which becomes particularly apparent in the envisioned type of change and the involved actors. On the one hand, **the pace, depth and direction of change** or pathways to repair are envisioned differently by the four discourses. Specifically, they diverge concerning the role of cultural change and empowering nearly everyone to repair (i.e. empowering discourse), recycling and the related technological innovation (i.e. the repair & recycling discourse), the creation of new repair markets (i.e. market opportunity discourse) and an employee-centred approach to labour (i.e. social economy discourse). The second and third discourse mainly propose minor, incremental changes to the current WEEE, repair and recycling system, whereas the first and fourth discourse consider more transformative changes in the system. On the other hand, it is likely that **particular actors**, (re)producing specific discourses, are more dominant and successful in influencing the repair debate than other actors. Specifically, the actors involved in the second and third discourse (e.g. manufacturers, retailers and public administration) tend to be powerful in comparison to, for example, the non-profit organisations reproducing the empowering and social economy discourse.

Hence, our empirical analysis not only suggests that the four discourses fundamentally differ in terms of political and societal choices related to repair, but also demonstrates that the four discourses compete over transition pathways and labour market challenges. Here it is likely that the established actors involved in the second and third discourse will succeed in shaping pathways of incremental change. Hence, a novel understanding of the slow uptake of transformative repair emerges, which is further developed by using a transition governance perspective in the next section.

## 5.3 The governance of transitions to a circular repair economy

Given the limited progress in achieving sustainability objectives and fundamentally transforming key societal systems (EEA, 2019a; UN Environment, 2019) and the CE ambition of the Government of Flanders (2019), the findings about incremental change (see 5.2) require closer examination from a transition governance perspective. It helps to understand the different interpretations and particularly the slow uptake of transformative repair, answering our second research question. Accordingly, we first discuss transition pathways to a circular repair economy, and then the politics of labour, training and education.

### 5.3.1 Transition pathways to a circular repair economy

One way to explore our findings about the slow or incremental uptake of transformative repair is an established **typology of transition pathways**. Geels & Schot (2007) distinguish between four transition pathways. In 'transformation' pathways, established actors gradually modify the direction of their activities; in 'de-alignment and re-alignment' paths, established actors' system is destabilised, creating room for multiple innovations of which one may become dominant and re-align a system; in 'substitution' pathways, an innovation replaces the prevailing system; and in 'reconfiguration' paths, the dominant system adopts small innovations, potentially inducing major reconfigurations over time. In the context of our results, established actors (i.e. the PRO, recyclers, manufacturers, retailers and public administration), who are involved in the repair &

recycling and market opportunity discourses are, at most, giving shape to a so-called transformation path, which may lead to a reconfiguration and, eventually, substitution path. By the same token, the incrementalism embodied in their discourses may give shape to a 'reproduction process', resulting in a dynamically inert WEEE, repair and recycling system in which they maintain their own position.

Through the lens of the typology of transition pathways, our study thus indicates that established actors' discourses on repair are likely to become successful in influencing transition pathways characterised by **incremental changes or the status quo**, which is in line with other academic work on the CE. Specifically, when we apply a classification of circularity discourses to the findings, the repair & recycling and market opportunity discourse resemble a so-called technocentric CE discourse, which is appealing to multiple actors who seek win-win solutions, particularly by transforming the current production system without changing socio-economic power relations (Calisto Friant et al., 2020b). Along these lines, our findings about these two discourses propose a pathway to repair that replays ecological modernist perspectives, emphasising static consumers that accept or reject repair, large businesses and their technologies driving repair and recycling, and governments facilitating repair by creating market opportunities, which confirms previous studies on the CE (Corvellec et al., 2021; Genovese & Pansera, 2021; Hobson & Lynch, 2016; Lazarevic & Valve, 2017). Regarding repair in particular, the repair & recycling and market opportunity discourse reproduce 'instrumental understandings of repair as a tool to extend product-life spans and reduce waste' (p. 1). Repair then implies developing circular business models to convince rational consumers and government interventions that facilitate new markets (McLaren et al., 2020); extending the present focus on efficiency within the reductionist understanding of repair (van der Velden, 2021); and, finally, in a narrowly-delineated process, restoring a given object to a certain specification in the context of a dyadic relationship between manufacturers and consumers (Spring & Araujo, 2017). Hence, these studies on the CE confirm our results about established actors' discourses shaping pathways of incremental change, helping to understand the slow uptake of transformative repair.

Overall, in the competition over the interpretation of a circular repair economy, it is likely that the repair & recycling and market opportunity discourse are becoming most successful. Yet their interpretations give shape to transition pathways characterised by incremental change, which adds a new understanding of the slow uptake of transformative repair to the three strands of literature described in section 2. Tackling current environmental challenges, however, may take more than these gradual, incremental reorientations, which we will address in section 6 on the implications for policymakers. Before doing so, we delve into the competing interpretations of labour, training and skills in a circular repair economy.

### 5.3.2 The politics of labour, training and education in a circular repair economy

In addition to diverging views on transition pathways, the **discourses profoundly differ in terms of labour market challenges**. In section 5.2, we illustrated competing interpretations of 'skills gap', 'labour market shortages' and 'training' for a circular repair economy. In this section, we illustrate that these concepts are far from neutral and are highly political. Here we further explore the slow uptake of transformative repair by focussing on the labour market, which is supported by the wider literature on work and skills in at least three ways (e.g. Attewell, 1990;

Bozkurt & Stowell, 2016; Green, 2013; Grugulis, Warhurst, & Keep, 2004; Payne, 2000; Schlogl, Weiss, & Prainsack, 2021).

First, concerning the **interpretation of skills**, 'Labour market actors vying for advantage are likely to follow their own convenient definitions and analyses' (Green, 2013, p. 25), which becomes apparent when focussing on the diverging labour market problems and solutions identified by different coalitions in our analysis. This further leads scholars to argue for the cautious use and interpretation of 'skills' (Attewell, 1990) and the 'future of work' (Watson, 2012), and related concepts such as labour market skills shortages, upskilling and reskilling.

Second, further exploring this first remark by using our empirical analysis, the repair & recycling and market opportunity discourse, mainly advocated by **private actors, indicate that public expenditures may play a role** in solving (perceived) labour market problems such as the skills gap, resembling a mechanism that was identified by other scholars. Specifically, as 'upskilling' towards, for example, a circular labour market could threaten companies' competitiveness, they change the meaning of skill to embrace attitudes and behavioural traits, shifting the responsibility for the creation of these attitudes away from their role and onto the public education and training system (Grugulis et al., 2004). Likewise, Lukas Schlogl and his colleagues (2021) illustrated the dominance of a specific narrative in the debate about the 'future of work' and technology. It places the responsibility on the shoulders of workers in the form of 'upskilling' and 'reskilling', requiring the support of public actors, whilst alternative options exist.

Third and indicating these **alternative choices**, the empowering discourse asks who is going to pay for the training and education for repair. Furthermore, the social economy discourse advances social objectives and a varying work pace and load, which leads to an employee-centred approach that bridges, and potentially dissolves, the so-called skills gap that is identified by the repair & recycling and market opportunity discourse. In this context, other researchers found that policies have started at the wrong place with skills. They need to shift out of the narrow pre-occupation with skill supply and address labour and skills in a more ambitious and radical way across multiple policy fronts, implying policies that, for example, incentivise firms to shift out of models of cost efficiency in terms of labour and skills (Payne, 2000). Here the employee-centred approach of the social economy may serve as a best practice for private companies. Specifically, this alternative approach may be useful to actors arguing for 'upskilling', particularly in reorienting their narrow, cost efficient approach to labour and employees towards a configuration that draws inspiration from an employee-centred approach. These observations further illustrate that the repair & recycling and market opportunity discourse have blind spots, which are partially highlighted by the empowering and social economy discourse.

In all, these observations about competing interpretations of labour market challenges demonstrate that **political and societal choices are hidden beneath the surface of 'skills'**, 'skills gap', 'labour market shortages' and 'upskilling'. To this list of concepts, popular notions such as upskilling, reskilling and the future of work may be added as well (e.g. Avison & Alvis, 2021; Goodwin Brown, Haigh, Schröder, Bozkurt, & Bachus, 2021; Roland Berger, 2021; WEF, 2020). The rhetoric surrounding these concepts is highly political, influencing specific policies for labour, training, education and skills that mainly assign roles to workers in the form of upskilling

and to public actors who are expected to close the so-called skills gap. Combined with the results about incremental change (see 5.3.1), the narrow labour market measures proposed by the repair & recycling and market opportunity discourse, driven by cost efficiency, are not unproblematic, particularly in the light of accelerating the uptake of transformative repair. In the next section, we elaborate on an approach that considers policymaking in complex, multi-actor and path-dependent settings, which may help to accelerate the uptake of repair.

# 6 Implications for policymakers and stakeholders

As section 5.1 described small steps forward for policymaking by underscoring the shared features between the four discourses, this section focusses on the implications for policymakers related to the fundamental differences between the discourses (see 5.2) and the related governance of transitions to a circular repair economy (see 5.3). Generally, the report illustrates that the slow uptake of a circular repair economy is characterised by complexity stemming from the involvement of multiple actors, including their interpretations and mutual blind spots, as well as by a rigid, path dependent WEEE, repair and recycling system characterised by logics of economic efficiency and recycling. To address such complexity, we consider an approach called reflexive governance as a policy recommendation, which may help to accelerate the uptake of transformative repair.

## 6.1 Reflexive governance for a circular economy

**Reflexive governance** is an approach that helps to pluralise environmental policy processes (Feindt & Weiland, 2018; Meadowcroft, 2007; Stirling, 2006; Voss & Kemp, 2006), resembling recent work on a knowledge system for systemic transformations of the European Environment Agency (EEA, 2021). At the beginning of the twentieth century, the approach emerged because the first generations of environmental policy (e.g. market instruments, stakeholder participation and regulatory approaches) did not have lasting environmental and societal effects. Scholars of reflexive governance attribute this result to the complexity of sustainability problems and path-dependency. Therefore, the approach suggests careful anticipation of long-term systemic effects of ongoing actions, their controversies and the resulting pathways of change. This implies exploring diverging paths to avoid path-dependent trajectories, which may be done in processes that encourage the inclusion of diverse actors and interpretations. The objective is to open up, rather than close down, the definition of problems and potential solutions and the pathways of change. Specifically, a space may be created for the articulation of competing interpretations and for exploring questions such as ‘what they see as worth striving for, standing for and/or living for’ (Hajer, 2003, p. 100) and ‘What do you want? What are you capable of? With whom are you prepared to cohabit? Who can threaten you?’ (Latour, 2018, p. 87), which may lead to the (re)construction of interpretations and shared perspectives.

When we **apply a reflexive governance approach to the discussion** in sections 5.2 and 5.3, it suggests that it is critical to open up transition processes. Specifically, it is likely that the repair & recycling and market opportunity discourse are becoming dominant and are also shaping incremental, possibly path-dependent trajectories of change, leading to the slow uptake of transformative repair. It highlights the need for thorough reflection on potential blind spots and alternative pathways to a circular repair economy, of which the potential beginnings may be provided by the empowering discourse and the social economy discourse.

In line with **recent literature on the CE and the labour market**, we thus argue that it is crucial to open up the pathways of narrow, incremental change of the repair & recycling and market opportunity discourse to deeper levels of reflexivity and anticipation. For example, a synthesis of policy-relevant lessons for a CE suggests deeper reflection on the problem descriptions and narratives of CE studies, which could be realised through public consultation and co-production between science and policy (Leipold et al., 2021). CE advocates' knowledge may also be enriched by adding a political and socio-cultural perspective to the narrow economic perspectives, particularly 'to propose a future which is not only possible and viable, but also desired by society' (Zwiers, Jaeger-Erben, & Hofmann, 2020, p. 134). The CE further demands profound modifications in extended producer responsibility schemes, raising contentious questions about the current and future roles and responsibilities of extended producer responsibility stakeholders (Campbell-Johnston, Munck, Vermeulen, & Backes, 2021). Finally, similar considerations are covered in the promotion of green jobs, which require deeper reflection about which jobs are part of the problem and which ones are part of the solutions to the environmental crisis (Ruault, Dupré la Tour, Evette, Allain, & Callois, 2022). Hence, a reflexive approach to the governance is recommended to diversify a circular repair economy and accelerate the uptake of transformative repair.

## 6.2 Reflexive governance in practice

In practice, policymakers, practitioners and academics may use **several tools** to open up policy processes for debate between different perspectives. For instance, Voss & Kemp (2006) suggest techniques such as constructive technology assessment, foresight exercises, participatory decision making, cooperative policymaking and transition management. A resource book and toolbox were recently published to deepen and broaden discussions around the problem among policymakers and stakeholders of system innovation (de Vicente & Matti, 2016), in addition to a 'transition model canvas' to systematically map different perspectives in transitions (van Rijnsoever & Leendertse, 2020). The Dutch Research Institute for Transitions also published an introduction to five techniques, namely analysis, transition arena, agenda-setting, experimenting and monitoring, which may be done by using tools such as actor analysis, system analysis, back-casting, developing scenarios and participatory approaches (Roorda, Avelino, Wittmayer, & van Steenbergen, 2012). Finally, a Transdisciplinary Field Guide was recently developed to understand complex problems by engaging with societal stakeholders, which may help to integrate scientific and non-scientific perspectives (Utrecht University, 2021).

**In Flanders**, the reflexive approach and tools may be combined with our findings about the commonalities and differences between the discourses. Specifically, we found that all discourses support the role of pioneering projects to explore new collaborations and

perspectives. Of course, new policies can support these projects but particularly important is that they are shaped along the lines of a reflexive approach to governance to enable a shift to a transformative circular economy.

In sum, the reflexive approach to governance and the associated tools may help to **enable the transformative potential** of the circular repair economy by 'opening up' discussions, allowing reflection, deliberation and participation between the four, competing discourses identified in this report. By doing so, the policy approach appreciates, instead of excludes, diverging perspectives, multiple actors, path dependency and uncertainty, which potentially helps to (re)construct interpretations, develop shared perspectives and accelerate the uptake of a transformative circular repair economy.

# 7 Conclusion

Given the ambition of the Government of Flanders, the **current environmental challenges and the limited uptake of repair** as a CE strategy, this report's point of departure was that accelerating the uptake of repair requires new ways of interpreting repair, particularly the ways in which problems and potential solutions are defined. Therefore, the report set out to analyse diverging interpretations of repair and, accordingly, provide an understanding of the slow uptake of repair.

Using discourse analysis to **identify diverging interpretations of the repair** of electronic consumer devices in Flanders, the report answered the first research question by distinguishing between four discourses that struggle over interpreting and defining a circular repair economy, namely the 'empowering discourse', the 'repair & recycling discourse', the 'market opportunity discourse' and the 'social economy discourse'. The report then presented the commonalities between the four discourses (e.g. informing consumers, involving the social economy and the crucial role of labour and pioneering projects), which may be used by policymakers.

These commonalities largely concern small steps toward a circular repair economy, which was underscored by drawing attention to **fundamental differences between the discourses**. They especially diverge in terms of political and societal choices about the pathways of change and labour market challenges. Concerning transition pathways, the report argued that it is likely that the repair & recycling and market opportunity discourse, advocated by established actors such as manufacturers, retailers and recyclers, are becoming most successful in defining repair and in shaping a pathway of incremental change to repair. Along these lines, the same actors and discourses are proposing specific, narrow labour market measures, mainly assigning roles to public actors who are expected to close the so-called skills gap and to workers in the form of upskilling. In this way, the report's analysis of discourses or interpretations adds a new understanding to the literature on the limited uptake of transformative repair.

However, the identified **pathways of incremental change and narrow labour market measures** may not sufficiently address the Government of Flanders' CE ambitions, pressing environmental challenges and the slow diffusion of repair. On top of that, the two discourses (re)producing these pathways and measures have blind spots, which are partially highlighted by the two other discourses, namely the empowering and social economy discourse.

For **policymakers and practitioners in Flanders**, the report therefore proposed an approach that considers policymaking in complex, multi-actor and path-dependent settings. This reflexive approach to governance and the associated tools may help to open up discussions between the four, competing discourses, allowing deliberation, dialogue and participation between multiple actors and interpretations, which may help to (re)construct interpretations and develop shared perspectives in pioneering projects and, over time, accelerate the uptake of transformative repair.

There are at least five promising avenues for **future research**. First, as discourses of the future of work, skills gaps, upskilling and reskilling are gaining traction in policy circles related to sustainability and the CE, more analyses are needed on how different labour market actors interpret and use these concepts in varying contexts to shape labour market policies along the lines of their own, specific preferences. Second, as we draw lessons from a single-case study on the repair of electronic consumer devices in Flanders, future research could transfer the findings to other settings such repair in other sectors (e.g. textile) and other regions or countries. Third, the analysis and, more generally, CE debates largely neglect North-South (e.g. Repp, Hekkert, & Kirchherr, 2021) and gender hierarchies (e.g. Graziano & Trogal, 2017), which may jeopardise a circular society (Jaeger-Erben, Jensen, Hofmann, & Zwiers, 2021) and circular justice (Kirchherr, 2021), requiring more research (funding) and policy attention. Fourth, considering the repairability of electronics, additional research is needed on the roles of established actors and the ways in which they may enable transformative change. Specifically, more work is needed on dynamics such as manufacturers being reluctant to implement ecodesign principles because of cost efficiency; retailers using their strong position to drive prices down, which puts pressure on manufacturers and leaves them little room to develop ecodesign principles; or the other way around, retailers using their sales position to force manufacturers to implement ecodesign principles, which may then allow retailers to enhance their repair and product-as-service business models. Fifth, given the multi-actor, contested and path-dependent settings of sustainability transitions to a CE, more knowledge on the science-policy-society interface is needed, appreciating these settings, supporting multiple perspectives and using co-creation, reflexive and nuanced approaches to knowledge development.

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# References

Alvesson, M., & Sköldberg, K. (2009). *Reflexive methodology: New vistas for qualitative research*. LA: SAGE.

Ampe, K., Paredis, E., Asveld, L., Osseweijer, P., & Block, T. (2019). A transition in the Dutch wastewater system? The struggle between discourses and with lock-ins. *Journal of Environmental Policy & Planning*, *22*, 155–169.

Ampe, K., Paredis, E., Asveld, L., Osseweijer, P., & Block, T. (2021). Power struggles in policy feedback processes: Incremental steps towards a circular economy within Dutch wastewater policy. *Policy Sciences*, *54*, 579–607.

Attewell, P. (1990). What is skill? *Work and Occupations*, *17*, 422–448.

Avison, Z., & Alvis, S. (2021). *Levelling up through circular economy jobs*. Green Alliance.

Bauwens, T. (2021). Are the circular economy and economic growth compatible? A case for post-growth circularity. *Resources, Conservation and Recycling*, *175*, 105852.

Bocken, N., Olivetti, E., Cullen, J., Potting, J., & Lifset, R. (2017). Taking the circularity to the next Level: A special issue on the circular economy. *Journal of Industrial Ecology*, *21*, 476–482.

Bosman, R., Loorbach, D., Frantzeskaki, N., & Pistorius, T. (2014). Discursive regime dynamics in the Dutch energy transition. *Environmental Innovation and Societal Transitions*, *13*, 45–59.

Bozkurt, Ö., & Stowell, A. (2016). Skills in the green economy: Recycling promises in the UK e-waste management sector. *New Technology, Work and Employment*, *31*, 146–160.

Calisto Friant, M., Vermeulen, W., & Salomone, R. (2020a). Analysing European Union circular economy policies: Words versus actions. *Sustainable Production and Consumption*, *27*, 337–353.

Calisto Friant, M., Vermeulen, W., & Salomone, R. (2020b). A typology of circular economy discourses: Navigating the diverse visions of a contested paradigm. *Resources, Conservation and Recycling*, *161*, 104917.

Campbell-Johnston, K., ten Cate, J., Elfering-Petrovic, M., & Gupta, J. (2019). City level circular transitions: Barriers and limits in Amsterdam, Utrecht and The Hague. *Journal of Cleaner Production*, *235*, 1232–1239.

Campbell-Johnston, K., Munck, M., Vermeulen, W., & Backes, C. (2021). Future perspectives on the role of extended producer responsibility within a circular economy: A Delphi study using the case of the Netherlands. *Business Strategy and the Environment*, 1–14.

CE monitor. (2021). How circular is Flanders' economy? [Hoe circulair is de Vlaamse economie?]. Retrieved from cemonitor.be

Cooper, T., & Salvia, G. (2018). Fix it: Barriers to repair and opportunities for change. In R. Crocker & K. Chiveralls (Eds.), *Subverting consumerism: Reuse in an accelerated world*. New York: Routledge Taylor & Francis Group.

Corvellec, H., Stowell, A., & Johansson, N. (2021). Critiques of the circular economy. *Journal of Industrial Ecology*, 1–12.

Diddi, S., & Yan, R.-N. (2019). Consumer perceptions related to clothing repair and community mending events: A circular economy perspective. *Sustainability*, *11*, 5306.

van Dijk, T. (2007). Editor's introduction: The study of discourse: An introduction. In T. van Dijk (Ed.), *Discourse studies* (pp. xix–xlii). Los Angeles: SAGE Publications.

Dryzek, J. (2005). *The politics of the earth: Environmental discourses*. NY: Oxford University Press.

Dryzek, J., & Niemeyer, S. (2008). Discursive representation. *American Political Science Review*, *102*, 481–493.

EC. (2015). *Closing the loop—An EU action plan for the circular economy*. European Commission.

EC. (2019). *Communication from the Commission: The European Green Deal*. European Commission.

EC. (2020). *Circular economy action plan: For a cleaner and more competitive Europe*. European Commission.

EEA. (2017). *Waste prevention in Europe—Policies, status and trends in reuse in 2017*. Copenhagen: European Environment Agency.

EEA. (2019a). *The European environment—State and outlook 2020: Knowledge for transition to a sustainable Europe*. Copenhagen: European Environment Agency.

EEA. (2019b). *Paving the way for a circular economy insights on status and potentials*. Copenhagen: European Environment Agency.

EEA. (2021). *Knowledge for action: Empowering the transition to a sustainable Europe* (b). Copenhagen: European Environment Agency.

Ellen MacArthur Foundation. (2013). *Towards the circular economy: Economic and business rationale for an accelerated transtion*.

Feindt, P., & Oels, A. (2005). Does discourse matter? Discourse analysis in environmental policy making. *Journal of Environmental Policy & Planning*, *7*, 161–173.

Feindt, P., & Weiland, S. (2018). Reflexive governance: Exploring the concept and assessing its critical potential for sustainable development. *Journal of Environmental Policy & Planning*, *20*, 661–674.

Fischer, F., & Forester, J. (1993). *The argumentative turn in policy analysis and planning*. Durham: Duke University Press.

Fitch-Roy, O., Benson, D., & Monciardini, D. (2019). Going around in circles? Conceptual recycling, patching and policy layering in the EU circular economy package. *Environmental Politics*, 983–1003.

Forti, V., Balde, C., Kuehr, R., & Bel, G. (2020). *The global E-waste monitor 2020: Quantities, flows and the circular economy potential*. Bonn, Geneva and Rotterdam: United Nations University/United Nations Institute for Training and Research, International Telecommunication Union, and International Solid Waste Association.

Geels, F., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy*, *36*, 399–417.

Geels, F., & Verhees, B. (2011). Cultural legitimacy and framing struggles in innovation journeys: A cultural-performative perspective and a case study of Dutch nuclear energy (1945–1986). *Technological Forecasting and Social Change*, *78*, 910–930.
Genovese, A., & Pansera, M. (2021). The circular economy at a crossroads: Technocratic eco-modernism or convivial technology for social revolution? *Capitalism Nature Socialism*, *32*, 95–113.
Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, *114*, 11–32.
Goodwin Brown, E., Haigh, L., Schröder, A., Bozkurt, Ö., & Bachus, K. (2021). *Closing the skills gap: Vocational education & training for the circular economy*. Circle Economy.
Government of Flanders. (2019). Coalition Agreement of the Flemish Government (2019-2024) [Regeerakkoord van de Vlaamse Regering 2019-2024].
Graziano, V., & Trogal, K. (2017). The politics of collective repair: Examining object-relations in a postwork society. *Cultural Studies*, *31*, 634–658.
Graziano, V., & Trogal, K. (2019). Repair matters. *Ephemera: Theory and politics in organization*, *19*, 203–227.
Green, F. (2013). *Skills and skilled work: An economic and social analysis*. Oxford: Oxford University Press.
Groothuis, F. (2015). Tax shift is key to a circular economy and jobs. *Huffpost*. Retrieved from huffpost.com
Grugulis, I., Warhurst, C., & Keep, E. (2004). What's happening to "skill"? In C. Warhurst, E. Keep, & I. Grugulis (Eds.), *The skills that matter* (pp. 1–18). Houndmills: Palgrave macMillan.
Haas, W., Krausmann, F., Wiedenhofer, D., & Heinz, M. (2015). How circular is the global economy? An assessment of material flows, waste production, and recycling in the European Union and the world in 2005. *Journal of Industrial Ecology*, *19*, 765–777.
Hajer, M. (1995). *The politics of environmental discourse: Ecological modernization and the policy process*. NY: Oxford University Press.
Hajer, M. (2003). A frame in the fields: Policymaking and the reinvention of politics. In M. Hajer & H. Wagenaar (Eds.), *Deliberative policy analysis: Understanding governance in the network society* (pp. 88–112). Cambridge: Cambridge University Press.
Hajer, M. (2006). Doing discourse analysis: Coalitions, practices, meaning. In M. van den Brink & T. Metze (Eds.), *Words matter in policy and planning: Discourse theory and method in the social sciences*. Utrecht: KNAG.
Hajer, M., & Versteeg, W. (2005). A decade of discourse analysis of environmental politics: Achievements, challenges, perspectives. *Journal of Environmental Policy & Planning*, *7*, 175–184.
Hobson, K. (2020). 'Small stories of closing loops': Social circularity and the everyday circular economy. *Climatic Change*, *163*, 99–116.
Hobson, K., & Lynch, N. (2016). Diversifying and de-growing the circular economy: Radical social transformation in a resource-scarce world. *Futures*, *82*, 15–25.
Homrich, A., Galvão, G., Abadia, L., & Carvalho, M. (2018). The circular economy umbrella: Trends and gaps on integrating pathways. *Journal of Cleaner Production*, *175*, 525–543.
Hunka, A., Linder, M., & Habibi, S. (2021). Determinants of consumer demand for circular economy products. A case for reuse and remanufacturing for sustainable development. *Business Strategy and the Environment*, *30*, 535–550.

Jaeger-Erben, M., Jensen, C., Hofmann, F., & Zwiers, J. (2021). There is no sustainable circular economy without a circular society. *Resources, Conservation and Recycling*, *168*, 105476.

Keller, R. (2013). *Doing discourse research: An introduction for social scientists*. SAGE.

Kirchherr, J. (2021). Towards circular justice: A proposition. *Resources, Conservation and Recycling*, *173*, 105712.

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the circular Economy: Evidence from the European Union (EU). *Ecological Economics*, *150*, 264–272.

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232.

Kissling, R., Coughlan, D., Fitzpatrick, C., Boeni, H., Luepschen, C., Andrew, S., & Dickenson, J. (2013). Success factors and barriers in re-use of electrical and electronic equipment. *Resources, Conservation and Recycling*, *80*, 21–31.

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular economy: The concept and its limitations. *Ecological Economics*, *143*, 37–46.

Kort, M., Vink, J., & van Rijn, J. (2021). *Verkenning Nederlandse Reparatie-infrastructuur [Exploring the Dutch repair infrastructure]*. The Netherlands: Rebel Group for the Ministry of Infrastructure and Water Management.

Kovacic, Z., Strand, R., & Völker, T. (2020). *The circular economy in Europe: Critical perspectives on policies and imaginaries*. NY: Routledge.

Kuah, A., & Wang, P. (2020). Circular economy and consumer acceptance: An exploratory study in East and Southeast Asia. *Journal of Cleaner Production*, *247*, 119097.

Latour, B. (2018). *Down to earth: Politics in the new climatic regime*. Cambridge, UK: Polity Press.

Lazarevic, D., & Valve, H. (2017). Narrating expectations for the circular economy: Towards a common and contested European transition. *Energy Research & Social Science*, *31*, 60–69.

Leipold, S., Feindt, P., Winkel, G., & Keller, R. (2019). Discourse analysis of environmental policy revisited: Traditions, trends, perspectives. *Journal of Environmental Policy & Planning*, *21*, 445–463.

Leipold, S., Petit-Boix, A., Luo, A., Helander, H., Simoens, M., Ashton, W., Babbitt, C., et al. (2021). *Lessons, narratives and research directions for a sustainable circular economy* (Preprint: Research Square). In Review.

Mayer, A., Haas, W., Wiedenhofer, D., Krausmann, F., Nuss, P., & Blengini, G. A. (2019). Measuring progress towards a circular economy: A monitoring framework for economy-wide material loop closing in the EU28. *Journal of Industrial Ecology*, *23*, 62–76.

McLaren, D., Niskanen, J., & Anshelm, J. (2020). Reconfiguring repair: Contested politics and values of repair challenge instrumental discourses found in circular economies literature. *Resources, Conservation & Recycling: X*, *8*, 100046.

Meadowcroft, J. (2007). Who is in charge here? Governance for sustainable development in a complex world. *Journal of Environmental Policy & Planning*, *9*, 299–314.

Nazlı, T. (2021). Repair motivation and barriers model: Investigating user perspectives related to product repair towards a circular economy. *Journal of Cleaner Production*, *289*, 125644.

OECD. (2021). *OECD environmental performance reviews: Belgium 2021*. Paris, France.

Payne, J. (2000). The unbearable lightness of skill: The changing meaning of skill in UK policy discourses andsome implications for education and training. *Journal of Education Policy*, *15*, 353–369.

Pollans, L. (2017). Trapped in trash: 'Modes of governing' and barriers to transitioning to sustainable waste management. *Environment and Planning A*, *49*, 2300–2323.

Reike, D., Vermeulen, W., & Witjes, S. (2018). The circular economy: New or refurbished as CE 3.0? —Exploring Controversies in the conceptualization of the circular economy through a focus on history and resource value retention options. *Resources, Conservation and Recycling*, *135*, 246–264.

Repair&Share & De Transformisten. (2021). *Eindrapport bevraging reparatiesector van klein huishoudelijk elektro [Report on the sector repairing electronic consumer devices]*. Möbius.

Repp, L., Hekkert, M., & Kirchherr, J. (2021). Circular economy-induced global employment shifts in apparel value chains: Job reduction in apparel production activities, job growth in reuse and recycling activities. *Resources, Conservation and Recycling*, *171*, 105621.

Riisgaard, H., Mosgaard, M., & Zacho, K. (2016). Local circles in a circular economy – the case of smartphone repair in Denmark. *European Journal of Sustainable Development*, *5*, 109–124.

van Rijnsoever, F. J., & Leendertse, J. (2020). A practical tool for analyzing socio-technical transitions. *Environmental Innovation and Societal Transitions*, *37*, 225–237.

Rogers, H., Deutz, P., & Ramos, T. (2021). Repairing the circular economy: Public perception and participant profile of the repair economy in Hull, UK. *Resources, Conservation and Recycling*, *168*, 105447.

Roland Berger. (2021). *Skills roadmap voor de Vlaamse klimaattransitie. Focus op de energie-intensieve sectoren 2020-2035.* Departement werk en sociale economie.

Roorda, C., Avelino, F., Wittmayer, J., & van Steenbergen, F. (2012). *Methoden in transitiemanagement. Een inleiding op de vijf kernmethoden. [Methods in transition management. An introduction to five methods]*. Rotterdam: DRIFT.

Ruault, J.-F., Dupré la Tour, A., Evette, A., Allain, S., & Callois, J.-M. (2022). A biodiversity-employment framework to protect biodiversity. *Ecological Economics*, *191*, 107238.

Sabbaghi, M., Cade, W., Behdad, S., & Bisantz, A. (2017). The current status of the consumer electronics repair industry in the U.S.: A survey-based study. *Resources, Conservation and Recycling*, *116*, 137–151.

Schlogl, L., Weiss, E., & Prainsack, B. (2021). Constructing the 'future of work': An analysis of the policy discourse. *New Technology, Work and Employment*, *36*, 307–326.

Schwartz-Shea, P., & Yanow, D. (2012). *Interpretive research design: Concepts and processes*. NY: Routledge.

Scoones, I., Leach, M., & Newell, P. (2015). *The politics of green transformations*. London: Routledge.

Sharp, L., & Richardson, T. (2001). Reflections on Foucauldian discourse analysis in planning and environmental policy research. *Journal of Environmental Policy & Planning*, *3*, 193–209.

Shittu, O., Williams, I., & Shaw, P. (2021). The 'WEEE' challenge: Is reuse the "new recycling"? *Resources, Conservation and Recycling*, *174*, 105817.

Simoens, M., & Leipold, S. (2021). Trading radical for incremental change: The politics of a circular economy transition in the German packaging sector. *Journal of Environmental Policy & Planning*, *23*, 822–836.
Smith, A., & Kern, F. (2009). The transitions storyline in Dutch environmental policy. *Environmental Politics*, *18*, 78–98.
Sovacool, B., Bergman, N., Hopkins, D., Jenkins, K., Hielscher, S., Goldthau, A., & Brossmann, B. (2020). Imagining sustainable energy and mobility transitions: Valence, temporality, and radicalism in 38 visions of a low-carbon future. *Social Studies of Science*, *50*, 642–679.
Spring, M., & Araujo, L. (2017). Product biographies in servitization and the circular economy. *Industrial Marketing Management*, *60*, 126–137.
Stirling, A. (2006). Precaution, foresight and sustainability: Reflection and reflexivity in the governance of science and technology. In J.-P. Voss, D. Bauknecht, & R. Kemp (Eds.), *Reflexive governance for sustainable development* (pp. 225–272). Cheltenham: Edward Elgar.
Svensson-Hoglund, S., Richter, J., Maitre-Ekern, E., Russell, J., Pihlajarinne, T., & Dalhammar, C. (2021). Barriers, enablers and market governance: A review of the policy landscape for repair of consumer electronics in the EU and the U.S. *Journal of Cleaner Production*, *288*, 125488.
The Circle Economy. (2020). *The circularity gap report*.
UN Environment. (2019). *Global environment outlook—GEO 6: Healthy planet, healthy people*.
Utrecht University. (2021). Transdisciplinary field guide. Retrieved from uu.nl
van der Velden, M. (2021). 'Fixing the world one thing at a time': Community repair and a sustainable circular economy. *Journal of Cleaner Production*, *304*, 127151.
de Vicente, J., & Matti, C. (2016). *Visual toolbox for system innovation: A resource book for practitioners to map, analyse and facilitate sustainability transitions*. Belgium: Climate-KIC.
Voss, J.-P., & Kemp, R. (2006). Introduction. In J.-P. Voss, D. Bauknecht, & R. Kemp (Eds.), *Reflexive governance for sustainable development* (pp. 3–30). Cheltenham: Edward Elgar.
Watson, T. (2012). *Sociology, work and organisation*. NY: Routledge.
WEF. (2020). *The future of jobs report*. World Economic Forum.
Wodak, R. (2008). Introduction: Discourse studies—Important concepts and terms. In R. Wodak & M. Krzyżanowski (Eds.), *Qualitative discourse analysis in the social sciences* (pp. 1–29). New York: Palgrave Macmillan.
Yalçın, N. G., & Foxon, T. (2021). A systemic approach to transitions towards circular economy: The case of Brighton and Hove. *Cleaner Environmental Systems*, *3*, 100038.
Yanow, D., & Schwartz-Shea, P. (2006). Introduction. In D. Yanow & P. Schwartz-Shea (Eds.), *Interpretation and method*. NY: M.E. Sharpe.
Yin, R. (2016). *Qualitative research from start to finish*. NY: Guilford Press.
Ylä-Mella, J., Keiski, R., & Pongrácz, E. (2015). Electronic waste recovery in Finland: Consumers' perceptions towards recycling and re-use of mobile phones. *Waste Management*, *45*, 374–384.
Zwiers, J., Jaeger-Erben, M., & Hofmann, F. (2020). Circular literacy. A knowledge-based approach to the circular economy. *Culture and Organization*, *26*, 121–141.

# Appendix

## Analysed interviews

| # | Actor | Date |
|---|---|---|
| 1 | Independent expert | 30/4/2021 |
| 2 | Repair centre in the social economy | 10/6/2021 |
| 3 | Repair movement (iFixit) | 15/6/2021 |
| 4 | Authorised repair centre (Servilux) | 17/6/2021 |
| 5 | PRO (Recupel) | 23/6/2021 |
| 6 | Retailer (Vanden Borre) | 29/6/2021 |
| 7 | Manufacturer (BSH Hausgeräte GmbH) | 1/7/2021 |
| 8 | Independent repairer (HerstelBar) | 5/7/2021 |
| 9 | Consumer organisation (Test Aankoop) | 6/7/2021 |
| 10 | Recycler (Galloo) | 8/7/2021 |
| 11 | Social economy (Herwin) | 9/7/2021 |
| 12 | Public Waste Agency (OVAM) | 27/7/2021 |
| 13 | Federation representing companies related to electronic appliances (Agoria) | 29/7/2021 |
| 14 | Repair movement (Repair & Share) | 26/8/2021 |
| 15 | Public Waste Agency (OVAM) | 9/9/2021 |
| 16 | Federation representing companies related to large appliances (F.E.E.) | 4/10/2021 |

## Consulted documents


Agoria, & Sirris. (2020). Circulaire economie: the time is now!

Agoria. (2021). Manufacturing Matters.

Bond Beter Leefmilieu. (2016). Lang Leve Producten: tien maatregelen voor betere producten.

BSH Group. (2021). How circular economy works: a case study from BSH Nederland. Retrieved from stories.bsh-group.com.

Commissie voor energie, leefmilieu en klimaat. (2021). Vraag van Kris Verduyckt aan Zakia Khattabi (Klimaat, Leefmilieu, Duurzame Ontwikkeling en Green Deal) over "De maatregelen ter bevordering van de circulaire economie". Retrieved from dekamer.be

Banti, M. (2020). Presentation: EU agenda on Circular Economy and Circular Electronics Initiative. DG Environment, European Commission.

Demir, Z. (2019). Beleidsnota 2019-2024: omgeving.

Energie- en milieu-informatiesysteem voor het Vlaamse Gewest. (n.d.) Afgedankte elektrische en elektronische apparatuur (AEEA). Retrieved from afss.emis.vito.be

ElektroVisie. (2021). Nieuwe Europese Verordening bevordert Herstellingen.

Ellen MacArthur Foundation. (2018). Circular consumer electronics: an initial exploration.

European Commission. (2019). The new ecodesign measures explained. Retrieved from ec.europa.eu.

European Commission. (2020). Circular Economy Action Plan.

European Parliament. (2021). Legislative train 05.2021: Circular Electronics Initiative / before 2022-1.

F.E.E. vzw. (2021). Professionele herstellers. Retrieved from feebel.be.
Heens, R. (2021). Dringend nodig: een Marshallplan voor de repaireconomie. MO Magazine.
Hendriksen, T., & van Dijk, H. (2020). Circulaire economie elektr(on)ische apparaten 2020. Growth from Knowledge & Recupel.
Hens, T. (2020). Je herstelt niet alleen spullen, ook mensen. MO Magazine.
Herwin. (2020). Recht op werk: 100.000 jobs in de sociale circulaire economie.
Rekenhof. (2021). E-Waste management: beheer van de afvalstroom van afgedankte elektrische en elektronische apparatuur (AEEA) in Vlaanderen.
Kort, M., Vink, J., & van Rijn, J. (2021). Verkenning Nederlandse reparatie-infrastructuur. Op weg naar meer en beter repareren. Rebel in opdracht van Ministerie van Infrastructuur en Waterstaat.
Lammertyn, L. (2021). Laptops willen en kunnen langer mee. MO Magazine.
Mikolajczak, C. (2021). New Ecodesign regulations: 5 reasons Europe still doesn't have the Right to Repair. Retrieved from repair.eu.
Möbius. (2021). Eindrapport bevraging reparatiesector van klein huishoudelijk elektro. Commissioned by Repair&Share vzw and De Transformisten vzw, supported by Vlaanderen Circulair.
Moore, D. (2020). France confronts 'planned obsolescence' with repairability rating. Retrieved from circularonline.co.uk.
Netwerk Bewust Verbruiken. (2018). Persbericht: 86% van de Vlamingen wil beter repareerbare producten.
November, S., & Thysen, T. (2020). Ingebouwde veroudering. Retrieved from test-aankoop.be.
OVAM. (2013). Startnota 3de MBO afgedankte elektrische en elektronische apparaten.
OVAM. (2015). Studie naar de rol van beheersorganismen in de afvalmarkt.
OVAM. (2017). Handel en wandel van de schroothandel: AEEA.
OVAM. (2018). Regels voor hergebruikcentra van elektrische en elektronische apparaten.
OVAM. (2020). Milieubeleidsovereenkomst afgedankte elektrische en elektronische apparatuur: evaluatierapport 2018-2019.
OVAM. (2021). Visie op beleid AEEA en nieuwe aanvaardingsplichtconvenant AEEA.
OVAM, AGORIA, FEDAGRIM, COMEOS, FEE, IMCOBEL, Eloya, NELECTRA, LABORAMA, GDA, Techlink & BeMedTech. (2021). Aanvaardingsplichtconvenant AEEA 2021-2029.
Repair & Share. (2021). Hoe zien professionele herstellers van elektro in Vlaanderen de toekomst van hun sector?
Repair & Share. (2021). Herstellers maken alles weer goed: pieter-jan van 123fix. Retrieved from repairshare.be
RReuse. (2015). Putting re-use and repair at the heart of the EU's Circular Economy Package.
Servilux. (2021). Servilux Solution Centre – bedrijfspresentatie.
Traxio. (2021). Vlaams Gewest - Nieuw aanvaardingsplichtconvenant voor afgedankte elektrische en elektronische apparatuur.
Test Aankoop. (2021). Test Talks over hoe je spullen langer laat leven. Retrieved from test-aankoop.be.
Verschaeve, J. (2021). Tewerkstelling is de grootste hefboom voor de circulaire economie. Trends – Knack.
Verschaeve, J. (2021). Paniekvoetbal na het IPCC-rapport? Circulaire economie vormt pijlsnelle counter. MO Magazine.
Verschaeve, J. (2021). Verbied de massale vernietiging van spiksplinternieuwe spullen. MO Magazine.

Vlaams Parlement. (2009). Hoorzitting: over het ontwerp van milieubeleidsovereenkomst betreffende de aanvaardingsplicht voor afgedankte elektrische en elektronische apparatuur.
Vlaams Parlement. (2021). Schriftelijke vraag Van Gwenny De Vroe aan minister Zuhal Demir: Elektrotoestellen - Inzameling en recyclage.
Vlaamse Overheid. (2015). Milieubeleidsovereenkomst betreffende de aanvaardingsplicht van afgedankte elektrische en elektronische apparatuur (AEEA).
VLAREMA. (2012). Hoofdstuk 3: uitgebreide producentenverantwoordelijkheid.
World Economic Forum. (2019). A new circular vision for electronics time for a global reboot.

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