

Making Sense of Rebound Effects in the Circular Economy: Findings from the Dutch Textile Industry



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Abstract

This research investigates the phenomenon of rebound in relation to the Circular Economy (CE) through qualitative inquiry. The rebound effect, known originally from the energy efficiency literature, occurs when improvements in efficiency or other technological innovations fail to deliver on their environmental promise due to (behavioral) economic mechanisms. This can happen as a result of insufficient substitution, e.g. when firm activities in secondary production (remanufacturing, recycling etc.) do not substitute or displace primary production, accumulating environmental impacts instead of replacing raw material extraction. Additionally, price effects can generate rebound, when innovations reduce costs, lower prices and subsequently raise demand, increasing net usage of a good or material. The presence of rebound can therefore lead to the structural overstatement of environmental benefits of certain innovations, which can influence reaching emission targets and the preference order of recycling. In this research, the CE rebound effect is investigated in the Dutch textile industry, which is identified as being prone to rebound, yet with a positive potential to avoid it. The main findings include realizations about the low to nonexistent awareness of this effect amongst organizations, and the identification of specific and general instances of rebound effects in the investigated industry. Causes and possible mitigating actions are discussed. In addition, the occurrence of these effects are placed in a larger context in order to gain a more comprehensive understanding about the place and role of this effect in the current transition towards a circular economy. This concerns the dire necessity for a new approach to how design has been practiced traditionally, and the need to place transitional developments in a systems perspective. This led to practical and theoretical recommendations about how to deal with rebound effects in order to foster an effective transition in which environmental benefits are actually realized, whilst simultaneously taking a more conscious and system-based approach to economic reform. This includes recommendations for the Dutch Circular Textile Valley initiative, as an entity for the development of a circular textile industry in the Netherlands. Finally, suggestions for further research include the reframing of the discourse on rebound effects when applying it in a CE context, abandoning antiquated research methods based on crumbling neoclassical assumptions.

Key Words: Circular Economy, Rebound effect, Textile industry, Value, Design, Systems perspective

Preface

Thank you for reading my thesis. Writing this thesis has been a very rewarding experience for me, both personally and academically. First, I would like to express special thanks to my supervisor Kim. Not only for allowing me to work with and explore this rather unfamiliar and at times elusive topic, but also for keeping me on track, providing valuable insights and comments, connecting me to thought-provoking informants, and doing all of this whilst conveying a high level of trust in my abilities. This gave me the strength to write with confidence and to fully explore my academic eloquence whilst maintaining the necessary diligence. Thank you for putting up with my occasionally stubborn convictions.

Another special word of thanks is in place for who has arguably been the most engaged informant, Douwe Jan Joustra, for taking the time and effort beyond the expected, and further stimulating critical systems thinking. In addition, I want to thank David Font Vivanco, who has been referenced throughout, for having a conversation with me in the starting phase of this research, helping me navigate this tricky subject. All of the interviewed informants have had a valuable contribution to this research; not only for their practical contributions, but also through the honest and engaging interest they have shown for my project, motivating me to get the most out of it. Thank you all for really trying to engage openly with me, and being enthusiastic in the process.

Finally, I hope this research sparks and inspires thoughts and conversations about moving forward, both towards a circular economy, but also beyond that. One of the goals of this research was to illustrate the deeper flaws of our current system of economics as they relate to contemporarily proposed solutions such as the circular economy, using rebound effects as a lens. The circular economy is not *the end of history*, just as our current system is not. I'm not here to provide the answers to the deeply rooted and pervasive problems we face, all I can do is advocate a thought-process that I think might lead us to them, standing on the shoulders of all who did so before me. I actively invite you to disagree with me. Honest academic discourse has no losers: only winners and learners. So let us continue to win and learn.

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1. Introduction

Our planet's ecology and its economy are on a collision course. Our closed planetary ecosystem imposes limited amounts of space and a finite amount of resources upon its inhabitants. However, practically all the currently and historically applied methods of economics have been defiantly neglecting these realities, as resources are extracted, used and disposed of reluctantly. Multiple essential raw materials are being depleted, whilst over two billion tons of waste is being created every year, putting heavy pressures on local ecosystems, biodiversity and material reserves (Silpa et al., 2018). The current, linear economic system operates blindly and indifferently in the face of pollution, ecological degradation and social destabilization, classifying such phenomena as 'externalities', or in other words, unaccounted public costs.

This linear nature of the current economy, in which resources are extracted only to end up as waste, is not conducive to the effective use and preservation of our limited resources. In fact, corporations apply *business efficiency* and *cost efficiency* in their operations, as opposed to true *technical efficiency*, a relevant distinction first pointed out almost a century ago by the economist Thorstein Veblen (Veblen, 1921). The latter type of efficiency, or type of logic, is what is needed to solve problems. It aims to utilize resources for their most appropriate purpose, taking into account the material's rarity, proximity, durability and regenerative/recycling potential, as they relate to natural laws. Also, it mostly does not hold great ambiguity, as a scientific or mathematical approach can be taken to determine what is technically the most efficient. In contrast, *business* or *cost efficiency* generally indicates methods with which an organization can produce a monetary profit, or economic value. However, when applying this logic there is little regard for any externalities created in the process, as these costs need not to be internalized, and will implicitly be shared by all of society. Many trends forecast that the pervasive effects of these externalities will become more visible as the global population grows, the climate changes, and resources are depleted (Millennium Ecosystem Assessment, 2005; Amos, 2005). This reality strongly suggests a necessity for economic reorganization. This reorganization needs to, at the very least, include a way to manage our resources beyond the production and use-phase, eliminating the destructive practice of landfilling the Earth's precious and limited resources, incentivizing true technical efficiency.

A popular concept that constitutes an attempt to reorganize the economy to solve the aforementioned problem is the *Circular Economy*. The Circular Economy (CE), as promoted by many organizations and governments globally, is based on three major principles: “Designing out waste, keeping products and materials in use, and regenerating natural systems” (Ellen MacArthur Foundation, n.d.; Rijksoverheid, 2016). From an etymological perspective this makes more sense than our current economic mode, as the word *economy*, deriving from the Greek *Oikonomia*, means ‘household management’. Viewing the entire planet as our common household, the current linear economy fails to manage it neatly, as indicated by but not limited to the massive amounts of waste produced globally. In contrast, the circular economy attempts to reconcile the extraction, production and usage of goods and resources with the limited availability of those resources and nature’s regenerative capabilities, and design waste out of the economy. As Figure 1 illustrates, CE practices separate biological and technological materials by design, for optimal retention of value throughout a product’s lifecycle. When goods reach their End-of-Life (EoL) phase, efforts are made to preserve these materials through reusing, remanufacturing, and recycling. In other words, it aims to take true technical efficiency into consideration in all stages of economic activity. Because of this, CE is often celebrated for its potential environmental benefits and its usefulness as a blueprint for sustainable development (Ghisellini et al., 2016; Ellen MacArthur Foundation, 2017).

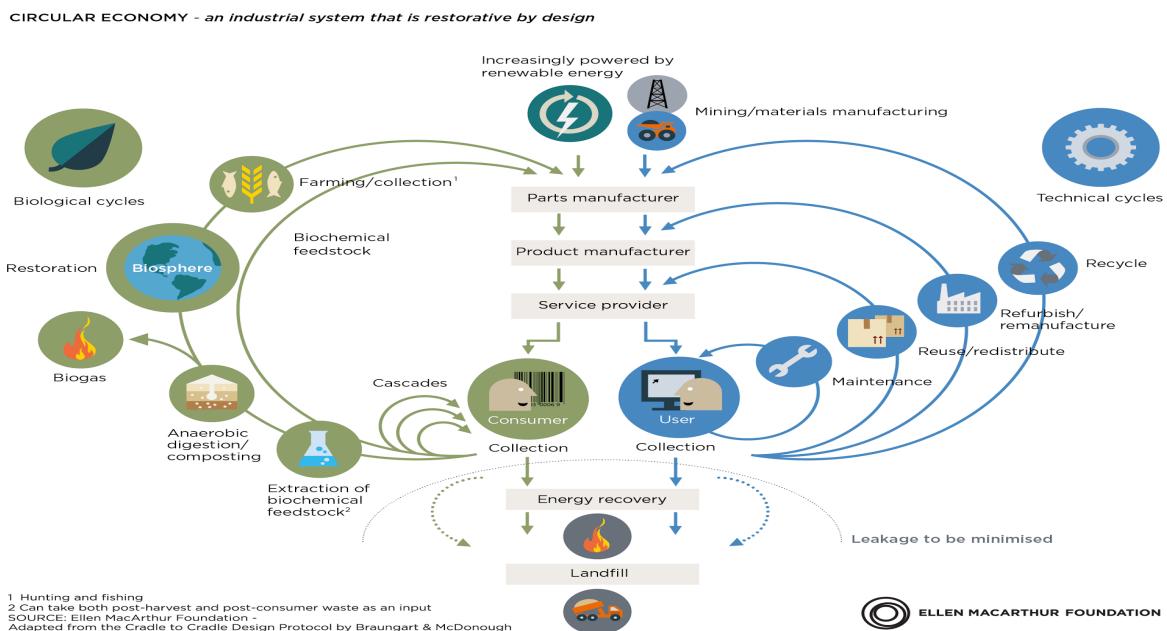


Figure 1: The circular economy from a technical perspective (Ellen MacArthur Foundation, 2014)

This concept or economic model intuitively sounds beneficial for the environment, as it would eliminate waste. However, as will be elaborated upon, care should be taken when assessing the true environmental benefits of CE practices in the corporate arena.

One of the more recently emerging reasons for the potential failure of CE practices to deliver on their environmental promises is called *circular economy rebound* (Zink & Geyer, 2017). The more researched classic rebound effect typically occurs when increases in production/consumption efficiency are canceled out due to absolute increases in production/consumption, also known as the Jevons' Paradox (Barker et al., 2009; Jevons, 1865). A common example concerning this type of rebound can be found relating to energy: when energy efficiency improves, prices lower, and usage/demand rises in response, leading to a higher net use of energy (and a worse environmental outcome) (Berkhout et al., 2000; Greening et al., 2000; Borenstein, 2014). In the context of CE, the rebound effect can manifest itself in two main ways: through imperfect or insufficient substitution (microeconomic) and through price or re-spending effects (micro- and macroeconomic) (Makov & Font Vivanco, 2018; Zink & Geyer, 2017).

When reused, remanufactured or recycled (from now on referred to as secondary production) goods are entered back into the market, usually this is paired with a message of sustainability and environmental benefits. However, these environmental benefits are often calculated under the assumption that primary production is displaced or substituted on a 1 to 1 basis, in which case environmental impact would decline if secondary production has a lower environmental impact. In reality, goods from secondary production (ordinarily of lower quality) compete with primary production goods in the market in every step of the diagram in Figure 1, rarely achieving perfect (1 to 1) substitution (Zink et al., 2014; Cooper & Gutowski, 2015; Zink & Geyer, 2017; Makov & Vivanco, 2018). Figure 2 illustrates this as an adaptation to Figure 1, in which markets were omitted. Consequently, true environmental benefits resulting from secondary production are frequently overstated, as secondary production happens *in addition* to primary production, as opposed to *instead of*.

Another way CE rebound can happen, even in the case of perfect substitution, is when increased efficiencies lower prices that lead to higher consumer purchasing power, resulting in re-spending on other goods with an environmental impact (Zink & Geyer, 2017; Makov & Vivanco, 2018). However, because of the high variability and arbitrariness in re-spending

options both locally and internationally, the main focus of this research will be on CE rebound effects resulting from insufficient substitutability.

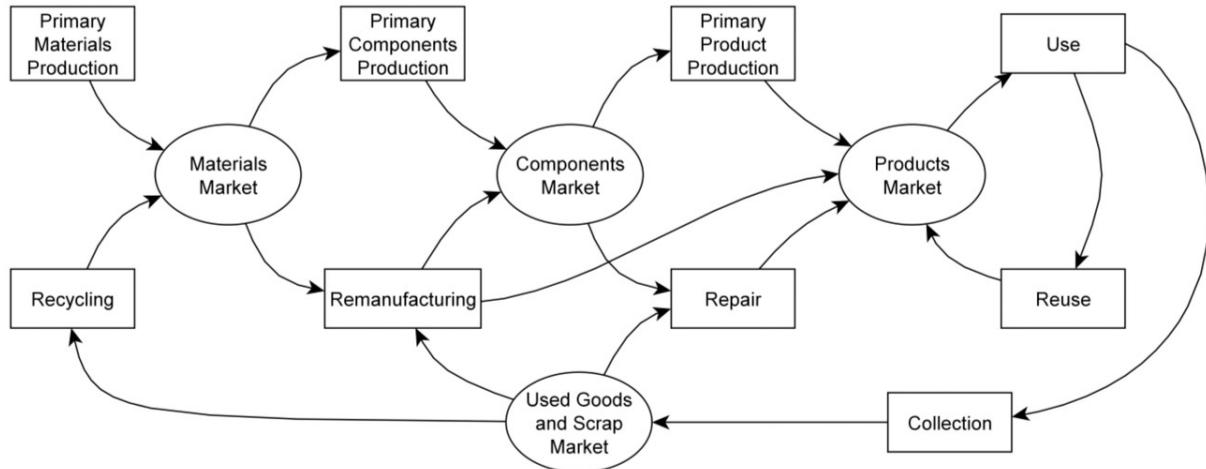


Figure 2: “The circular economy as a system of interconnected markets. The diagram is typically drawn without the market ovals and therefore misses the key interactions between economic agents in the circular economy. Including the markets makes the outcomes of the circular economy harder to predict. Adapted from Ellen MacArthur Foundation (2014)” (Zink & Geyer, 2017).

Since the circular economy concept firstly takes an engineering (technical) perspective on the economy (Figure 1), it fails to account for the economic (market/business) forces in play. From an engineering perspective, it appears simple and mathematically logical. However, when technically indifferent market forces such as price dynamics, competition and the pursuit of profit are included into the equation, the circular economy is prone to being bastardized and reduced to a business strategy, once again putting economic value over environmental goals. This keeps the environmental responsibility with the individual consumer and their ability to pay for more ‘green’ products. Although perhaps unintended, this is how a potentially radical economic reorganization can become a business strategy and join the many initially well-intended and hopeful ideas that have been ‘greenwashed’ over the last decades (Krieg, 2008; Marciniak, 2009). It is therefore crucially important to uphold a high standard of rigor when assessing the impacts of (CE) business strategies, which includes accounting for economic mechanisms such as the rebound effect.

1.1 Research scope and aim

As will be outlined in more detail in the theoretical framework, current literature on the topic of CE rebound in specific is lacking. Zink and Geyer (2017) attempted to unify and connect

future studies around this topic through coining and defining the term “Circular Economy Rebound”. In doing this, an explicit call for the extension of the body of research on this topic was launched. Since then, only a handful of papers in relation to this particular topic have been published (Korhonen et al., 2018; Makov & Font Vivanco, 2018; Zink et al., 2018; Kjaer et al., 2018). Fortunately, CE literature and literature on the rebound effect in its various forms is plentiful, and will therefore be able to provide a fruitful foundation for further investigation. The integration of these previously unconnected phenomena is highly significant if the true environmental benefits of the transition to CE are to be uncovered. In addition, a more comprehensive understanding of what the rebound effect means in relation to CE will help avoid the overstatement of environmental benefits due to, at best, ignorance, and at worst, blatant greenwashing. This could have implications for reaching greenhouse gas (GHG) reduction targets, and even change the preference order of EoL practices. Also, the expansion of research on this subject generates meaningful criticism on CE strategies and business models, helping the further development of truly sustainable business practices in the future by identifying such caveats.

In order to add significantly to the existing body of literature, the CE rebound effect will be investigated in the context of the Dutch textile industry. This industry is chosen due to a combination of factors. Firstly, the fashion industry is known to be the second largest polluting industry in the world, only outranked by the oil industry (Ellen MacArthur Foundation, 2017). As a result, as an attempt to decrease the many environmental problems associated with the industry, many companies both large and small are known to have been engaging CE strategies over the last decade (Inditex, C&A, H&M, Nike, Gap) (Ellen MacArthur Foundation, 2017). Secondly, contemporary demand for fashion products is known to be quite insatiable, making the industry as a whole prone to the rebound effect as large volumes of products are being sold continuously (Zink & Geyer, 2017; Ellen MacArthur Foundation, 2017). Thirdly, theoretically, circular fashion products could reach high levels of substitution in relation to fashion products from primary production. High volumes of clothing and garments are in circulation and technologies for secondary production are increasingly promising concerning quality and price possibilities (Ellen MacArthur Foundation, 2017). Therefore, this industry represents not only a high vulnerability to CE rebound, but also great potential to avoid it. Large companies engaging in both primary and secondary production should in theory be confronted by the troubles associated with rebound in the Circular Economy, making them especially fit for a research such as this one. Finally,

the WUR serves as a knowledge institute on circular economy and in particular on circular fashion, making data collection relatively more convenient compared to other industries, as industry ties are already present (Wageningen University & Research, 2018).

The aim of this research is to investigate the occurrence and the role of CE rebound in the textile/fashion industry and its transition towards circularity. Due to the current absence of any literature on this topic in relation to this industry specifically, the research will have an exploratory nature. Awareness of the concept and any current rebound avoiding measures (if present) amongst industry stakeholders and experts will be examined and described. Another goal is to develop a better understanding about what types of organizations are most prone to generating CE rebound and to provide more tailored recommendations on how to avoid it. As described before, wider implications of these results could influence the future development of Circular Business Models (CBMs) and the currently accelerating transition towards a CE as a whole.

To clarify, the aim of this research is *not* to narrow down or quantify the rebound effect in the textile industry or in the specific cases discussed in this study. A broader conceptual perspective is taken to get to the essence of why, how and if the rebound effect is an important or threatening concept to consider when envisioning the transition towards a circular economy and specifically circular textiles. The existing literature has deemed the if-question positive, for which reason this research has relevance, and is carried out. Thus, the study investigates the salience of rebound as it relates to CE strategies and the transition that is currently taking place in the Dutch textile industry. The following research question and accompanying sub research questions were set up to achieve these aims.

1.2 Research Questions

The main research question that this study attempts to answer is:

How do organizations that engage in CE strategies in the textile industry deal with the rebound effect and what can be learnt to avoid this effect?

The accompanying sub-research questions (SRQs) are:

1. What is the level of awareness amongst organizations in the Dutch textile industry of the concept and dangers of CE rebound?
2. How does the rebound effect manifest itself in the textile industry?

3. In which CE strategies is rebound most likely to occur and why?
4. What is the role of rebound effects in the transition towards a Circular Economy?
5. How can textile/fashion corporations avoid, reduce, and/or minimize CE rebound?

2. Theoretical Framework

To establish a contextual foundation for the research, a theoretical framework is presented here. First, the early literature on the classic rebound effect is revisited. After that, the emergence of the environmental rebound effect (ERE) and CE rebound will be discussed. This is followed by a review of several CE business models/strategies that we can (potentially) find in the textile industry. Then, drawing from the existing literature, a range of suggestions to avoid and/or mitigate CE rebound is examined. Based on the discussed literature, several propositions are suggested that are to serve as topics of discussion during the interviews, and are repeated at the end of Appendix A. Unfamiliar terms are clarified and defined in the Glossary.

2.1 The classic rebound effect

In his seminal book *The Coal Question*, William Stanley Jevons (1865) was amongst the first to address the implications of the finite nature of the main fuel of the British economy: coal. In his work, he identified an interesting economic dynamic, in which a rise in the efficient use of a material would, rather paradoxically, lead to a net increase of the usage of said material. He illustrates this with the following example:

“The number of tons of coal used in any branch of industry is the product of the number of separate works, and the average number of tons consumed in each. Now, if the quantity of coal used in a blast-furnace, for instance, be diminished in comparison with the yield, the profits of the trade will increase, new capital will be attracted, the price of pig-iron will fall, but the demand for it increase; and eventually the greater number of furnaces will more than make up for the diminished consumption of each. And if such is not always the result within a single branch, it must be remembered that the progress of any branch of manufacture excites a new activity in most other branches, and leads indirectly, if not directly, to increased inroads upon our seams of coal.” (Jevons, 1865, p.76)

This constitutes Jevons’ Paradox, which states, in other words, that increasing energy efficiency will not necessarily diminish energy consumption; it might actually directly and/or indirectly increase total demand and usage of energy. In the wake of the energy crisis of the 1970s, both Daniel Khazzoom and Leonard Brookes independently revived this theory, putting forward that increased energy efficiencies can have macroeconomic effects that lead to higher net usage of energy, offsetting the benefits of the efficiency increase (Khazzoom,

1980; Brookes, 1990). This led Saunders (1992, 2000) to formulate the ‘Khazzoom-Brookes postulate’, reiterating this counterintuitive phenomenon, in an attempt to find empirical evidence for it. Consequently, literature on the topic proliferated, with more yet still mostly suggestive and theoretical ‘evidence’ being found (Greening et al., 2000; Berkhout et al., 2000; Barker et al., 2009; Hertwich et al., 2005; Sorrell and Dimitropoulos, 2008; Sorrell et al., 2009). Whilst all of these authors agree on the (theoretical) reality of the rebound effect, which is not limited to the energy phenomenon, some claim the effect is underestimated and may be much worse than has been estimated, and others contradictorily suggest it is overestimation that may be looming. In either case, it is clear that the existence of this effect and its implications compel us to rethink previously assumed commonsensical approaches to reducing environmental impacts and mitigating climate change.

Sorrell (2009) elaborates and reflects on the rebound-discourse by acknowledging the extreme difficulty of providing empirical evidence for the postulate, but reaffirming the strong theoretical basis of rebound and backfire effects, and the need to take them seriously. He concludes that Jevons’ Paradox has a stronger theoretical backing when relating it specifically to energy-efficiency improvements of ‘general-purpose technologies’ (GPTs), as opposed to any or all types of efficiency improvement. This is due to the fact that GPTs, especially in early stages of diffusion, “have a wide scope for improvement and elaboration, are applicable across a broad range of uses, have potential for use in a wide variety of products and processes and have strong complementarities with existing or potential new technologies” (Sorrell, 2009, p. 1467). Jevons (1865) used the steam engine as a quintessential (GPT) example of his time, as the electric motor made the case a century later in the work of Schurr (1982, 1983, 1984, 1985) and then Brookes (1990). An important lesson to be drawn from this is that efficiency increases in contemporary GPTs (such as recycling-, IT or renewable energy technologies) could be potential indicators for a high likeliness of (indirect) rebound.

2.2 The environmental rebound effect (ERE)

Now, as the ‘classic’ rebound effect discussed above particularly relates to energy efficiency, there is a need to broaden the scope to include a wider, more comprehensive understanding of the effect in an environmental, sustainability or CE context. Font Vivanco and colleagues (2016a) attempted to shed light on how the debate on rebound effects has ‘outgrown’ the energy efficiency domain, and can now be understood as a set of economic (and behavioral) mechanisms. In doing this, they created a separation to distinguish the classic rebound effect

in the early energy literature from the broader environmental rebound effect (ERE), which is rooted in ‘lifecycle thinking’ (Font Vivanco et al., 2016a). The ERE perspective allows the studying of technological innovations beyond energy efficiency improvements to include a wider array of environmental consequences, whilst it avoids becoming a substitute term for any economic cause-effect mechanism. The general framework they arrived upon is portrayed in Figure 3, and can serve as an important schematic reference-point to situate triggers, drivers, mechanisms and indicators of rebound in this research (Font Vivanco et al., 2016). Also, it can help clarify relations between different concepts and mechanisms that will be discussed in the remainder of this study. A succinct clarification of Figure 3 will be provided below, covering some of the most prevalent forms of rebound as guided by a hypothetical example from the textile industry.

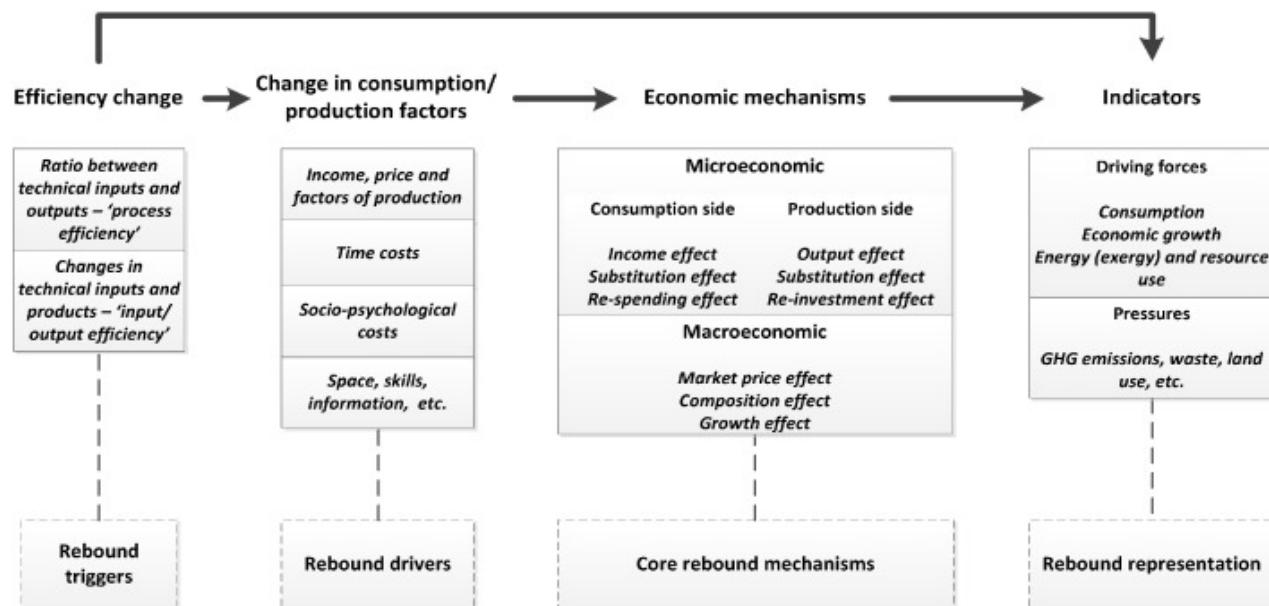


Figure 3: General framework for the study of rebound effects (Font Vivanco et al., 2016a). Please visit the glossary for further explanation of the terms

Suppose an incremental yet significant technological breakthrough occurs in a textile factory, giving rise to an increase in the reuse of garments (e.g. the establishment of a smoother EoL infrastructure). This constitutes a positive change in technical inputs/products, or a rise in input/output efficiency: a rebound *trigger*. Consequently, input prices of production materials drop, and time/transportation costs may drop, as garments need not to be extracted from overseas. Both consumer and producer benefit from the resulting price decline, representing a rebound *driver*. From an engineering/technical perspective, these facts would intuitively amount to lower lifecycle-wide impacts on the environment. However, various economic *mechanisms* could be set in motion as a result of these technical improvements. A direct

rebound effect on the consumption side can happen when the decline in price causes a rise in demand, (partly or fully) offsetting initially assumed environmental benefits, depending on factors such as price elasticity. Indirectly, the money now saved on clothing will likely be spent on other goods, with their own environmental footprint (re-spending effect). On the production side, this is called the re-investment effect. Importantly, the question ‘does reusing reduce producing?’ needs to be answered to determine whether primary production is actually displaced by the new reusing method, arriving at the size of the substitution effect (Cooper & Gutowski, 2015). In addition, although dependent on the degree to which industry-wide effects occur and can be measured, macroeconomic consequences can take place as the initial technological improvement diffuses and causes wider economic growth (as discussed, most likely with improvements in GPTs). Finally, whereas *indicators* for the classic rebound effect were limited to driving forces itself such as energy use, the ERE perspective uses various pressures on the environment to represent rebound, as they relate most closely to the ultimate goal of investigating the rebound effect: effectively reducing these environmental pressures (Font Vivanco et al., 2016).

Recently, more research has been done on the ERE from which valuable lessons can be learnt. In 2015, Font Vivanco and colleagues investigated multiple eco-innovations relating to transportation that were claimed to provide the city with environmental benefits. After assessing the ERE occurring after the implementation of these innovations, only 3 out of 7 cases studied managed to achieve the claimed benefits. The results portrayed high ERE observations due to the fact that innovations were realized in low environmental intensity areas, and included significant cost reductions at the same time (Font Vivanco et al., 2015). Thus, liberating income (reducing costs) in combination with innovations relating to low environmental intensity can be expected to have a high ERE. In addition, this again emphasizes that it is important to consider economic/behavioral consequences of technological innovations beyond the mere technical improvements realized, when studying environmental impacts.

Apart from cases in which the ERE detracts from or diminishes the realized environmental benefits of a certain technological improvement, there are also cases in which a ‘negative rebound effect’ can be observed (with an actually positive effect). Font Vivanco and colleagues (2014, 2016b) encountered this phenomenon when investigating the ERE of electric cars, finding that in some cases, high capital costs can actually generate a decline in

net environmental pressures, reversing the direction of rebound. This occurs when a consumer buys a car that has clear environmental benefits and is relatively more expensive than its alternatives, binding more income otherwise spent on high impact goods, and therefore “reinforcing the environmental benefits” (Font Vivanco et al., 2014, p. 12068). This means that producers might also be underestimating achieved environmental benefits following a technological innovation. Perhaps this possibility increases the chance that organizations will support further investigation of their CE strategies with attention to rebound.

2.3 Eco-efficiency and Cradle-to-Cradle

It seems that whenever an incremental efficiency improvement appears, at least some level of ERE will be present. The Cradle-to-Cradle (C2C) school of thought offers an insightful take on the apparent inherency of rebound to eco-efficiency strategies, stating:

“Eco-efficiency is a reactionary approach that does not address the need for fundamental redesign of industrial material flows. Eco-efficiency is principally a strategy for damage management and guilt reduction. It begins with an assumption that industry is 100% bad, and proceeds with the goal of attempting to make it less bad (...). While being eco-efficient may indeed reduce resource consumption and pollution, and provide temporary economic advantage in the short-term, it lacks a long-term vision for establishing a truly positive relationship between industry and nature. Eco-efficiency strategies do not address the deep design flaws of contemporary industry. They address problems instead of the source, setting goals and using practices that sustain a fundamentally flawed system. The ultimate result is an unappealing compromise that takes for granted, even institutionalizes, the antagonism between nature and industry. This tendency can be seen in resource use patterns over recent decades, where the absolute quantities of materials extracted from, and wastes and pollution disposed into, the natural environment have continued to grow despite significant efficiency improvements.” (Braungart et al., 2007, p.1340).

In other words, the concept of eco-efficiency is fundamentally untrustworthy as it unsuccessfully attempts to integrate cost-efficiency and ecological impacts, failing to deliver true environmental benefits or long-term sustainability. Interestingly, the authors also state that eco-efficiency is inextricably linked to the linear nature of our economy, arguing:

“Eco-efficiency begins with the assumption of a one-way, linear flow of materials through industrial systems: raw materials are extracted from the environment, transformed into products and eventually disposed of. In this system, eco-efficient techniques seek only to minimize the volume, velocity and toxicity of the material flow system, but are incapable of altering its linear progression” (Braungart et al., 2007, p.1337).

Rather than being eco-efficient, Braungart and McDonough (2009) advocate eco-effectiveness. Being effective as opposed to efficient eliminates the need to constantly reconsider or ‘optimize’ operations because they have negative side effects. Harnessing true effectiveness means producing only positive side effects. The example of a cherry tree recurs throughout the Cradle to Cradle book, illustrating what an eco-effective structure would be like: multifunctional, providing abundance, and serving the ecosystem without ‘waste’. The abundant (yet inefficient) production of blossom is no liability for the ecosystem; instead it is a nourishing factor. The tree still benefits from an efficient energy conversion, but there is no necessity to constantly increase efficiency, because the tree only produces positive outcomes for the ecosystem. This ‘doing good instead of less bad’-mindset is what is needed in industrial practices in an intelligent economy that aims to coexist with nature. Conceptually, the CE accepts and supports this premise. However, discerning and eliminating exactly those CE strategies that embody a particularly detrimental pledge to efficiency (e.g. through excessive rebound) can be troublesome.

The above quotes along with the ensuing argument to switch from eco-efficiency to eco-effectiveness strikingly resemble the rhetoric used by proponents of the CE. So then, does this imply that, theoretically at least, ‘circularizing’ the economy is the ultimate solution to undesired rebound effects? Or can we still observe rebound effects in what is now often referred to as ‘CE strategies’? As this appears to be the case, does the problem originate from the CE strategy (or CBM) itself, the persistent nature of rebound and the ignorance about it, or perhaps an incomplete or flawed comprehension or manifestation of circularity in today’s economy?

Proposition A: Organizations engaging with CE are largely unaware of the concept of rebound and its potential downsides.

2.4 Circular Business Models and CE Strategies

So, what characterizes or defines a CBM, and how does it relate to a CE strategy? Nussholz (2017) provides a useful review on the increasing volume of discourse surrounding these concepts. She, after a careful assessment of the existing literature on these notions, defines a CBM as follows: “A circular business model is how a company creates, captures, and delivers value with the value creation logic designed to improve resource efficiency through contributing to extending useful life of products and parts (e.g., through long-life design, repair and remanufacturing) and closing material loops” (Nussholz, 2017, p.12). Furthermore, she emphasizes the reality that resource efficiency strategies, which often equate to CE strategies, do not by definition lead to increased resource efficiencies or environmental benefits. Rather, innovating the business model towards a CBM “can help create an offer that embeds a circular strategy and successfully operates it” (Nussholz, 2017, p.12). Therefore in this research, the focus will be on specific CE strategies, as they, if inappropriately embedded in the overarching business model, are hypothesized to be the cause of rebound. Note that in certain cases, a business model can be entirely focused on one specific CE strategy, and the terms could then be seen as synonymous. The following paragraphs will elaborate on several CE strategies.

Figure 4 below illustrates the array of ‘Circular Business Models’ as displayed on the Value Hill (Achterberg et al., 2016). Taking the characterization of a CBM as described above into account, the individual activities taking place in this figure will be referred to as ‘CE strategies’.

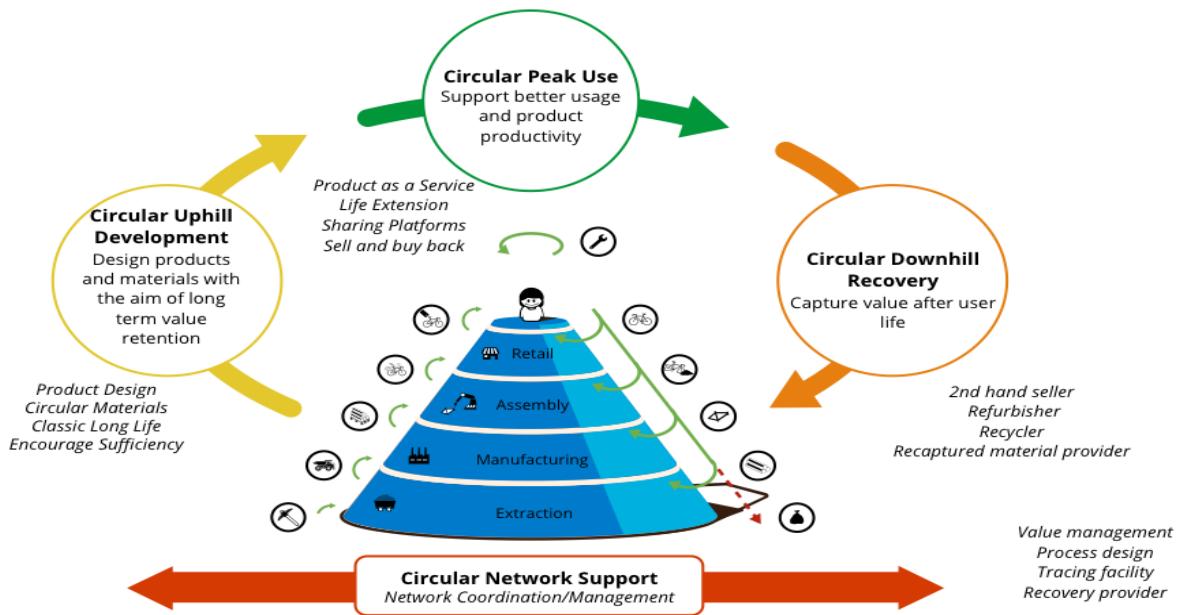


Figure 4: The Value Hill. (Achterberg et al., 2016)

First, firms engaging in CE strategies on the left side of the Value Hill have the responsibility to create and design products that are conducive to prolonged and smooth circulation in the envisioned CE, as they include the extraction of raw materials. Examples of this are initiatives using unconventional (regenerative, sustainable or C2C) materials in product design (e.g. kombucha leather, mycelium garments).

Second, the peak of the hill hosts strategies that prolong the use-phase or lifecycle of a material, for example through sharing platforms (e.g. clothes-swapping). Also, Product as a Service, or Product Service Systems (PSS) is, in this illustration, situated on top of the hill. However, a PSS strategy is not limited to prolonging the use phase of a material or good. Firms applying PSS can control resources through retained ownership throughout their lifecycles and might therefore have the potential to decouple resource use from economic growth (e.g. clothing libraries, laundry service; Kjaer, 2018).

Third, on the right, we find what has so far been referred to as ‘secondary production’. This includes the refurbishing, remanufacturing, repairing, reusing and recycling of materials after their initial EoL. As discussed and as will be elaborated upon, this branch of CE strategies is in theory most prone to generating rebound, as has been illustrated by the existing literature (e.g. Cooper & Gutowski, 2015; Makov & Font Vivanco, 2018).

Lastly, on the bottom of the hill we find network, facilitative and supporting organizations. Because of their role as connectors, such organizations can provide valuable insights on ranges of industry players and their CE activity. They act as representatives of sectors and can have important roles in decision-making and supply chain management. Therefore, as discussed further in the methodology section, such organizations are consulted for their industry knowledge.

Proposition B: Rebound effects are most likely to occur in Circular Downhill Recovery strategies (secondary production).

2.5 CE rebound

CE rebound occurs when CE strategies fail to deliver on their environmental promise, in ways very similar to the ERE. As touched upon in the introduction, there is a small groundwork of literature about rebound effects occurring particularly in relation to CE strategies (Zink & Geyer, 2017; Makov & Font Vivanco, 2018; Kjaer, 2018; Korhonen, 2018; Laurenti et al., 2018). Albeit small, these studies provide a strong theoretical foundation of rebound in the CE. Their findings build upon a larger body of work concerning the economics of secondary production methods and their respective environmental consequences (e.g. Geyer et al., 2016; Geyer and Doctori Blass, 2010; McMillan et al., 2012; Ekvall, 2000; Cooper, 2008). In fact, many of these studies are essentially about CE strategies, yet simply before the term had become popularized, as CE strategies include the recycling, remanufacturing, refurbishing and reusing of materials. The net environmental impact of these strategies is determined by the difference in impact between primary and secondary production in combination with the accompanying change in production quantity, as illustrated by Figure 5, from Zink and Geyer (2017).

		Change in production impacts	
		$e_r < e_p$	$e_r > e_p$
Change in production quantities	$\Delta Prod > 0$	Q1: Circular Economy Rebound Video on demand, recycling, service-based floor covering, recoverable rocketry, refurbished phones	Q2: Higher net impact
	$\Delta Prod \leq 0$	Q4: Lower net impact Smartphone parking meter Product lifetime extension (<i>ceteris paribus</i>)	Q3: Potential shortfall Reusable bottle Reusable grocery bag

Figure 5: “Framework of potential environmental outcomes of CE activities based on changes in production quantities and differences in production impacts.” $\Delta Prod$ = Change in total production

quantity, er and ep = environmental impact of secondary and primary material (per unit), respectively. (Zink & Geyer, 2017, p. 597)

Q2 represents those actions that will always result in higher impacts (higher quantity plus higher per-unit impact), and Q4 represents the opposite. Q3 only lowers impacts if the new, higher impact secondary good is used ‘enough’, so that the rise in per-unit impact is offset by the decline in production/use. For example, if a reusable coffee cup is discarded after only two uses, shortfall occurs, as two single-use plastic cups have less impact than one reusable cup. When the per-unit impact of secondary material is lower than that of primary material (which holds true in most cases), but simultaneously the production quantity rises, Circular Economy rebound occurs (Q1). The size of rebound varies per case, having the potential to cause *backfire*: when the rebound more than completely offsets the difference between er and ep .

The rebound represented in Q1 occurs due to the direct price effect: secondary production decreases price that leads to rebound in a ‘classic’ way, increasing the quantity produced/sold. In addition, this price effect manifests indirectly through the now newly liberated income as it is spent on other goods (for both consumer and producer: re-spending effect and re-investment effect). But, even if the secondary good is not cheaper, eliminating the price effect as described above, it can still influence prices by increasing the (secondary) supply in a market, as these goods now also compete with primary goods (Zink & Geyer, 2017). Through elementary economic rules of supply, demand and competition, eventually a new, lower equilibrium price will stabilize. As a result, price effects will happen anyway.

Besides that, the environmental benefits of these secondary production strategies can only truly materialize if and when they actually displace or at least significantly lower primary production. A lack of displacement/substitution can be the result of the inferior quality of secondary goods (e.g. recycled plastics and paper), or when a new market is opened up due to the vastly different price at which the new good is being sold (e.g. refurbished smartphones (Geyer and Doctori Blass, 2010; Makov and Font Vivanco, 2018). Therefore, perhaps in some cases CE strategies might displace primary production through superior performance in competition. However, assuming that every unit of secondary production achieves environmental benefits directly proportional to the difference between the secondary and primary good’s impact ($er - ep$), surely seems a premature conclusion (Cooper & Gutowski,

2015; Geyer et al., 2016; Geyer & Doctori Blass, 2010; Kjaer, 2018; Zink et al., 2016). Nevertheless, this assumption is often implicitly made in CE strategies, as rebound effects continue to be omitted from LCAs, and corporations benefit from this lack of disclosure through inflated environmental achievements (Chalmers, 2015; Atherton, 2007). Therefore, to recognize and account for the rebound effect is essential to safeguard both environmental and market integrity.

Proposition C: *Current textile industry CE strategies are subject to rebound effects through price effects and insufficient focus on displacement/substitution.*

2.5.1 Mitigating rebound effects

Drawing from the early literature mainly focused on the classic and environmental rebound effect, several historic and current mitigating approaches have been explored. In a paper by Font Vivanco et al. (2016c) an accumulation of suggested pathways are described. First, the authors note that no binding act or policy currently exists that explicitly mentions the rebound effect, and therefore there is no enforced policy on the subject yet, at all. In a small yet significant amount of different legal acts by the European Commission (EC) the term is mentioned, though remaining suggestive (Font Vivanco et al., 2016c). In the academic world, mitigating strategies have often revolved around changing consumer behavior, stressing the need to consume more efficiently, differently and less in general (Jackson, 2014; Sorrell, 2010). Also, market-based instruments centered on carbon and energy pricing has been discussed (Saunders, 2011). The EC commissioned the most substantive and comprehensive report on rebound effects, including a wide range of suggested policy pathways, summarized amongst others in the figure below (Maxwell et al., 2011; Figure 6). The need for simplified measuring tools is also mentioned, as well as the potential for smart meters to mitigate direct rebound, and attentiveness towards perverse green advertising that promotes moral licensing and compensation behavior following (efficiency) innovations (Font Vivanco et al, 2016c; Maxwell, 2011). Despite the absence of the CE concept in these mitigation approaches, they could potentially be retrofitted to be applied to the current paradigm and prove useful in the transition.

Type of policy pathway	Rebound mitigation strategy		
	Increased environmental efficiency – “consuming more efficiently”	Consumption shifting – “consuming differently”	Downsize consumption – “consuming less”
Policy design	Recognition in policy design		
		Broader definitions and toolkit Benchmarking tools	
Sustainable consumption and behaviour		Consumption information Identity signalling Standardisation	Autonomous frugal behaviour
Innovation	Targeted eco-innovation		
Environmental economic policy	Energy/carbon tax Bonus-malus schemes Cap and trade schemes		
New business models	Rebates and subsidies Product service systems		

Figure 6. Pathways for rebound mitigation (Font Vivanco et al., 2016c). (See Glossary for further concept description)

Now, taking the perspective of the well-intentioned firm, what can be done to prevent excessive rebound from happening in the emerging CE? Zink and Geyer (2017) provide a threefold of conditions that, when adhered to, will minimize CE rebound. Firstly, products and/or materials from secondary production need to be presented as true alternatives for primary production, with comparable quality, price and marketing efforts. If a product from secondary production cannot seriously compete with its primary alternative, meaningful substitution, as well as the accompanying environmental benefits, will likely not occur. Secondly, CE activity should, at least, have no effect on the total demand, or decrease total demand for the given good. Therefore, markets with a somewhat satiable demand or low price sensitivity would be more suitable (e.g. home appliances would be more satiable than clothing or electronics). Thirdly, even in the case that the first two conditions are met, it needs to be made sure that introducing a new product from secondary production to the market indeed diverts buyers away from primary production. This is especially difficult since the usual

methods to draw consumers (searching niche markets or lowering prices) should not be used to ensure the environmental benefits by avoiding CE rebound (Zink & Geyer, 2017). Therefore, although theoretically attainable, fostering business circumstances that circumvent the creation of rebound will prove especially difficult in an economy governed by market forces.

These rebound-avoiding conditions fundamentally oppose economic incentives. As McKinsey & Company (Zils, 2014) indicate, applying CE strategies becomes most profitable when seeing secondary production possibilities as an *additional* market to re-sell original goods, *not* cannibalizing existing sales: a practice with a near-certain rebound (and thus environmentally undesirable) outcome (Geyer & Doctori Blass, 2010; Geyer et al., 2016; Zink et al., 2014; Zink & Geyer, 2017). Because of this, introducing CE practices to the free market is likely to result in rebound-effects in more sectors of the economy. The environmental benefits related to CE practices are based upon the assumption that over time, net (primary) production and consumption will decline because of the prolonged circulation of goods and resources in the system. This would mean that overall economic growth should also decline, as over time less and less resources/raw materials would have to be harvested, decreasing the relative volume of the economy as a whole. However, when circular economy strategies are applied in a context governed by market/business logic, it will cause (as put forward by a.o. the Ellen MacArthur Foundation, 2015) substantial economic growth. This is fuelled by a net increase in production and consumption as market cannibalization continues to be avoided, resulting in a CE rebound effect.

2.5.2 Market Cannibalization

The CE's environmental message is therefore in its essence in support of market cannibalization, as the displacement of primary production by secondary production is desired to drive down environmental impacts and avoid resource depletion. However, from a business/market economics perspective, market cannibalization by remanufactured products is a threat to earnings, as secondary products can 'eat up' the demand or market share for primary products (Guide & Li, 2010; Cooper & Gutowski, 2015). In light of this, large manufacturers are generally reluctant towards investing in radically new products and production processes, as they would make their own operations obsolete in the long run. Consequently, businesses must make sure secondary production does not lower demand for their primary products by finding a niche market or targeting different consumer segments. In

fact, multiple examples exist in which active measures are taken (by nation states or industries) to make sure goods from secondary production cannot seriously compete with primary goods because displacement is feared, not encouraged (Guide & Li, 2010; Pelletiere & Reinert, 2002; Power, 2008; Ghose et al., 2006). As discussed, this causes CE rebound, as without displacement the net environmental effects of secondary products are simply added to primary production impacts. Therefore, the challenge remains to create structural incentives for market cannibalization, or more accurately, for the significant displacement of primary production.

Proposition D: *Market cannibalization is necessary to reach the full potential of environmental benefits of CE.*

2.6 Circular transition in the textile industry

Given the increasing publicity and awareness of the devastating impacts of the textile industry, initiatives concerning sustainability and circularity have been soaring in recent years. On a global scale, organizations such as the Ellen MacArthur Foundation and the Global Fashion Agenda have made significant progress by including 94 large textile companies (comprising an acclaimed 12.5% of the global market) in a commitment to sustainable and circular fashion (2020 Commitment, 2018). The Global Fashion Agenda has set the following “immediate action points” as goals for the year 2020:

- 1) Implementing design strategies for cyclability
- 2) Increasing the volume of used garments and footwear collected
- 3) Increasing the volume of used garments and footwear resold
- 4) Increasing the share of garments and footwear made from recycled post-consumer textile fibers

At first glance, these goals seem both useful, through their pledges to smarter design, reusing and recycling, and easily attainable, precisely because of their vagueness and lack of detail and quantification. However, as discussed, putting the emphasis on increasing the volumes of collection and recycling has its pitfalls. Although point 4 does add proportionality to the goals (specifically the share of post-consumer waste recycling), solely focusing on increasing recycling activity could lead to disappointing results. Undoubtedly, increasing the volume of garments collected and recycled is desired and even necessary for a circular textile system.

However, more effective goals would include actually decreasing the volume or share of garments from primary production. Since, as the rebound literature has made clear, increasing recycling efforts does not necessarily mean a decrease in environmental pressures.

Proposition E: To reduce vulnerability to rebound, goal setting should focus on the displacement and reduction of primary production.

2.7 Wrap-up

As we now understand the workings and relevance of the CE rebound effect from the literature, we need to ask ourselves what the place of this effect is in the current transition. How do we take it into account when forming CE strategies and visions? Is there something that organizations can actively do to avoid the rebound-trap? Or is it simply a given reality that can only be avoided when the economy is fully circular?

So far, the literature on the rebound effect, its academic development and its relationship with CE has been covered. Also, several CE strategies have been identified, as well as initial ideas about avoiding rebound and their potential implications. In order to investigate the questions raised thus far and understand more about how rebound effects manifest in the Dutch textile industry, data was gathered from stakeholders in this industry that should have at least a certain amount of agency over potential mitigation options. The next chapter describes the methods that were used in this research.

3. Methodology

3.1 Methodological approach

This study uses a qualitative approach to collect data due to its mainly exploratory nature. Inductive reasoning is used to learn general lessons about rebound effects and how they relate to CE, from actors in the Dutch textile industry and their efforts to become circular. As a start, the relevant literature was reviewed in a theoretical framework in order to arrive at the forefront of knowledge concerning the rebound effect and its relation to CE. Different relevant experts and stakeholders in the textile industry were consulted through the use of semi-structured interviews. Snowball sampling complemented this form of expert sampling, as informants suggested other experts to approach during initial interviews (Kumar, 2014). The interviews were adjusted to the particular interviewee, as their individual expertise, role in the industry transition and accompanying perspectives on CE strategies differ (Gioia et al., 2012). After the first couple of interviews, the semi-structured nature of the interviews became increasingly unstructured, as the researcher gained experience in steering the conversation to relevant topics. This was done purposefully, as it facilitated exploratory conversations, and, according to Corbin and Strauss (2015), unstructured interviews constitute the richest form of data collection. Finally, the accumulated knowledge from the various angles represented by the interviewees was analyzed to produce comprehensive recommendations and insights on the role of the rebound effect in the future of the textile industry as it transitions towards circularity.

The propositions that were drawn up in the theoretical framework were used primarily to incite discussion during the interviews. This does not mean that the propositions were explicitly accepted or rejected. The informants' views on the propositions are included into the Findings section where relevant, and the remainder of topics of the propositions is dealt with in the Discussion.

These methods were used to help formulate a thorough and well-contextualized response to the main research question: ***How do organizations that engage in CE strategies in the textile industry deal with the rebound effect and what can be learnt to avoid this effect?***

3.2 Research Setting

In the Netherlands, efforts to transition the textile industry towards circularity have progressed relatively far compared to most of the developed world. As the government is

committed to reach full circularity in 2050, multiple sub-goals and transition-agendas for various sectors of the Dutch economy have been set (*A Circular Economy in the Netherlands by 2050*, 2016). Within the five different ‘priorities’ (biomass & food, plastics, manufacturing, construction and consumer goods), relevant and active industry stakeholders have been assigned to conjure up so called *roadmaps* to reach the wider strategic goals set by the national government. The Social and Economic Council of the Netherlands (SER) is the supervisory organ for these roadmaps. The textile industry falls within the category of Consumer Goods, where the key branch organizations Modint, INretail and VGT (Vereniging Grootwinkelbedrijven in Textiel) are responsible for the roadmap to a circular textile system. Based on this roadmap for circular textiles, the Dutch Circular Textile Valley (DCTV) has been developed by these organizations (Modint in particular). This plan involves the creation of four different ‘hubs’ in the country, each revolving around their specific area of expertise. The region of Amsterdam has specific expertise on business and brands, Twente on fiber- and recycling techniques, Tilburg on workwear and Arnhem/Gelderland on circular design and sustainable materials (Week Circulaire Economie 2018: Icoonproject Dutch Circular Textile Valley in transitieagenda, 2018). Currently, these hubs, both in content and vision, are being developed through workshops in which the relevant stakeholders from different areas of the sector cooperate.

3.3 Data Collection Strategy

In order to illustrate the data collection approach, the table below (Table 1) identifies the individuals and the corresponding organizations that were interviewed. Each individual brings his or her own perspective to the table, as their backgrounds differ significantly. Because of this, it can be said that the subject is approached from several ‘angles’, or lenses, allowing the researcher to observe and study the concept of rebound given different contexts. A single informant could provide valuable data for more than one angle. These angles and their relevance are identified and described below.

Name	Organization	Function / Role	Angle
Douwe Jan Joustra	Fashion For Good, C&A Foundation	Head of Circular Transition	1
Traci Kinden	REvolve Waste, Circle Economy	Founder, Circular Textiles Expert	1
Gerard Taat	Province of Gelderland	Energy Transition & Economy	3

Esther Munoz Grootveld	State of Fashion	Head of Projects	3
Luc Kikkert	Kiemt – Circular Accelerator	Director	3
Peter Koppert	Modint – Branch-organization Textiles	Initiator DCTV Roadmap	2 & 3
Pals Brust	UpSet Textiles, (Formerly C&A)	Founder, (Former Director of Country C&A Benelux)	2
Iris van Wanrooij	EMMA Safety Footwear	CSR Manager	2
Jeroen van den Eijnde	ArtEZ	Lector Product Design	3
Michiel Westerhoff	Circulus Berkel	Manager Strategy & Development	2 & 3

Table 1: Research informants

3.3.1 Angle 1: Industry experts / NGOs

The first angle of data collection included CE experts from NGOs. They were consulted to test awareness and understanding of rebound, as well as to gain insights on the role of rebound in CE strategies and CBMs. In addition, a follow-up interview was conducted with an expert after the bulk of the interviews had been completed.

3.3.2 Angle 2: Circular Textile Businesses

The second category of interviewees was composed of individuals that represent businesses operating in the textile industry that are actively engaging with CE strategies. The respective businesses and their CE strategies were analyzed for rebound vulnerability as well as awareness and understanding. Through questioning their view on circularity and CE strategies and inquiring about their price, quality and marketing positioning, the aim was to construct conceptual image of potential rebound effects. This was done with the help of existing literature such as Santarius (2016) and Font Vivanco et al. (2016a), in which specific mechanisms and examples of rebound are discussed. In addition to organizations engaging in secondary production as a CE strategy, business-networking organizations have been interviewed due to their unique knowledge about and position in the industry.

3.3.3 Angle 3: Dutch Circular Textile Valley – Arnhem/Wageningen Hub

Between October and December of 2018, three workshops have taken place at WUR with the

goal of creating a regional hub with an accompanying vision that facilitates and stimulates the circular transition of the textile industry in the Gelderland province, and the Netherlands at large. These workshops were triple helix collaborations with participants from industry, government and knowledge institutes including the WUR itself. The workshops were observed to identify whether rebound is treated as a salient topic, either explicitly or implicitly. During the final workshop, the topic of rebound and its potential relevance to the hub and its vision were introduced to the group. After this, the participants were interviewed separately, as due to time constraints an active discussion was not feasible. The participants were questioned about the role of rebound in the future of the circular textile industry, their associations with rebound from the perspective of their organization and the hub they helped to envision. In doing so, the study aimed to uncover the real magnitude of importance of the rebound effect in the CE, both in the current transition and in the future, whilst also gathering data on possible areas of occurrence.

In total, 10 interviews with an average duration of 55 minutes were conducted, recorded and transcribed. Together with the observed workshops, the consultation with an academic expert, and the extensive literature review, this constitutes the collected data. The flexibly applied interview guide can be found in Appendix A. Note that the sheet was adjusted per informant, as their respective potential to add value differed in scope. This suited the general methodological approach, as the following data analysis explains and illustrates.

3.4 Data Analysis

To achieve the scientific rigor required to provide credence to such qualitative research, the data was analyzed according to a general structure adapted from Gioia and colleagues (2012). That means the data was structured in first and second order coding, after which aggregate dimensions were formed. The first order codes are the categories that emerge from the raw data with minimal influence from the pre-existing theory. Naturally, speaking of a concept with this level of complexity requires a certain level of jargon and explanation of the topic of conversation. During the interviews, care was taken not to over-impose a certain narrative and accompanying terminology. From these categories, themes (code families) were distinguished as a second order code. Then, aggregate dimensions (or third order themes) were included in a data structure that was combined with the theory to form new understandings (Gioia et al., 2012). As this research attempts to make sense of a rather abstract concept applied in a more palpable setting, this approach can help ground the theory in a structured manner, combining

the existing theory with the knowledge of the individuals that are closest to the theorized effect, and should have real agency to influence its manifestations.

3.4.1 Step one: First- & second-order coding

An initial review of the interview transcripts identified all relevant quotes from the participants. At first, this was done manually by highlighting any quotes with bearing on the topic at hand. Subsequently, the quotes were translated into a first-order categorization of concepts, an example of which can be seen below (Table 2). At this point in the analysis, interpretation stayed as close to the literal language used by the informants as possible. Because of the previously described flexibility in the interview approach, this analytical method was designed to retrieve as much valuable information from the interviews as possible. As a result, from an initial 250 separate quotes extracted from the interviews, approximately 150 first-order codes (as some codes are linked to multiple quotes) were distilled with considerable overlap, to be found in more detail in Appendix C.

Quote from interview	First order code
“een van de meest belangrijke dingen is dat je de herkomst van de textiel weet, en dat je dus weet wat de exacte content is, en ook wat voor een chemicaliën en dergelijke en gebruikt zijn” – “One of the most important things is that you know the origin of the textile, so that you know the exact content, as well as the kind of chemicals etcetera have been used.”	Importance of the origins of textiles
“dat het belangrijk is dat je regisseurs hebt die de hele keten doorzien en die mensen wijzen op elkaar... want iedereen kijkt misschien te snel naar zijn eigen stukje van de keten en kijkt misschien niet helemaal verder... ik denk dat je daar een soort tolk voor nodig hebt die zorgt dat mensen elkaar begrijpen.” – “That it is important to have directors who can see through the entire supply-chain and point to each other... because everyone might be looking at their own part of the chain but overlook the rest, so i think you'd need kind of interpreter to help people understand each other.”	Need for director / overview of supply chain

Table 2. *Examples of Quotes & First order codes*

3.4.2 Step two: Creating code families (second-order coding / themes)

After the first-order codes were determined, similar codes were grouped together. The qualitative coding program ATLAS.ti 7 was used to organize the codes and create code families or second-order codes as presented later in this chapter. In order to reduce the overlap and increase the meaningfulness of the codes, theoretical knowledge was combined with the

grouped first-order codes to construct a manageable amount of second order codes. An example of this can be found in Table 3 below.

First order code	Code Family / Second order code
Importance of origins of textiles	Need for supply-chain collaboration and transparency
Need for director / overview of supply chain	Need for supply-chain collaboration and transparency
Placing technological innovations in process and system perspective	Need for supply-chain collaboration and transparency

Table 3. *From first order code to second order code*

Just as multiple quotes relate to a single first-order code, multiple first-order codes combine to become code families or second-order codes. Due to the interrelatedness and complexity of the concepts embedded within the codes, singular first-order codes can be a part of various code families. In addition, the first-order codes were assigned links, creating more pathways between the codes as they relate to each other. In this way, an intricate web of codes was created, connecting codes and code families to quotes from multiple informants, ensuring that any claims made can be easily related to the collected data, whilst maintaining an appreciation for the complexity of the discussed topics. In total, 13 second-order codes were created, each consisting of between 8 and 30 first-order codes, a list of which can be found in Appendix B.

3.4.3 Step three: Arriving at aggregate dimensions & data structure

Finally, the 13 code families were condensed into three main aggregate dimensions: Rebound effects, New Design Approach and System Transition. The data structure below illustrates the build-up of these main dimensions (Figure 7). Note that, as mentioned, the complete data structure is larger than the illustration below, and all its components can be found in the Appendix (B & C).

An important note with the simplification of the data structure below concerns the fact that the aggregate dimensions are not mutually exclusive in terms of what they comprise. The structure of the data as illustrated below exists mainly to help create a clear overview of the categories of data collected. In fact, the new approach to design is a large part of the system transition, and rebound effects influence both of these dimensions in various ways.

Uncovering exactly how and why this is the case is discussed in the Findings chapter, in which these links and connections are made more apparent.

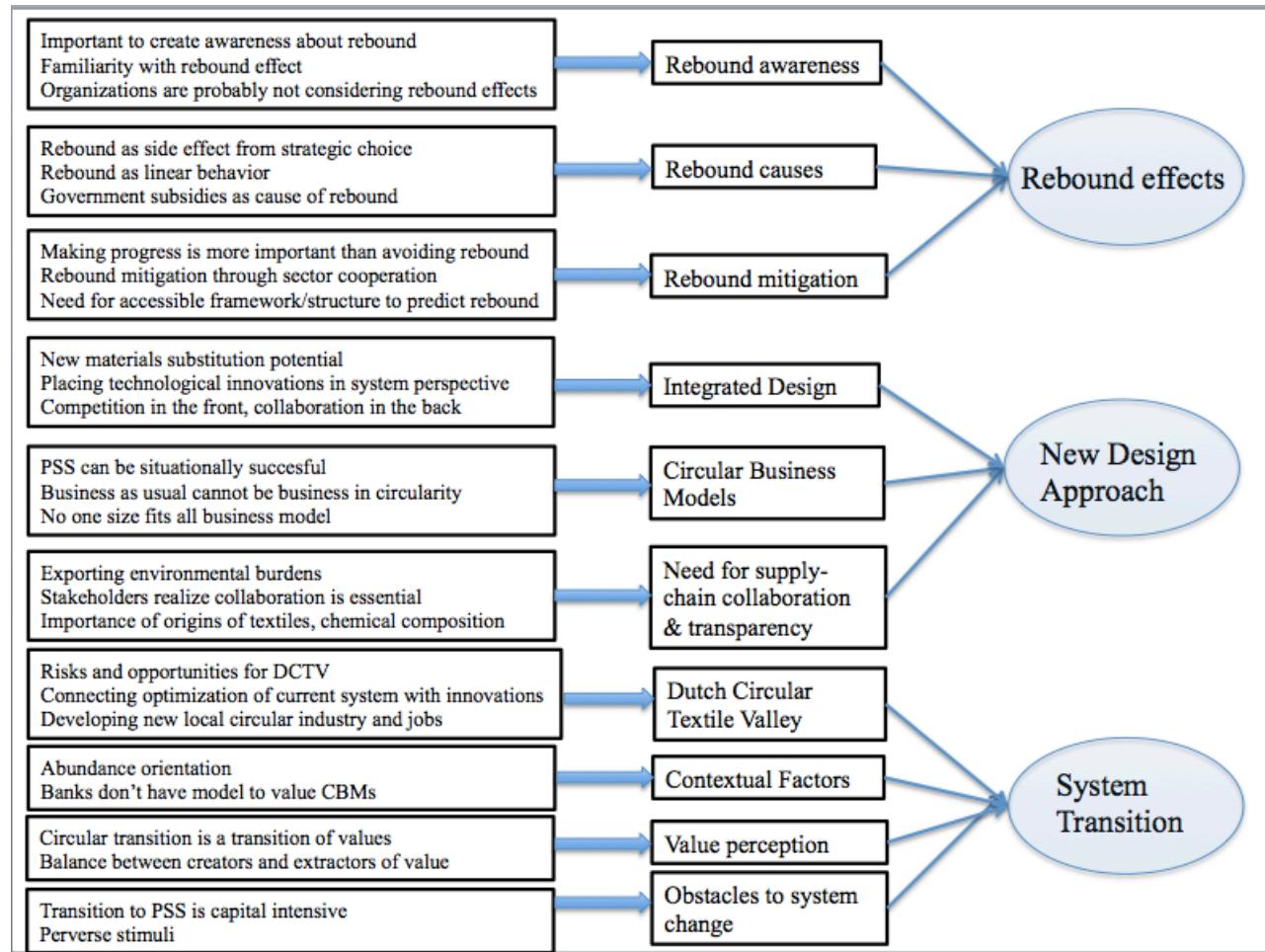


Figure 7. Data Structure

3.5 Validity and reliability considerations

Due to the nature of qualitative research, the researcher has a considerable amount of influence on the interpretation of the data. In this study, the researcher was generally more broadly educated on the specific topic of rebound than most of the informants themselves. Therefore, concepts such as the informants' understanding of the topic could be assessed, and sense and meaning could be given to data that had a more indirect or associative bearing on the topic, building upon the assumption that the researcher is a "knowledgeable agent" (Gioia, 2012, p.20). Respondent validation was assured through a feedback round in which all informants were asked to read and give comments on their contributions as well as other claims made in this research. Their comments and notes were processed, and all informants gave full consent for publishing their names, organizations and quotes. In addition, to avoid

logical fallacies and missteps, two supervisors were consulted and included in checking the analysis for possible shortcomings.

4. Findings

In this section the most noteworthy findings are described. They are presented as narratives drawn from the interviews, guided by the voices of the informants. They are structured in general accordance with the previously presented data structure. Therefore, first, rebound itself is discussed, after which the implications for design and the overarching and underlying systemic hurdles are addressed. Afterwards, the RQs will be answered, before arriving at the discussion.

4.1 Rebound Effects

This section will present an account of the participants' understanding, perception and suggestions concerning the central topic of this research. First, awareness about rebound is discussed, after which several examples proposed by the informants are raised. Linking to these examples, their causes and potential mitigation pathways are described.

4.1.1 Awareness

One of the first remarkable findings was that awareness and understanding about the concept of the rebound effect was, if present at all, mostly implicit. This means that nearly all of the informants expressed being familiar with the effect, but had not heard of the term 'rebound' before:

"Yes yes yes, I understand it very well, only I did not know the term, to be honest... But the mechanism you describe with the rebound effect of course I'm familiar with." - MW

Also, their familiarity mostly concerned the direct rebound effect, being able to relate to examples of behavioral changes after efficiency increases of light bulbs or driving a car. Instead of the term 'rebound', they were inclined to label this phenomenon as a kind of strategic or behavioral side effect, agreeing that it was probably often overlooked or simply ignored. Interviewees had difficulty with speaking about rebound explicitly, and sometimes conveyed they had a limited understanding of it:

"Well, let's put it this way, I don't have the answer ready. That's why your research interests me so much, if you really think it through. I only have a rather vague notion of it, and simply know it can occur." - PK

Increasing awareness and knowledge about the effect and its dynamic mechanisms were nearly unanimously agreed upon to be important for organizations that want to become circular and/or sustainable. The informants do not think that organizations actively take rebound effects into account when making decisions (“*There’s still a world to win there*”). In order to actually consciously consider rebound, a prerequisite must be a more complete understanding of circularity and sustainability itself, as will be discussed in a later section.

The main takeaway is therefore that rebound effects are generally acknowledged to be an important factor to consider, whilst simultaneously it is likely that barely any organization has any practical method to do so. Attempting to avoid rebound could serve as an extra strategic consideration that would force organizations to look beyond their own in-house operations when making decisions, and be more aware of effects that echo through the supply chain or the sector/economy as a whole. In addition, because of the high complexity and elusiveness of the concept, the necessity for more accessible frameworks and rebound-identifying tools were emphasized.

4.1.2 Examples of CE Rebound in the textile industry

In an effort to explore possible rebound effects, the participants were asked whether they could fathom real-life examples in which rebound could take place in the textile industry. The main type of rebound mentioned by the informants concerned the direct rebound effect, resulting from undesirable behavior as a reaction to new sustainable or circular initiatives. Specifically, the development of new materials in the textile industry such as biodegradable clothing and ‘living materials’ such as mycelium or kombucha leather were mentioned. A potential problem with these materials could be an increased reluctance with regards to extending the lifespan of such a product:

“The throw-away culture, if we can put it like that, could maybe even increase when we start showing how bio-based or circular a product is, because it might stimulate an image that says it’s okay to simply throw it away. This is partly true of course, but then we quickly forget the fact that a long use-phase is still desirable.” - GT

Similarly, concerns were raised for other, relatively more sustainable fibers such as hemp cellulose, but also the use of second-hand clothing in general. In these cases, rebound is the result of a kind of moral licensing that can consciously or unconsciously summon EoL-

reluctance that is justified by the assumption that the operation or use of a material is inherently ‘sustainable’ or ‘circular’, and will therefore always do less harm than traditionally impactful production.

[Talking about algae project] ... *He compares his materials to cotton, and sees that he's winning something here, and loses somewhere else, but improves on total environmental impact. In the production process he does not cut energy use, actually it increases slightly, which is not sustainable you could say, but he wins hugely on water use.*" - JvdE

Another way in which these type of radically new materials can create trouble is through arbitrary environmental tradeoffs and unknown effects of scale. For example, algae cultivation for garments is an upcoming field of research. Whilst saving substantially on water use in production, energy use goes up (slightly) compared to cotton. Additionally, scaling up the process of algae cultivation will transform natural ecosystems into aquatic-agrarian systems, which usually negatively impacts biodiversity.

Other potential rebound effects that may arise from creating a circular business concerns return logistics and disassembly:

"The only thing I can think of is our return logistics and disassembly. Disassembly happens by hand by people with a distance to the labor market, but we eventually want to automate it, which will of course require extra energy, just as the logistics involved, as now trucks will be driving that would not drive otherwise." - IvW

These two operations are essential components of circularity, however, they do require extra energy and therefore create additional, otherwise nonexistent environmental impacts. They both are forms of direct rebound, yet not behavioral, but more operational. It again emphasizes the necessity to work only with renewable, low-impact energy sources: one of the key fundamentals of the Circular Economy.

The example below relates to suboptimal reuse strategies, leading to insufficient substitution:

"So we want to go from one textile-application to another textile-application. And not suddenly say we can use jeans material as wallpaper because it is hip, because then the fibers

leak out of the system as a new application is created for something that did not require any textile in the first place, so the reuse of the material does not replace any virgin material.” –

PK

In this case, valuable jeans fibers exit the textile system by being used as decorative wallpaper. Given that the wallpapers are decorative and other, less impactful materials exist to fulfill this role, using a relatively high-impact material such as jeans should not be considered ‘sustainable’ or particularly environmentally friendly. This is when an excessively broad definition of ‘recycling’ can become an argument for ineffective circularity. Sure, the material is being reused, which might be better than landfilling (in case there is no adequate system for recycling). However, the fibers still exit the system to fulfill a down-cycled function, working against the goal of replacing virgin material input by recycled fibers through the enlargement of the application of textiles. Of course, there is a technical nuance inherent to this consideration, as some jeans are not fit for recycling at all because of their ‘monstrous’ composition, making them significantly less valuable in this context. Some virgin wallpaper or insulation materials have a relatively high impact, perhaps rendering some jeans types suitable for such reapplication.

So far, it appears there are several examples in the textile industry that can potentially be the victim of rebound. The table below provides an overview of the examples and relating types of rebound discussed so far, before elaborating on their causes and mitigation possibilities later in this chapter. The examples are generalized in order to illustrate that the specific examples brought forward by the informants have a larger scope.

Specific example	Generalized example	Type(s) of rebound
Biodegradable clothing (mycelium, kombucha, fruit leather)	Recycling of biological textile alternatives	Direct: potential use-increase Behavioral: Moral licensing
Algae production for garments	Biological textile alternatives production	Environmental impact tradeoff: water use down, energy use up. Unclear effects of scale on biodiversity
Return Logistics	Circular infrastructure	Direct: Additional energy use

Automated Disassembly	Automation & mechanization	Direct: Additional energy use Indirect: Cost-saving: lower price: re-spending / re-investment effect
Jeans as wallpaper	Creative reuse	Insufficient substitution Leaking resources from system Does not reduce virgin production

Table 4. Examples of rebound

4.1.3 Causes of CE Rebound

Naturally, as the rebound effect has multiple manifestations, there is no singular cause to be identified here. In fact, there are behavioral, strategic, and economic origins of different types of rebound, all of which need to be seen in a larger context.

“Now people use a lot of stuff and throw it away. This will later translate to being able to use even more stuff, since it won’t be thrown away, it will be recycled anyway.” - LK

One clear cause of rebound is rooted in behavior. As discussed, environmentally ‘superior’ goods and services tend to induce moral licensing behavior amongst consumers, offsetting some or much of their benefits. As one informant put it, (behavioral) rebound is receding back into linear behavior. This represents the propensity of people to resort to increasing wasteful behavior as soon as they are comforted by the increased efficiency of a product or an improved recycling system. This also stresses the fact that technological innovation is not the sole grand solution to our environmental issues; sociocultural considerations deserve attention too:

“Innovation, in most cases, is too much a technological innovation, with insufficient knowledge about the cultural and societal aspects of it.” – JvdE

However, besides the fact that changing behavior is a very difficult obstacle to overcome, rebound can have more complex, systemic origins. When asked directly, most informants attributed (non-behavioral) rebound effects to consequences of strategic choices:

“If you think about the fashion chain and what steps we must and can take to make it more healthy, not even necessarily more circular but more healthy in general, every time you push

a button in the supply chain it sets in motion a chain reaction. For example if a designer chooses to work with a specific material instead of another, you can trace the consequences of that decision.” - EMG

This perspective relates to the responsibility of designers' choices in circular production. As will be elaborated upon in the next section, the approach to design in the circular economy needs to emerge from isolation and take into account the ripple effect such decisions can have. The example of jeans fibers as wallpaper could also be seen as a side effect from a strategic/design choice made by, in this case, the designer of the wallpaper, resulting in insufficient substitution.

Some rebound effects are direct causes of the transition towards circularity. This includes the need for infrastructure and transportation between organizations that can now benefit from each other's waste streams, and the increased necessity for (dis-) assembly practices due to modular design. This type of rebound is inherent to the transition, as it embodies the energy required to move from one system to the next. It could be seen as the ‘necessary evil’ of the transition, retaining its ‘evil’ aspect only as long as energy still has the large environmental impact that it has today. Although perhaps still blurry, the distinction between rebound that is situational and the rebound that is inherently caused by the transition towards a circular system now becomes clearer. This is an important distinction to make when confronted with a potential rebound effect, to prevent ultimately counterproductive measures.

4.1.4 Mitigating Rebound

Different types of rebound require different mitigation strategies. As indicated by the majority of the informants, a clear and accessible framework to identify, predict and accurately measure any potential rebound effects is necessary as a prerequisite for mitigation from an organizational perspective. Since, in order for organizations to act upon the knowledge that the research on rebound provides, simple(r) methods to incorporate these effects into existing LCAs or other decision-making tools are necessary.

“In the decision process in which all the alternatives are presented, we need to have a checking or ticking box that says whether this choice will lead to rebound, or leaking- effects, or in other words, does this actually lead to the goal of reducing demand for virgin resources.” – PK

Such a tool could be a practical starting point to assist organizations in dealing with direct rebound by steering them to ponder questions about what type of behavior their actions or products induce, what alternative it is replacing and perhaps even what competitors could be suitable for cooperating with to alleviate environmental pressures. During one of the interviews, when contemplating mitigation strategies for the rebound originating from circular infrastructure and automation, this was reflected as follows:

“In the future perhaps we will produce for our competitors in our production facility, since there is plenty of room left in the building for another mill. And, in that spirit, we could cooperate working with our return logistics system.” – IvW

Two firms in the same industry might be in competition for customers, but in cooperation to secure effective and smooth resource flows. Especially when, as in the example of safety shoe producer Emma Safety Footwear, their waste stream has a considerable distance to travel before connecting to an organization that can make use of their stream, or in other words, make it part of the circular economy. Since it is likely that their competitors have similar resource flows and thus waste streams, it would make economic and environmental sense to cooperate. In this way, this type of transitional rebound can be reduced significantly.

Another consideration for organizations to mitigate rebound is to re-calculate environmental performance metrics when certain demand or sales benchmarks have been exceeded. To avoid a direct rebound effect resulting from a rise in sales and thus production (for example through lowering prices), perhaps sales cannot be allowed to exceed a certain number in order for the initial environmental assessment to hold:

“Let’s say I’m doing something circular, sustainable and I can prove that, but it is successful to a degree that I have to complement it, because demand has risen enormously. Then I have to say no to that increased portion of demand until I can guarantee or secure that the same conditions apply as with the first batch, perhaps with a lower demand-estimate.” - LK

In other words, you need to be able to justify scaling up. If your calculations held true for producing your product or delivering your service at a certain demand level, do they still hold true for larger numbers? Do the means still justify the end? Especially in the context of the

fast fashion culture with an increasingly insatiable demand, these considerations could prove valuable.

Unfortunately, mitigating or avoiding rebound can have some complicated implications. For instance, weighing environmental concerns against social concerns is difficult. Sometimes, a rebound effect will occur because a new, previously priced-out consumer group gains access to a new good or service. Although environmental impacts accumulate, mitigating this development would deny lower income citizens access to those goods, posing a moral problem. Especially in the case that it would be beneficial for society that a good was used more widely, rebound mitigation strategies could prove destructive. In addition, as stressed by multiple informants, mitigation cannot become an obstacle for the transition towards a circular and more just economy:

“Yes, but I’d want to do that very strategically and tactically, because I want to create as few obstacles as possible for us to get in motion.” – PK

“But I would not bring it in too early. It is more important for people to start moving, and I think we’re still in that phase. From there, awareness will spread.” - LK

With these remarks, the need to keep the bigger picture in mind was emphasized. The road towards a circular economy might be bumpy, but it is important that we keep moving into the right direction, and not be discouraged by the size of the bumps.

4.2 New Design Approach

A recurring theme that was put forward persistently when discussing the rebound effect was the necessity for a new approach towards design. The ‘traditional’ designer often worked as a self-contained entity within the production process, focusing mainly on aesthetics and acceptance by the consumer. The ‘new’ designer needs to have a more comprehensive approach to design, seeing through the whole supply chain, taking away the heavy burden of complex EoL practices from the recycler by anticipating the continuous cycling of materials and resources in the system. In this way, systems can be intelligently constructed from the outset, as opposed to current practices in which responsibilities are simply transferred when goods/materials switch hands, and recyclers end up with the often-impossible task of retrieving valuable resources from monstrous hybrids.

4.2.1 Supply-chain collaboration, transparency & integrated design

Diving into what this means opens up a wide array of suggestions and implications. The first and foremost aspect of this new design approach concerns the realization that value chains need to become more collaborative, open and transparent. As one interviewee summarized: “*just taking a more connected approach to how a product is being produced*”. This entails among others the need to know the origins and composition of the materials that designers work with, and more scientific involvement in the process to approach higher technical effectiveness in product design. This is illustrated by the quotes below:

“So also applying design to its fundaments, meaning that if you look at the fashion sector, design is often a matter of contemporariness, color, snit, length, and not as much on the composition of a product in terms of the material or how it is used and processed... Coming back to the old example of a shirt made of 98% cotton, well, there’s only 2% polyester in it, but that totally ruins it.” – DJ

“Closing the circle is not only a matter of recycling techniques, but it’s also about purposeful design, design-for-recycling, and design-for-longevity.” – PK

Fundamentally, design needs to move from being only about satisfying the consumer and reaching sales targets to satisfying the consumer with a holistic backdrop of scientific benchmarks, broadening the scope of design. In conjunction with the mitigation of rebound effects, an emphasis is put on effectiveness of design and cyclability, not just market success.

Furthermore, complementing the point made before about the sociocultural dimensions of technological innovation, there is a need for an extended, operational systems perspective on new technologies:

“There is a big love for technological innovation, but we have to make sure that these innovations are always placed within the perspective of the larger process and system.” – DJ

This could, for example, concern the previously mentioned new biological textile alternatives such as fruit leather. This constitutes a disruptive technology, radically changing the old approach to textiles manufacturing. One informant explicitly indicated that these type of innovations need to quickly be viewed from a larger systems perspective in order for the

positive impact to really take effect. This means for instance assessing the opportunities of scale in an urban context, how the required resource/waste streams can be secured, and what the infrastructural and legislative aspects would look like. In essence, it is about discovering early on how an innovation fits into the circular system that is being set up, and does not solely function as an improvement to an existing system that actually supports linear thinking:

“So if you start investing in such recycling initiatives you have to realize that in fact this is meant to solve a temporary problem, namely that all those existing pieces of clothing actually have been produced and designed in the wrong way, so you also have to take action to change something more fundamentally.” – DJ

The realization that a lot of contemporary recycling technologies are actually solutions to problems that can be averted in the first place by taking a new approach to design is an extremely important one. This is not to say that these solutions should not be applied: the vast amount of resources currently circulating in the system is too valuable to simply leave behind. This poses a dilemma between optimizing current systems and moving to more radically new systems, which will be elaborated upon in section 4.3.

4.2.2 Understanding Circularity

In order to understand how rebound effects manifest in the circular economy, an improved understanding of the concept of circularity is needed. Circular economy is not just recycling. As indicated by the respondents, this knowledge and understanding is a prerequisite for effective action:

“Well, I think you can take a step back, as a large number of companies feel they need to do something with sustainability but are not even fully comprehending what that means, so I can’t imagine them thinking about potential rebound effects.” – JvdE

The aforementioned necessity for accurate measurements and indicators surrounding contributions to circularity also play a role in this. For, without such universal, standardized metrics, a commonplace and simultaneously in-depth understanding of what circularity means will be hard to achieve. Whilst, as put forward by this research, this in-depth understanding is exactly what is needed for both the smooth progression of the transition and the mitigation of rebound on the way.

Because of the at times blinding focus on recycling as the definition of circularity, one of the occasionally overlooked goals of becoming circular is the actual reduction of raw materials in production:

“Eventually you’d want to phase out virgin materials, or at least minimize their use.” – MW

“The goal of circularity is, less pressure on virgin raw materials.” – PK

As was discussed with the respondents, goal-setting concerning circularity in the textile industry is prone to miss this focus, by primarily targeting the increase of recycling. Whilst an increase in recycling is certainly an important tenet of the transition towards a circular system, as mentioned, circularity is not just recycling. Creating connections, becoming part of a resource network, lowering primary resource use and using clean energy sources are of critical importance for increased recycling to become truly effective in light of rebound effects.

Another potential caveat of understanding circularity is the notion that creating a circular product will somehow decrease the quality of the product, or that it requires substantial (financial or other) sacrifices. Since it is very important that a circular product can outcompete its alternatives for optimal impact, an effective circular product should in principle never be of lower quality than its non-circular counterpart.

“Quality always comes first. We even said, safety first, comfort second and circularity comes after that. Our shoes are also designed as such since otherwise you lose sight of your purpose.” (...) “So in our idea these products are not just circular, but simply better products, we don’t feel like we are making sacrifices.” – IvW

Without a doubt, fundamentally changing your product design to become circular could depend upon a financial investment. Yet, as any good investment, making the shift to circular design provides opportunities and opens up many pathways and opportunities. It could save costs in wasteful production processes, increase the marketing appeal of your products, and open up new favorable networks of collaboration.

“So, our position in the market was actually not changed by this [becoming circular], we even notice it’s an entrance to other companies that act sustainably and it is a big pro in tender offers, with which we can earn extra points, so that is only positive actually.” – IvW

Mainly, the narrative surrounding what it means to be and to become circular cannot be constructed with a tone and language that incites the feeling of sacrifice. Also, it cannot view unilateral aspects of what circularity means and paint them as fully circular solutions. In the current phase of diffusion it is essential to arrive at an agreed upon, thorough understanding of this new approach to design. Consequentially, this new approach to design also requires new business models to accompany it.

4.2.3 Circular Business Models

So, this new approach to design requires new business models to function from an economic point of view, as current business models imply that short lifecycles are better for turnover and profit. The most prominently discussed solution to align business incentives with design-for-longevity and circularity in general was the Product-as-a-Service business model, or lease-model approach. The usefulness of the Value Hill conceptualization of circular business models somewhat falls short in light of the PSS business model, as it potentially encompasses multiple areas of the ‘hill’.

“If applied strategically, it can be really useful. If it’s applied across the board as the solution today, I don’t think it will be. In the near term, it really depends on the quality of the product, the consumer, etc.” – TK

In other words, whilst the prospect of this particular business model seems very positive in regard of the imperatives concerning design discussed before, it does not constitute a silver bullet type of solution. The appropriateness of this business model is very dependent on the nature and characteristics of the product (or service) the organization intends to sell.

“Luxury brands have the opportunity to really do rental and leasing well, because by definition they have a desirable product. Theoretically it’s of higher quality, better construction etc., so it should last multiple use cycles and retain its value longer.” – TK

The conduciveness of this particular business model can therefore be determined by considering multiple distinctive qualities inherent to the product/service at hand. One such distinction concerns the difference between products that *flow* versus products that *last*, in which products that last would be more appropriate for the PSS business model. However, from a fashion/clothing-perspective, the line between flowing and lasting products is blurry. The fact that this line is blurry, however, seems socio-culturally induced rather than based on technical considerations, as the technical life-span potential of a piece of clothing is usually far longer than its actual use-time. Certainly, companies such as Primark will not be particularly keen on starting to lease their €3 t-shirts, as this would not make any practical sense. This however raises the question whether a business model based purely on tiny margins and large material turnover is even feasible in a circular economy, especially when these products are not designed for recycling:

“Mass companies, such as Action and Primark, exist purely to turnover as much mass as possible, as much material flow as possible, so that they can retain a low margin on them, so it’s all about the mass. But that is a perverse value driver, and at the moment you really manage to incorporate the value of the materials and the impacts on the planet in that, this will stop.” – LK

As will be elaborated, such a value driver incentivizes the kind of behavior that needs to be abandoned. So, although there are certainly more business models that are feasible in the circular economy, PSS has the potential to facilitate the more fundamental underlying shift from ownership to access in our economy. One way that PSS could reduce rebound is through the fact that it can find an answer to seemingly insatiable levels of demand, whilst limiting resource use. Rebound occurs especially in those areas with insatiable, elastic demand. A PSS business model can reduce excessive waste generation and resource depletion through retaining a clear perspective on who holds the responsibility for the product. However, it is also susceptible to bolstering the type of moral licensing behavior that causes rebound, when consumers decide to perhaps not treat their products as carefully as they would if they had been the owner of it. These points indicate that a careful approach to new business models should be taken, and considering the rebound effect could be a concrete tool to revise the true effectiveness of a CBM in a particular context.

4.3 System Transition

As already implied by the points described before, a truly systematic change is required to accomplish real improvements in the transition to a CE without excessive rebound effects. Every single informant who was questioned unequivocally stated that system-level changes are essential to reach the desired outcomes. This entails reshaping design and business models, rethinking consumption and ownership practices, and eliminating perverse incentives or stimuli amongst many more. As frequently stressed in the interviews, optimizing the current system through endless incremental efficiency increases both creates rebound effects and actually becomes an inhibiting barrier for real meaningful change. Problematically, more radical ideas are bound to encounter a strong opposition from established industry:

“From the art-context we think about more radical innovations. Well, that never really resonates within an industry, since radical innovation always means that you have to start developing something that you will become the victim of.” – JvdE

This poses a challenge, especially to current large-scaled production houses that operate according to traditional, impactful yet profitable methods. The daunting scale and complexity of this challenge requires a level of collaborative effort unseen before in not only the textile industry, but across sectors, governments, knowledge institutes and society as a whole: everyone has a role to play.

4.3.1 Value Perception

A central component of the systemic change described above that was mentioned by multiple informants was a shift in how we value things in our economy.

“The transition towards a circular economy is not a transition of materials, it is a transition of values. (...) The deeper problem will be about value, and the perception of value. (...) So we need to have a much better understanding of value, and move away from only economic value, based on profits and losses.” – LK

Whilst circularity is a broad concept that can be approached through different lenses, the way in which things are valued and how value is created and extracted lies at the heart of the transition. Not only are consumers disconnected from the true value of (textile) products; also

valuation models applied by banks are lagging behind. New circular business models require a new approach to what value means, and how circular asset management is conducted.

If the concept of value and the way that it is used in strategic/economic calculation can evolve to reflect more than just money, real-world environmental pressures could be taken into account in such calculations. This requires a shift from value being determined by price, as it is today (which itself is determined by the arbitrary forces of supply and demand), to value itself once again determining price. Although it might seem an abstract futuristic conception, one can imagine that once value determines price (and not the other way around), and value is no longer purely a financial indicator, environmental pressures (also as a result of rebound effects) can finally be included into the equation.

Our perception of value is not evolved far enough yet. At the moment the value-transition has been completed, because it has to be a transition of values, you will see the rebound-effect decline.” – LK

Despite the fact that the proposition that a transition in values will catalyze the decline of the rebound effect is hard to either prove or refute, this train of thought suggests that incorporating environmental indicators into the equation makes it easier to account for those kinds of pressures that are now deemed externalities. This could help level the playing field, portraying a more accurate depiction of rebound effects stemming from environmental tradeoffs as discussed before. Just as there is no waste in nature, there are no externalities in nature, since we inhabit a closed planetary system in which everything influences everything else, all powered by one external solar source. Perhaps the necessity of excess energy in circular processes should be called externalities, not the damage done and waste created, which should be reflected in value and price.

“So, how do you approach the value of a product? Do you look at it from a possession principle, which is what our model is based on, it is not based on what function it has for me and what value I attach to that function, no, it is determined by the value of possession. That is what is fundamentally wrong in our value-pattern, and why many perceive possession as wealth. Whilst I think, no, rich experience is wealth. But that is the climb that we as humanity need to make.” – LK

Abundance

Another interesting theme that was raised during the interviews concerned a necessity for an orientation towards (sustainable) abundance, contrasting with the scarcity-driven economics practiced today, linking again to the C2C rhetoric of ‘doing good instead of doing less bad’. An abundance-assuming perspective counters the narrative that portrays the road towards circularity as being paved with sacrifices and ever-receding amounts of consumption. When taking an abundance worldview, average consumption levels are not necessarily required to drop drastically, as superior technical systems could facilitate our current levels of consumption whilst dramatically reducing environmental impact.

“You can imagine a future in which abundance, as the cradle-to-cradle guru’s say, we won’t be consuming less and less, but even more, but we’ll do it in a kind of perfect technical environment in which there is no waste, in which all problems of recycling have been solved.”

— MW

The implication is that the (macroeconomic) rebound effect would become irrelevant as waste is designed out of the system and virgin material use is minimized, leaving room for a type of economic ‘growth’ that is decoupled from the depletion of resources. In this regard, rebound effects are only transitional phenomena that will become irrelevant as systemic change progresses.

4.3.2 Context, Obstacles and Role of Government

Whenever speaking from a systems perspective, the context in which events and processes take place always deserves to be addressed. A context, whether cultural, political, sociological, or one of the many more contexts that comprise the system, sets the stage for development. It can either facilitate progress, or be an impediment to it. Therefore, it is important to evaluate these conditions, and see if they can be shaped to create the desired incentives.

An influential factor that enables large increases in environmental pressures concerns the flow of second hand textiles. As collectors need to pay a hefty price on the right to collect these textiles, and they are subsequently sold to the highest bidder in the market, the only financially feasible options to turn these textiles into a profit exist in countries with very low labor costs.

“The price of 1 kg of second-hand textile is almost higher than the price of regular, new cotton worldwide. You’re paying for the waste stream. If you are allowed to place a textile-collection bin, you have to pay for it. [...] Companies such as H&M and C&A are then no longer interested.” – PB

Creating recycled fibers of adequate quality out of second hand clothing can thus only be realized with a high cost price due to the costs of collecting and processing the garments. Second hand textiles are still collected, but they are exported for processing in order to generate a profit at the price-level that these brands aim for. Multiple problems arise as a result of this. Because the textiles are exported, so are their measured environmental burdens, which from a systems perspective gives a distorted view of the environmental balance sheet. A huge step towards mitigation of logistical rebound effects such as those discussed before could be taken by managing to localize the processing of these second hand textiles. Apart from the fact that it would lower the net environmental impacts because of the extremely reduced travel time of the textile, it would be an injection of jobs into the circular economy that are now exported, and increase the well-needed transparency in the supply chain of our clothes.

“We also asked for the highest price in the market for our second hand textiles. The consequence of that was that the sorting facilities in the Netherlands did not get any more textiles, and it moved abroad where there is cheap labor. Even more so, the bidding war led to the fact that the textile ended up in countries with provable child labor practices, and a very irresponsible way of dealing with textiles. This means that if you start with a price that is too high, in the beginning of the recycling chain, you’ll never have a circular stream in the Netherlands.” – MW

Whilst the environmental balance sheet knows no borders, our political reality does. Differences in international legislation and environmental laws inhibit the standardization and transparency of treatment processes, posing obstacles to circularity. Because of this, the general idea that the Netherlands (or any specific country) can only become circular if the international community also moves towards it tends to become popular. But, this idea negates the influence you can have on your supply chain as a company:

“On the other hand we can say that for a small part we can stimulate this from the Netherlands, as we have a lot of active brands that have their clothing produced abroad, so they can decide how clothing is being produced and what resources are used in production. Then we can decide about wanting as much recycled content as possible in my products, and about designing products with higher quality, timelessness, etc.” – PK

The above remark encourages local brands with an international supply chain to start demanding circular production principles of their suppliers. Even though the legal context might not be very facilitative, as a brand you can always set benchmarks for your suppliers. Agreements (or laws) within the national industry could help retain a level playing field in terms of competition, whilst increasing national circularity and promoting it internationally.

In addition, the textile industry and the economy as a whole still harbors incentives with detrimental outcomes. This comes down to what actions and business practices are rewarded in the marketplace, and what the environmental outcomes of those actions are.

“The wrong actions are being rewarded. I mean, a hamburger is still way too cheap, and we have something such as a Primark, which is popular, so that is rewarded. There are perverse stimuli, we still subsidize the oil industry, so...” – LK

The ‘perverse stimuli’ in this context are incentives that organize business models around high levels of material turnover against very low margins. This type of business model works financially but is extremely wasteful and poses a problem especially with goods that are not fit for recycling, as is the case with a lot of cheap textiles. The implication here is that the government has a position from which it can influence these incentives through taxes or other instruments, so that more (environmentally and socially) desirable value drivers are rewarded. In this line of thinking, the government can shape contexts to foster the right circumstances (legal or fiscal for example) for organizations that apply the newly emerging design approach, or circular business models in general.

On a slightly more practical note, the government can also be helpful regarding the creation of awareness of rebound simply through applying the knowledge in their relevant daily activities. This can be done for instance through including it when deciding on subsidies, the buy-in of goods and when facilitating or initiating meetings and collaborations.

4.3.3 Dutch Circular Textile Valley

When discussing DCTV with the informants, multiple threats and opportunities that the initiative might encounter were mentioned, such as the example below. A further elaboration on these threats and opportunities is provided in chapter 5.2.1.

“Instead of writing more papers, start doing more, connecting things that are already being done to learn from each other. One of the things that can make that initiative really strong is an ability to come together.” – TK

At the moment, the term DCTV serves as an umbrella to include the initiatives part of the roadmap towards a circular textile industry in the Netherlands, initiated by the government in combination with ambitious companies and stakeholders in the industry. It is a narrative that serves to set trends and stimulate innovation around recycling, design and circular practices. In the interviews it was discussed what relevance rebound could have in the development of this narrative and specifically in the development of the local hub, which was the purpose of the workshops attended by most of the participants. Because this development is in a very early stage and still lacks concrete projects and overall shape, stating a current, direct relation with rebound seems premature. However, in discussing how DCTV contributes to molding, framing and ultimately stimulating the progress of the circular textile industry, the potential relevance of the rebound surfaces. Since the informants agreed that, for reasons discussed before, awareness about rebound would be useful for organizations, this knowledge could be applied when DCTV begins to take a more detailed form. A starting point for this is provided in the Discussion chapter, in which practical and theoretical recommendations relevant to DCTV are presented.

Altogether, the conversations with the informants have provided a valuable set of information. The compiled narrative that resulted embodies both a general train of thought surrounding the best way forward in the transition towards circularity, and specific areas of interest with regard to the rebound effect. Next, these insights are combined with the discussed literature in order to formulate answers to the research questions at the base of this research.

4.4 Answering Research Questions

In this section, the sub-research questions are answered based on the findings described above, in combination with the knowledge from the theoretical framework.

- 1. What is the level of awareness amongst organizations in the Dutch textile industry of the concept and dangers of CE rebound?*

Drawing from both the observations of the workshops and the interviews with the respondents from different angles as described in chapter 4.1.1, it appears safe to conclude that the level of awareness about rebound effects amongst organizations in the Dutch textile industry is very low to nonexistent. Although it is still possible that organizations ‘accidentally’ consider rebound effects through strategic decision-making by focusing on substitutability for example, there are still very large steps to be made. The salience of this finding lays in the fact that spreading awareness to help organizations consciously consider rebound effects in their operations could help realize large potential environmental benefits. In addition, teaching organizations about what rebound effects are and how they can be averted can bring about a more comprehensive understanding of what effective circularity and by extension sustainability means.

- 2. How does the rebound effect manifest itself in the textile industry?*

As was clear from the outset due to the fact that the rebound effect does not have a singular form, there are multiple ways in which these effects manifest itself in the textile industry. Chapter 4.1.2 presented some specific examples that surfaced after interviews and discussions with industry stakeholders. When generalizing these examples, a larger order of rebound effects becomes apparent.

First, seemingly inevitable, transition-induced rebound effects occur when organizations begin to engage with CE practices. This entails the extra energy requirements that are required for setting up logistical and infrastructural fundaments of (becoming part of) a circular network. Because these energy requirements are created purely as a consequence of a technological innovation/improvement (becoming circular), they are considered rebound effects. This type of rebound is not native to the textile industry: every sector of the economy will experience this development when making moves towards circularity.

Another rebound effect that is not limited to the textile industry per se concerns the extra

energy requirements for automation and mechanization of labor practices. This development will be beneficial for productivity, profitability and relieve humans from arduous labor. However, it requires additional energy, and, as an extra social rebound effect, it will eliminate jobs.

A rebound effect that is more specific to the textile industry revolves around the substitutive abilities of new materials. Momentarily, there are efforts in the industry to research and create alternative forms of fibers created from e.g. algae, mycelium and/or fruit leather. Whilst these new materials significantly outperform traditional and current fibers on environmental impacts, the question remains whether they can adequately compete with these traditional fibers in the market. Since, if they cannot manage to actually displace their more impactful alternatives, their relative environmental benefits will decline accordingly.

Relating to this example, producers of such materials should be aware of moral licensing behavior that could occur in conjunction with their products. As described in chapter 4.1.3, consumers that purchase goods with a relatively lower environmental impact are prone to subsequently use more of the good in question. This same behavioral dynamic applies to the use of recycled textiles and clothing, potentially offsetting the benefits of their relative environmental superiority.

Furthermore, as seen in the example about the use of jeans as wallpapers, rebound may occur when the range of use and application of textiles is unnecessarily enlarged, leaking precious fibers from the textile system. Especially when aiming for a circular system, these kinds of practices are not very effective. An important note to this point is that it specifically concerns high-value and pure cotton fibers from circular apparel textiles that could be kept for high-value apparel applications. Cascading blended fibers or monstrous hybrids for applications outside the textile system could prove to be a good solution in certain cases. This should be captured within the new approach to design and a more comprehensive understanding of what circularity and sustainability means, as this type of ‘reuse’ is not necessarily bad or even undesired, but it does prompt us to rethink what really is the goal of this transition. Reusing pure and cyclable fibers for a newly invented application does not reduce the pressure on virgin textiles, and is therefore at best suboptimal, and at worst simply wasteful.

Although the variety of potential rebound effects presented here is most definitely non-exhaustive, it provides a decent starting point to which organizations can relate when

attempting to identify rebound in their operations and periphery. It is also important to distinguish between rebound that results directly from the efforts of engaging with the circular economy and those that occur anyways. This can suggest a different approach to mitigation, seeing a certain type of rebound as a ‘necessary evil’ and others as ‘unnecessary evil’. These considerations can be valuable when deciding to consciously ignore some forms of rebound, and taking deliberate action to counteract others.

3. In which CE strategies is rebound most likely to occur and why?

One of the realizations that occurred during this research was that rebound is not bound to any particular CE strategy or business model. As described above, rebound manifests in multiple ways. This means that no CE strategy or practice is inherently void of rebound. However, some areas are more prone to generate rebound than others. This has more to do with the market-form of the industry or sector that the organization operates within than the strategy it applies, as well as the demand and price elasticity of the goods. The reason for this is that the rebound effect is in its nature a relativistic measurement indicator, dependent on the price and impacts of alternatives and the level of competition in the market, especially when taking the indirect rebound effect into account.

In the theoretical framework, the Value Hill (VH) was presented as a conceptual tool to illustrate a variety of CE strategies and business models. Initially, the right side of the VH was hypothesized to be most susceptible to rebound effects due to the fact that reusing does not necessarily cause a reduction in production, and could be not achieving sufficient displacement of primary materials. In fact, CE strategies on the left side of the VH need to deal with the same challenge, only instead of using secondary materials for design, these strategies often take a new approach to product design. Goods originating from either side of the VH need to successfully compete with noncircular alternatives and be wary of moral licensing behavior in order to avoid rebound. Rebound effects from infrastructure and logistics are also not particular to one area of the VH. The only type of rebound to which strategies on the secondary production side of the VH are more vulnerable concerns those of suboptimal reuse, as in the example of the jeans as wallpaper. This indicates a certain responsibility for organizations that engage in these activities about optimal reuse of raw materials, and in the case of textiles, avoid that valuable fibers leak out of the system.

Thus, besides the latter example, the categorization of circular strategies as presented in the

theoretical framework as guided by the Value Hill appears to be rather moot in light of rebound effects but also in light of the PSS CBM. Although successful applications of this CBM in practice are still limited, especially in the textile and fashion industry, this model potentially encompasses all areas of the Value Hill. Nonetheless, this business model can be prone to rebound effects, for example the ones resulting from moral licensing behavior. When ownership (and thus responsibility) of a good remains out of the hands of the consumer, behavior could change accordingly. In this case, being able to use a good continuously and in an apparently unlimited fashion, irresponsible behavior might lurk, constituting a direct rebound effect when use goes up or an increasing amount of repairs are needed, requiring extra logistics and materials. Despite the fact that this model is in many cases still superior to its traditional ownership-based counterpart, actively seeking to reduce these types of effects could prove essential for realizing the projected environmental benefits and perhaps even for its functional application in general.

4. What is the role of rebound effects in the transition towards a Circular Economy?

Studying, investigating and attempting to mitigate and/or avoid rebound effects in the transition towards a circular economy can serve multiple purposes. Dealing adequately with rebound effects will ensure that the transition is effective, goal-oriented and realize its positive environmental benefits as quickly as possible. It can help organizations rethink what circularity means, and initiate and foster cooperation in the attempts to combat it. It can serve as an argument for or against certain strategic decisions, and a widespread awareness of the existence of rebound will at least provide a more comprehensive assessment of the options at hand. At the moment, rebound effects detract from the ambitious efforts organizations undertake in their quest to become circular, perhaps even unknowingly. However, considering the current state of the fashion industry, ignorance cannot be bliss. True environmental impacts can be assessed with more accuracy by including rebound effects into the equation, and learning about rebound and its mitigation pathways can provide organizations with the metaphorical handlebars needed to accomplish more ambitious environmental goals.

Taking a wider scope, studying rebound effects can, as extensively described in this research, steer organizations towards a new approach to product design. It can level the playing field within industries about what the (common) goal is of the transition, infusing a systems perspective into decision-making. In addition, the existence of rebound in the transition emphasizes the critical importance of clean energy sources, and the realization that there will

be no effectively functional circular economy without it. Setting up the circular economy requires financial, material, logistical and infrastructural investments, which is accompanied by an inevitable increase in energy use. This increased energy use is in fact a rebound effect of the transition that will bring about tremendous environmental benefits, and can and should therefore not be avoided altogether. Identifying rebound as such will constitute a powerful argument for the acceleration of the energy transition as a precursor to the transition towards a circular economy.

Importantly, the role it should most definitely *not* have is the one of obstacle or barrier, or reason for inaction. As discussed, this was one of the main concerns of the informants in this research. Being more aware of and knowledgeable about rebound effects can help when people are using rebound implicitly or explicitly as an argument for inaction. The realization that progressing the systemic change ahead is paramount despite the presence of rebound needs to be at the forefront of the discussion. Since, even though this research advocates and specifically stipulates the importance and dangers of rebound, it is more important to keep the bigger picture in mind.

5. How can textile/fashion corporations avoid, reduce, and/or minimize CE rebound?

Many pathways for rebound mitigation exist, and many more still need to be uncovered and applied. However, there is an important distinction between reducing rebound and avoiding it in the first place. The single most important step organizations (and society as a whole) must undertake to avoid CE rebound is the transition to clean energy use in all areas of operation. This aligns with the comments made on GPTs in chapter 2.1, which were identified as potentially rebound-prone. Indeed, the bulk of rebound is a result of increased energy use inherent to the transition to circularity and the impending automation of production processes. If this increase can be supplied by renewable energy, these rebound effects will not create additional environmental impact/pressure (excluding the investment costs of creating additional renewable energy facilities).

Now, given the fact that it is unlikely that a full energy transition will be accomplished in the near future, and the CE transition is happening simultaneously, in the meantime there are mitigating options for this type of rebound (relating to increased energy-use). As discussed in chapter 4.1.4, one of those options is to increase collaboration with competitors in the industry regarding logistics, lowering costs and fuel/energy use. There are other policy

pathways to mitigate this type of rebound further described in the existing literature about energy efficiency, which will not be discussed here.

Even an economy powered fully by clean energy is not necessarily free of rebound, as production processes will remain exerting other types of pressures on the environment as well. Adhering to certain rules of rationality in approach to production and design is the first step to minimize environmental impact and its corresponding rebound. This requires considering technical efficiencies such as the optimization of recycling and distribution, as well as the discussed considerations in chapter 4.2, unhindered by cost efficiency logic. Surely, not letting cost efficiency considerations dictate strategic decisions will often prove to be impossible in the current business climate, but this is where the government could play a valuable role. Government action, whether through legislative capabilities, networking stimulation, research funding or other forms of subsidizing, could help shape the business climate to create a context that enables organizations to adhere to these technical optimization and design considerations. This includes the mitigation of rebound effects.

On a more practical level, producers of circular textile need to be aware of the substitution potential of products in order to reach the desired environmental benefits. As discussed, quality, comfort and security of a product need to be safeguarded for it to compete with its alternatives, and avoid becoming too much of a niche product. Simultaneously, as suggested by the literature, prices cannot be lowered too much in order to avoid increased use as a direct rebound, and an additional re-spending effect. However, as argued in the ensuing chapter, this consideration should perhaps not hold too much significance.

In addition, the direct rebound effect that results from moral licensing behavior has been discussed. As their origins are behavioral, mitigation strategies for this type of rebound involve communicating with the consumer about the use and recycling-practice of products. Examples range from simply disclosing specific information to engaging more extensively with the consumer, however mostly in the context of energy efficiency, not the use of textile products. The table/figure in chapter 5.2 provides an overview of the discussed and suggested mitigation strategies.

As the issue of rebound is multi-faceted, its solution is as well. A concerted effort is required to address the various forms of rebound until it is safe to conclude that it has become

irrelevant. However, this will only be the case when all energy is clean and renewable, resources are managed in a dynamic equilibrium, and circular systems and product design have been technically optimized so that higher levels of consumption would not bring about higher impact. Since this is still only an uncertain, distant future scenario, current efforts should be made to build the most effective road towards it.

How do organizations that engage in CE strategies in the textile industry deal with the rebound effect and what can be learnt to avoid this effect?

Since this question is composed of two, related questions, let it be answered as such. The answer to the first part of the question is short, and not very pleasing, as there is no indication that the majority of organizations are even aware of the existence of rebound. Therefore, it is unlikely that organizations consciously do something to deal with rebound. In the example of Emma Safety Shoes however, it was discussed that through collaborative efforts in logistics within the sector potential rebound effects could be averted. This indicates that some organizations, unknowingly, could well be applying some effective rebound mitigation strategies.

The answer to the second part of the question is a lot more sizable, as everything discussed in this research constitutes the answer to it, and there is still a lot more to be learnt. Everything there is to know about rebound fits into a larger narrative, propelling us towards the direly needed systems thinking and new approaches to design and production. This larger narrative includes a conversation about our economic system and the assumptions it is based upon, along with our perception and measurement of value. Dealing with rebound effects in the paradigm of the circular economy requires a different approach to the methodologies commonly used to measure rebound as well as to mitigation strategies. Skipping these vital components of the problem when discussing rebound can lead to conclusions with detrimental implications for society such as the exacerbation of inequality and ineffective transitional policies. However, if this knowledge can be applied, we might be able to avoid having to ask this question in the first place.

5. Discussion

In this chapter, the findings and their theoretical and practical implications are discussed. First, noteworthy concepts or closely related studies and areas of research are linked to the material described so far. This includes among others notes on the not very extensively discussed macroeconomic rebound effect, and the relevance of socioeconomic inequality to this subject, which deserve to be addressed through the new perspectives offered by this research. Recommendations for organizations engaging in CE strategies and more general recommendations for DCTV and governmental bodies are presented. Finally, limitations of this research are recognized, and suggestions for further research are provided.

5.1 Theoretical implications

The findings of this research carry some remarkable implications. First, as argued in the answer to SRQ 3, the Value Hill may not be very useful when attempting to attribute rebound to certain categories of CE strategies. The development of business models and strategies in the CE is still in its early stages, and the market/industry within which the organization operates is more relevant than the strategy it applies. In addition, the C2C school of thought provides a useful contribution to the rebound discourse, as it illustrates the difference between efficiency and effectiveness. Where efficiency improvements are incremental and prone to generate rebound, a more radical change in approach to become truly effective according to technical standards can help organizations rethink their production methods. Beyond these insights, the findings of this research sparked a deeper conversation about the nature of value and the economic transition the CE espouses. The remainder of this subchapter addresses this conversation and the bearing it has on the future of the rebound effect in the circular economy.

The macroeconomic rebound effect

In their article about the CE rebound effect, Zink and Geyer (2017) conclude the following: “What is truly required to reduce environmental impact is less production and less consumption. The circular economy promises this outcome, but, once economic realities are considered, may fail to deliver on its potential” (p. 600). Whilst this is a logical conclusion given the contemporary realities of wasteful and impactful methods of production and design, the new approach to design and the shaping of an improved system as discussed in this study, should in the long run be able to reduce environmental impacts without the requirement of less production and less consumption. *This* is the outcome the circular economy promises, not

necessarily one of ever-decreasing amounts of production and consumption as the solution to our environmental problems, as Zink and Geyer (2017) argue. The fact that the circular economy is currently being developed in parallel to the linear one and could therefore cause, to a certain degree, macroeconomic growth is perhaps an unfortunate one, yet it should not misconstrue the ‘promise’ of circularity in such a paradigm. In a world with a rapidly rising population and a growing global middle class, satisfying the increasing global demand for resources with a growing circular economy will still be better than not satisfying it at all, or continuing to do so with linear means.

Rebound & inequality

Mitigating rebound effects could have detrimental outcomes for the lowest income-group of society (Galvin, 2015). As illustrated by the case of smartphone reuse, placing too much value on the attempts to reduce re-spending and macroeconomic rebound would exclude consumer groups from the option to purchase a certain good (Makov & Font Vivanco, 2018). In certain cases, this could be positive: for some goods (especially high-impact goods), it is better to remain a luxury. For goods with a relatively low impact in comparison with their alternative, a low price that provides access to that good to a larger portion of society should be desirable, especially in the case of a satiable demand (since then its total use will not grow beyond current use-levels). For example, it is desirable that everyone makes use of a ‘circular’ washing machine with a lower impact, despite the fact that its lower price will boost sales, since most households use only one washing machine regardless. With regard to fashion, however, demand is not very satiable. Recent trends have shown that drastically lowering the price of clothing does in fact increase its consumption rate significantly, which, from an environmental perspective, is not very desirable. Fashion spans the full spectrum of basic human need to pure luxury good, making it even more complex to apply a single set of rules or assumptions to it. The bottom line is that low impact clothing should be affordable for everyone, and circular clothing should not be exclusively a luxury item. Rebound mitigating measures that turn circular clothing into a luxury item (or make it unavailable for low-income consumers) should therefore not be supported. Rather, high-impact linear clothing should become a luxury good. In this way, low-impact basic needs are available for everyone, whilst higher impact goods become the luxury they ought to be.

To illustrate how this problem manifests in rebound quantifications, in chapter 2.2, the ‘negative rebound effect’ was discussed, which occurs when the rebound effect ‘reverses’,

and causes extra environmental benefits (Font Vivanco et al., 2014). This effect could be observed when a good is both a better alternative environmentally and more expensive, binding extra income that could otherwise be spent on high impact goods. According to this logic, increasing the price of environmentally friendly goods would be more beneficial for the environment because it would stop people from consuming other goods. The ERE model, and specifically the re-spending effect, captures this tendency, or as Font Vivanco and colleagues say, “In other words, it [the ERE model] describes how income that was liberated or bound due to cost changes will or will not be re-spent over the various consumption categories” (2015, p. 73). By extension this means that the poorer people are, the better it is for the environment. This type of framing is not in the best interest of society as it would disproportionately disadvantage lower income groups and restrain them specifically from purchasing sustainable goods. Therefore, when discussing rebound mitigation options based on calculations with a model that captures this effect, especially in relation to policy, these considerations concerning what is desirable for society should be taken into account.

Market cannibalization

The apparent necessity of market cannibalization for the environmental success of the CE was discussed in the theoretical framework as well as with the informants. New, ‘circular’ production can either replace current production methods, or constitute an additional strategic product diversification. The latter approach will certainly generate more profits, in the short term at least (Zink & Geyer, 2017, p. 600). As indicated by the quote in section 4.3, the development of radically new production methods will, if successful, eventually require a certain level of disinvestment regarding the current production methods. This is the dilemma that the circular economy, especially when taking rebound effects into account, is facing. Are the large manufacturers willing (or brave) enough to seriously divest from traditional, harmful production methods and switch to disruptive new circular methods? Or will circularity and sustainability efforts of these organizations be limited to eco-efficiency considerations and incremental improvements, further ingraining the current system and its rebound effects?

As touched upon, current economic logic will likely prevent organizations to radically switch their production methods, judging by the amount of real change that has currently manifested. The dilemma posed here might also explain the lack of focus on displacement in the goal setting of organizations such as the Global Fashion Agenda (2020 Commitment, 2018). A focus on increasing recycling and reuse of materials allows the larger system and its

incentives to stay in place. A focus on displacement means a necessity for new production methods and abandoning the old. As only corporations are part of this agenda, omitting such focus from circularity goals allows them to make incremental environmental improvements within the current system, without having to go against economic logic: without having to cannibalize their own market share, paving the way for rebound effects.

Market efficiency vs. technical efficiency

In the introduction as well as in the paragraph above, a distinction between two contradicting types of operant logic was described. Where businesses use market efficiency, industry and engineers work with technical efficiency. This contradiction underlies many of the issues discussed in this research and beyond. After a thorough inquiry about the meaning and place of rebound effects in the current economic transition, the following question arises: is rebound a consequence of the discrepancy that occurs when the two different types of logic are being applied in the same context? There are technical efficiencies that can be reached by intelligent design. Economic, cost efficiency calculations then contradict these technical efficiencies because the prices of goods and services do not represent their real, technical value. This is why food can travel an average of 1,500 miles before arriving at your plate, and a T-shirt that was sown by six-year-olds in Bangladesh can be sold for €2 with a profit. It does not make any real, technical (or social) sense; in fact, many would say it is beyond absurd. Yet, because it makes economic sense, it happens. Joseph (2018) elaborates on the apparent logical dilemma as follows:

“Historically, the assumption had been that these two processes were complementary. It was assumed that money saved meant resources saved, and money earned or spent meant resources efficiently utilized. This is far from reality – a reality that has become more evident given the rapid rise in productivity over the past 200 years. What we find is that business efficiency disdains industrial efficiency. Being truly economical, accomplishing ‘more with less’, maximizing longevity, and facilitating conservation is not what works for business. Rather, it needs technical inefficiency to ensure repeat purchases and a dissatisfied, generally unhappy culture that has endless, neurotic material desires. Inefficiency and its partner, *planned obsolescence*, now largely drive economic growth in the twenty-first century, coming in the form of consumerism. Even more, since business is confined to money and trade only, the abundance capacity (and benefits) of modern industry only extends to those regions and

classes where purchasing power exists. This fact explains why, in a world able to achieve such vast productivity, poverty is still rampant” (Joseph, 2018, p.172/173).

The idea of the circular economy is making the first step towards reconciling the different types of logic by trying to put the value back into the resources, and out of the subjective eyes of the beholder, as discussed as well by Mazzucato (2018). Of course, ‘reconciling’ in this case means altering economic logic to align with technical logic, since the socially constructed ‘laws’ of the economy can be altered, unlike the laws of nature. The problem is, as long as the CE operates within the old (current) paradigm, within the same markets and incentive structures, these discrepancies will not be resolved. The fruits of the circular economy will still be valued along the same value standards of the linear economy. And as long as this is the case, circular, technically superior products will forever be at a disadvantage compared to their cost-efficiency-based alternatives, as these alternatives are allowed to ignore technical considerations in favor of the ‘best good for the lowest possible price’- doctrine. Hence, these cheap products can reach similar levels of functionality (aesthetics, feel, user-friendliness, image) and be favored by consumers for their comparatively low price. Sure, some examples of circular products, such as the ones emerging now, will be successful in the market, as they fall into the area of the hypothetical Venn diagram in which cost efficiency and technical efficiency overlap. Examples of these types of products are mostly confined to goods in the highest price and quality segment of their industry (e.g. EMMA Safety shoes), as these products are not relentlessly obstructed by cost-efficiency considerations. But for the vast majority of goods and services, a technically optimal and environmentally superior version simply has no chance of even being produced in the first place because of cost efficiency logic.

Value

An essential aspect of the problem described above concerns the way in which value is created, extracted and perhaps most importantly, the way in which value is accounted for. In her insightful book *The Value of Everything*, Mazzucato (2018) sheds light on the fact that price has ‘evolved’ from objectively representing value to subjectively determining value. She identifies that “price has become the indicator of value: as long as a good is bought and sold in the market, it must have value. So rather than a theory of value determining price, it is the theory of price that determines value” (p. 271). At the same time, supply and demand within markets determines price. Among multiple problems associated with this, the following is

most relevant at this time: “Price-equals-value thinking encourages companies to put financial markets and shareholders first, and to offer as little as possible to other stakeholders. This ignores the reality of value creation – as a collective process” (p. 272). This is a core issue that the CE is currently struggling with: financial indicators such as price and profit do not necessarily represent the value created from transitioning to a circular system. Because true multidimensional value is not accurately represented in price, decision-making based only on financial considerations often leads to suboptimal, societally undesirable, ‘linear’ choices.

It might seem that entering deeper into this discussion would stray too far from the subject of rebound effects in the circular economy. On the contrary, this research suggests that this discussion lies at the very heart of the problem, and is therefore essential for understanding and resolving the problems associated with rebound effects. Increasing within-systems efficiencies as a solution to rebound can create a kind of perpetual cyclical rebound resulting in an ultimately futile game of rebound-whack-a-mole, in which eventually the search for rebound itself, becomes the rebound. In order to avoid this, solutions need to be explored on a deeper level, reframing the discourse.

5.2 Practical Implications: Recommendations

Now, how do these findings and insights translate into a course of action for the stakeholders involved? First of all, it should be noted that there is no silver bullet to combat rebound effects as they take many shapes and forms. Sometimes, mitigating approaches can have temporary benefits, but make it more difficult to avoid rebound altogether. Consider energy efficiency increases versus creating a system of renewable energy: investing in and optimizing the current system might mitigate rebound temporarily, but it entrenches the current system even more, whilst the real solution lies in the inception of a completely new system. This analogy also applies to optimizing recycling systems versus fundamentally rethinking design. Therefore, a balance needs to be found between optimizing current systems and creating new ones.

Further recommendations are presented from different perspectives. Businesses and governmental organizations have a different role to play. Also, some recommendations relate specifically to the mitigation of rebound whilst others are more concerned with the larger systemic change that is advocated here. The recommendations are drawn up as combined knowledge from the findings of this research, the existing literature on rebound that has been

discussed, and additional literature that can provide useful contributions such as Joseph (2018) and Raworth (2019). First, recommendations for businesses and organizations are presented, followed by recommendations for DCTV. Since DCTV is essentially a government initiative, governmental and broader system-related suggestions are included there. Recommendations for further research are provided in chapter 5.4.

The table below lists recommended actions for businesses and organizations that are engaging or want to engage with CE strategies, based on the findings of this research. The second column provides additional information to the action, referring to sections in which it has been discussed and/or other relevant literature.

Recommended action	Elaboration	Rebound addressed
Raise awareness about rebound: communicate environmental benefits with more precision	Within strategy & design departments Exclusively use LCA-based methods Ensure eco-labels are LCA-based	All
Communicate and support systemic change	Engage in a deeper conversation about what is needed for real, long term sustainability in line with one-planet thinking	All
Take action to counter moral licensing behavior	Extended sustainability communication Design for sustainable use (<i>Dütschke et al., 2018</i>)	Direct, behavioral rebound
Rethink design: explore more radical change in approach Operate on desirable value drivers	Ch. 4.2 Ch. 4.2.3: What CBM suits your organization/product/service?	Creative reuse
Work exclusively with renewable energy	Ch. 4.4: SRQ 4 & 5	All rebound types that embody a increased pressure on energy use
Cooperate within sector	Competition in the front,	'Transitional' rebound

Maximize localization of CE network	collaboration in the back: (return) logistic and infrastructural expansion impacts can be shared and strategically minimized	originating from setting up circular system, e.g. logistics & infrastructure
Ensure substitutability of products to achieve maximum displacement of alternatives	Prioritize quality, practicality, safety and comfort alongside new design principles	Insufficient substitution
Do not lower price enormously: avoid becoming niche player	Note in chapter 5.1 on rebound & inequality	Insufficient substitution

Table 5. Recommendations for businesses & organizations in CE

In addition to these actions that are listed specifically for the goal of avoiding and mitigating rebound effects, the table below provides a more general approach to the type of circularity that aligns with these recommendations. As presented by Kate Raworth at the Beyond Next Circularity Festival in Amsterdam in February 2019, the circular economy runs the risk of becoming segmented as opposed to systemic.

	Segmented Circularities	Ecosystem Circularities
Material flow	Closed loops	Nested loops / network
Material control	Return to brand	Return to ecosystem
Standards	Owned & protected	Open & shared
Governance	In-house	Network-wide
Technology	Proprietary	Knowledge commons

Table 6. What future for the circular economy? (Raworth, 2019)

By no coincidence, the difference between segmented and ecosystem circularity closely resembles the difference between a type of circularity replete with rebound effects, and one that is congruent with the new design approach discussed in this research. For example, closed loops and materials returning to the brand implies a rigid, isolationist approach to circularity that negates the potential for extended cooperation and networked integration that can mitigate rebound effects. Keeping technology proprietary will inevitably result in reinventing the wheel and the hoarding of knowledge that can benefit society.

Again, with an unsurprisingly similar message, Joseph (2018) conceptualizes five main attributes of a new economic model that operates in line with technical logic (Figure 8). Even though these attributes were not developed with the circular economy in mind, they find common ground in their pursuit of aligning economic practices with a technically logical train of thought. As stated by Joseph, “Each of these represents a more efficient mechanism to achieve higher productivity and the least amount of waste and environmental impact feasible. The logic is not different in principle from the practical decision to reject using a manual screwdriver in favor of an electric one, increasing productive efficiency” (p.264). The major problem remains however, the stark contrast between this commonsensical approach to economics and the one based in market logic that is practiced today.

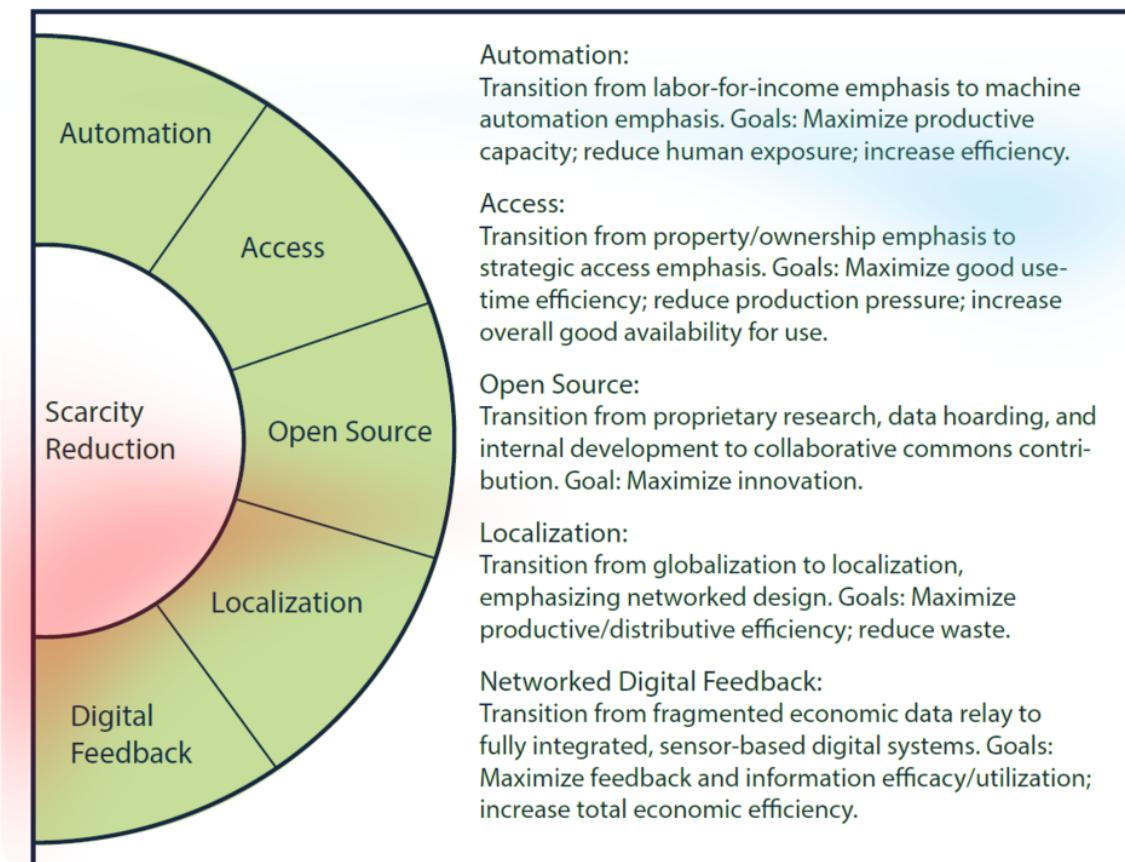


Figure 8. Graphic representing system transitions to reduce scarcity, inequality and environmental impacts (Joseph, 2018).

Adopting these recommendations and stimulating ecosystem circularity will therefore undoubtedly go against current economic imperatives in some cases, as described in the latter half of chapter 5.1, making them hard to realize. In other words, they could require financial

investments or raise the costs of production, rendering business cases unfeasible. This is where initiatives such as DCTV and other governmental interventions can play an important role. Governmental bodies wield the power to create incentives and conditions in which these actions become feasible. They can assist organizations through various policy pathways, eco-taxes, financial assistance and legislative flexibility to help foster the circumstances that allow, facilitate and even stimulate the adoption of the recommendations and type of circularity proposed here.

5.2.1 Dutch Circular Textile Valley

As a complement to the recommendations above, this research generated more insights specific to the DCTV concept. Table 7 below identifies several threats and opportunities in the future of DCTV, drawn from the conversations with the participants of the Arnhem/Wageningen design hub as well as other industry experts.

Opportunities	Threats
Establish level playing field in terms of most contemporary knowledge and research dissemination (understanding circularity, knowledge commons)	Reinventing the same wheel: reports on shelves catching dust
Setting up network within the EU Together influence larger international value chain by demanding higher standards for national brands	Dependency on international collaboration, law and policy
Monitoring balance between current system improvement & new system development	Optimizing current system hinders new system development
Intervene in second-hand textile market: Developing new, local & circular industry	Raising national environmental impacts (rebound)
Ability to come together, cooperate, and ask the right questions	Competition and politics within the industry
Putting innovations and developments in a system context early on	Ineffective application of promising innovations (e.g. high amounts of rebound, lack of scale for real impact)
Bridging the gap between technical efficiency and cost efficiency	Decision-making based purely on financial value

Table 7. Opportunities & Threats for DCTV

5.3 Limitations

The first and most obvious limitation of this research concerns the relatively low amount of informants comprising the data collection. Due to the scale and time limitations of this project, including a much higher number of informants was not feasible. However, due to the exploratory nature of the research, the diversity of the background and the status of the informants, valuable lessons could nonetheless be learnt.

In addition, again due to the exploratory nature of the research in combination with a relatively complex and at times elusive topic, finding a narrow focus proved to be difficult. As one of the purposes of this research was to place the issue of rebound into a larger, systems-perspective, the narrowness that would be desired for other types of research was hard to achieve from the outset. Because of this, it becomes hard to draw specific, scientifically rigorous conclusions. On the one hand, this can be a vulnerability of the research. On the other hand, it can inspire a larger debate.

Another limitation to the methodology of the research concerns the specific expertise of the informants. Besides an extensive literature review and the consulting of an academic rebound-expert, none of the informants who were interviewed was very familiar with this economic effect. Therefore, speaking in literal terms and asking rebound-specific questions during the interviews was sometimes problematic. This fact does not however deny them of being relevant to the case. The knowledge about rebound and especially rebound mitigation is most important in the hands and minds of those who are in the process of goal setting and decision-making in the transition to a circular economy. The informants were selected precisely because they are agents of change for this transition, and could therefore benefit from as well as contribute to this research. Nevertheless, they are no economists or experts on the rebound effect, which puts a large responsibility on the researcher to avoid misunderstandings.

5.4 Further Research

Because rebound mitigation can achieve real results in terms of environmental benefits, and studying these effects from a new perspective can inspire a fruitful discussion, further research into the topic is suggested. The development of the circular economy in the different sectors of the economy will generate all kinds of rebound, some sector-specific, eating away at potential environmental benefits. Many sectors are still uninvestigated with regards to CE rebound effects. Qualitative inquiries such as this one can be a starting point to identify and

make stakeholders aware of rebound effects in their vicinity. Further categorization and mapping of rebound effects within sectors and product types could create increased accessibility to mitigation strategies. Also, further emphasis could be placed on the difference between ‘transitional’, and therefore maybe inevitable rebound as was discussed before, and the types of rebound that can and need to be mitigated.

In addition to these types of studies, more ready-to-use indicators and frameworks are necessary to translate awareness into action. Although qualitative, strategic and principle-based mitigation strategies are important, in order to account for rebound effects on the environmental balance sheet, quantitative indicators are needed. Current methods often still generate large ranges of uncertainty. This has to do with the complexity of currently used input-output models and the methods to determine elasticity, disconnecting theory from practice. Economics is not, and has never been, an exact science. One of the goals of the economic transition is to make economic calculation align with the realities that nature imposes upon us.

One of the implications of this research is that there is a need for a new approach not only for design, but also for the research methods commonly used to investigate rebound. Although as suggested above there is a need for more accessible metrics to assess the rebound effect, the assumptions that underlie some of the conventionally used metrics might not hold anymore in the new paradigm. Quantifications of rebound with econometric models based on neoclassical assumptions such as those we have visited in chapter 2.1 should be used with caution, as they belong to the economic paradigm from which we are attempting to depart (e.g. Sorrell & Dimitriopoulos, 2008; Saunders, 1992; Khazzoom, 1980; Greening, 2000, but also newer work such as Zink et al., 2016 and Font Vivanco et al., 2014). This is not the first time that neoclassical assumptions for economic calculation have been criticized; in fact most authors are probably aware of the limitations of these rigid, antiquated assumptions. As Berkhout and colleagues (2000) note concerning the tenacity of the neoclassical paradigm: “The reason for its perseverance is the minimal requirement of behavioral axioms, and the elegance of graphical and mathematical presentation, and the fair explanatory power” (p. 426). In other words, these assumptions might be inaccurate, but they are simple, easy to work with and alternatives are not plentiful. Therefore, new models are required that work with updated and suitable frameworks and assumptions in line with new economic thinking (such as circular economy) and natural laws. Albeit the rigid assumptions used by the old economic models we

have grown accustomed to were conducive to simplified calculations and useful deductions, we must acknowledge the fact that they do not stand up to the scrutiny imposed by the changing (socio-) economic landscape.

A recent study by Santarius and colleagues (2018) has similarly suggested the need for a different, more multidisciplinary approach beyond economics only, to study rebound effects. They propose that perspectives from psychology, sociology, industrial ecology, physics and broader trans-disciplinary approaches are necessary to gain a more comprehensive understanding of rebound, and place it in a real-world context. In support of these suggestions, mapping the economic landscape more extensively can provide a more vivid picture of the obstacles and conditions that need to be overcome. For example, the discussion about the perception and necessary transition of values is very much related to banking practices and how money (or value) is created. More in-depth research is needed to connect previously isolated topics, since in fact, they are crucial components of the economic change the circular economy advocates. All of this is necessary for the circular economy to become the holistic, systemic change it could be. Only when a broader, more profound research approach is taken, becoming another meaningless sustainability hype can be avoided.

6. Conclusion

The logic of our economy and our ecology need to be aligned. And, since nature's logic is beyond defiance, it is the economy that needs to do the aligning.

So what does the rebound effect tell us in light of this? Rebound is a lens through which we can identify what type of efficiency is truly effective, and what type of efficiency is ultimately irrelevant or even counterproductive. Rebound effects force us to think about the deep problems that lie at the core of our current economy, and what it takes to truly evolve beyond them. Rebound is what we measure when a technically superior good does not manage to outperform its higher-impact alternative, or is not produced in the first place because of market forces, guided by the logic of cost efficiency. Rebound is the environmental punishment that is the consequence of the lack of change in our behavior following an efficiency increase: the increase allows us to dwell in our routine behaviors whilst creating the illusion of lowered environmental impacts. It is the consequence of linear, one-dimensional thinking in a networked system with complex reaction chains of cause and effect. It tells us that we need the transition to be systemic, structural, disruptive and not incremental: there is no progress in isolation.

Therefore, the transition can be painted as a large macro-scaled prisoner's dilemma in which rebound effects shift environmental burdens between industries and individual agents in the system, steered by a pricing system based only on the arbitrary value of exchange as opposed to the true, multidimensional value embedded in our resources and human and social capital. As is known, the prisoner's dilemma cannot be 'solved', only strategized. The incentive structure our current system employs does not stimulate large-scaled cooperation, leading to outcomes that are detrimental for everyone. Thus, the only thing that can be done to 'break out' of this prisoner's dilemma, is not devising an optimal strategy, but rather challenging and changing the underlying assumptions on which this dilemma is built: a definitive rejection of the 'rational' *homo economicus*. Producers maximize profits and consumers maximize utility, insatiable, certain and with complete access to all relevant information: rebound has thus far been framed in a neoclassical economic paradigm, which is no surprise given that William Stanley Jevons himself was one of the fathers of neoclassical economic thinking. Because of this, rebound has nearly always been framed in this paradigm. However, these assumptions are not congruent with the circular economy and the system transition this research has

discussed. An updated understanding and modern framework to assess these effects in a new, circular economy context is therefore necessary, as the previous assumptions no longer hold. Whilst this economic paradigm shift is substantially supported by scientific evidence from psychology, sociology, natural sciences and new insights about the environmental susceptibility of human nature, its potential for adoption requires the inception of a radically new value system.

A transition towards this new system will inevitably generate rebound in various areas and directions. Despite the temporary importance of avoiding and mitigating these effects where possible, as repeatedly stressed in this research, rebound cannot be allowed to become an obstacle for change. Rebound cannot be an argument for inaction. Rather, it should become a funnel for effective action. Thus, it is the duty of any producer, recycler, consumer, or self-proclaimed renegade economist out there to adequately avoid, account for or at least acknowledge the rebound-trap. Perhaps that harnessing this knowledge could increase the slope-gradient of the arch of system change progression, by fostering a more mindful and effective transition.

7. Glossary

(Sustainable) Abundance: “Referring to a society focused on maximizing its efficiency to reduce scarcity and economic inequality as much as technically possible, while ensuring homeostasis with the planet.” (Joseph, 2018, p.263)

Autonomous frugal behavior: “Autonomous frugal behavior is based on the principle of sufficiency, which relies upon the notions of restraint and moderation of individual consumption. Sufficiency behavior is based on two concepts: (1) it presupposes purchasing power, so that essential consumption (e.g., food or heating) is still possible after downsizing consumption and (2) it is driven by environmental motivation” (Font Vivanco et al., 2016c, p. 120)

Backfire: When the rebound effect exceeds 100%; initially assumed environmental benefits are more than completely offset by behavioral/economic mechanisms.

Bonus-Malus Scheme: Taxing high environmental burden activities and using those tax proceeds to subsidize environmentally friendly alternatives. Studies could not find evidence for success because of the direct rebound effect.

Circular Economy (CE): “a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: 1. Design out waste and pollution, 2. Keep products and materials in use, 3. Regenerate natural systems.” (Ellen MacArthur Foundation, 2017)

<https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept>

Circular Economy Rebound: Undesirable effect occurring when CE strategies fail to deliver on environmental impact potential. When reductions in environmental impact from increased efficiencies are offset by increases in total production volume because of imperfect substitution and price or re-spending effects.

Cradle-to-Cradle: The Cradle to Cradle® concept by William McDonough and Michael Braungart (2002) is a new approach for designing intelligent products, processes and systems taking into account the entire life cycle of the product, optimizing material health, recyclability, renewable energy use, water efficiency and quality, and social responsibility.

Environmental Rebound Effect (ERE): “The ERE mainly differs from other perspectives in that the rebound effect concept is generalized to encompass efficiency changes and indicators of interest that go beyond energy and energy-related emissions (mainly CO₂ emissions from fuel combustion) to a wide range of environmental issues. This perspective thus incorporates broader efficiency changes as well as the representation of the rebound effect as a multidimensional value into rebound assessments (Font Vivanco et al., 2015). The ERE can be thus defined as the environmental consequences from changes in demand in response to efficiency changes from technical improvement.” (Font Vivanco et al., 2016)

Greenwashing: “Greenwashing (a compound word modeled on "whitewash"), also called "green sheen", is a form of spin in which green PR or green marketing is deceptively used to promote the perception that an organization's products, aims or policies are environmentally friendly.” (Wikipedia) <https://en.wikipedia.org/wiki/Greenwashing>

Identity signaling: Signaling pro-environmental values as a method to encourage purchasing goods/services with low rebound effects to groups of people that identify particularly with environmentalism.

| *Income effect:* When the opening up of income causes a rise in consumption

Market Cannibalization: “cannibalization refers to a reduction in sales volume, sales revenue, or market share of one product as a result of the introduction of a new product by the same producer.” (Wikipedia, n.b.)

[https://en.wikipedia.org/wiki/Cannibalization_\(marketing\)](https://en.wikipedia.org/wiki/Cannibalization_(marketing))

Market/Business/cost efficiency: Efficiency from a cost-based business perspective as a means to maximize aspects of operations such as extraction, production, distribution, and in the end, profit.

Market price effect/ Composition effect/ Growth effect: When a change in efficiency or a technological innovation creates a large economic shockwave affecting market prices, demand and/or wider economic growth.

Neoclassical assumptions: The neoclassical economic meta-theory rests upon a set of rules or assumptions as a basis for constructing economic theories. These assumptions include the following: 1. People have rational preferences among outcomes. 2. Individuals maximize utility and firms maximize profits. 3. People act independently on the basis of full and relevant information.

<http://www.econlib.org/library/Enc1/NeoclassicalEconomics.html>

Planned obsolescence: “In industrial design, this is the policy of designing a product with an artificially limited useful life, so it will become obsolete after a certain period of time.” (Joseph, 2018, p. 356)

Price Elasticity: Price elasticity of demand (PED or E_d) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price when nothing but the price changes.

Primary production: Production that includes extraction of raw materials

Rebound Effect: “The rebound effect is generally defined as the difference between the expected and the actual environmental savings from efficiency improvements once a number of economic mechanisms have been considered, that is, the savings that are ‘taken back.’” (Font Vivanco et al., 2016, p.60)

Re-spending effect: When money saved on cheaper (and relatively more environmentally friendly) goods/materials is spent on other products that have their own environmental impact.

Secondary production: Production based on ‘second life’ of a good/material, including repair/refurbishment, reusing, recycling and remanufacturing.

Substitution effect: When goods/materials from secondary production fail to successfully/sufficiently outcompete their primary alternatives, diminishing environmental benefits due to the addition of goods/materials to the market instead of replacing/displacing primary production.

Technical efficiency: In contrast with business efficiency, technical efficiency is concerned with optimal use of resources, sustainability, design, conservation and reducing waste, without monetary or business influences. (Joseph, 2018; Veblen, 1921)

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9. Appendices

Appendix A: Interview Guide

Introduce my research and myself.

Ask interviewee for brief introduction of him/herself & associated organization.

Establish common ground on definitions of Circular Economy

How do you understand the term ‘Circularity’?

What makes a business strategy ‘circular’?

- **Awareness/understanding** of rebound
 - o Any prior knowledge?

Explanation of CE rebound from the perspective of my research

- Insufficient substitution
- Price effects
- Problem of rebound:
 - o overstatement of environmental benefits
 - o Underachievement of CE strategies

Ask for comment on this effect, whether it is recognized from experience

Talk about the environmental rebound effect, and how it relates to CE

- **Presence** of rebound
- **Secondary production** as a CE strategy
 - o How is it presented to the market? **Comparable quality, marketing, price?**
 - o How is it **competing** with primary substitutes?
 - o Is primary production **displacement** emphasized?
 - o Closing loops or adding loops?
- **triggers, drivers, mechanisms, representation:**
 - relate to example proposed by interviewee / in interviewee’s business / experience
- **Dealing with rebound**
 - o Are actions undertaken? Is it something companies care about, or can (afford to) care about?
 - o Suggestions to avoid rebound?

- The problem with avoiding rebound / **implications of rebound** / larger order criticism of CE
 - o Cannibalization?
 - o Growth?
 - o ...

Propositions

Proposition A: *Organizations engaging with CE are largely unaware of the concept of rebound and its potential downsides.* –

Proposition B: *Rebound effects are most likely to occur in Circular Downhill Recovery strategies (secondary production).* –

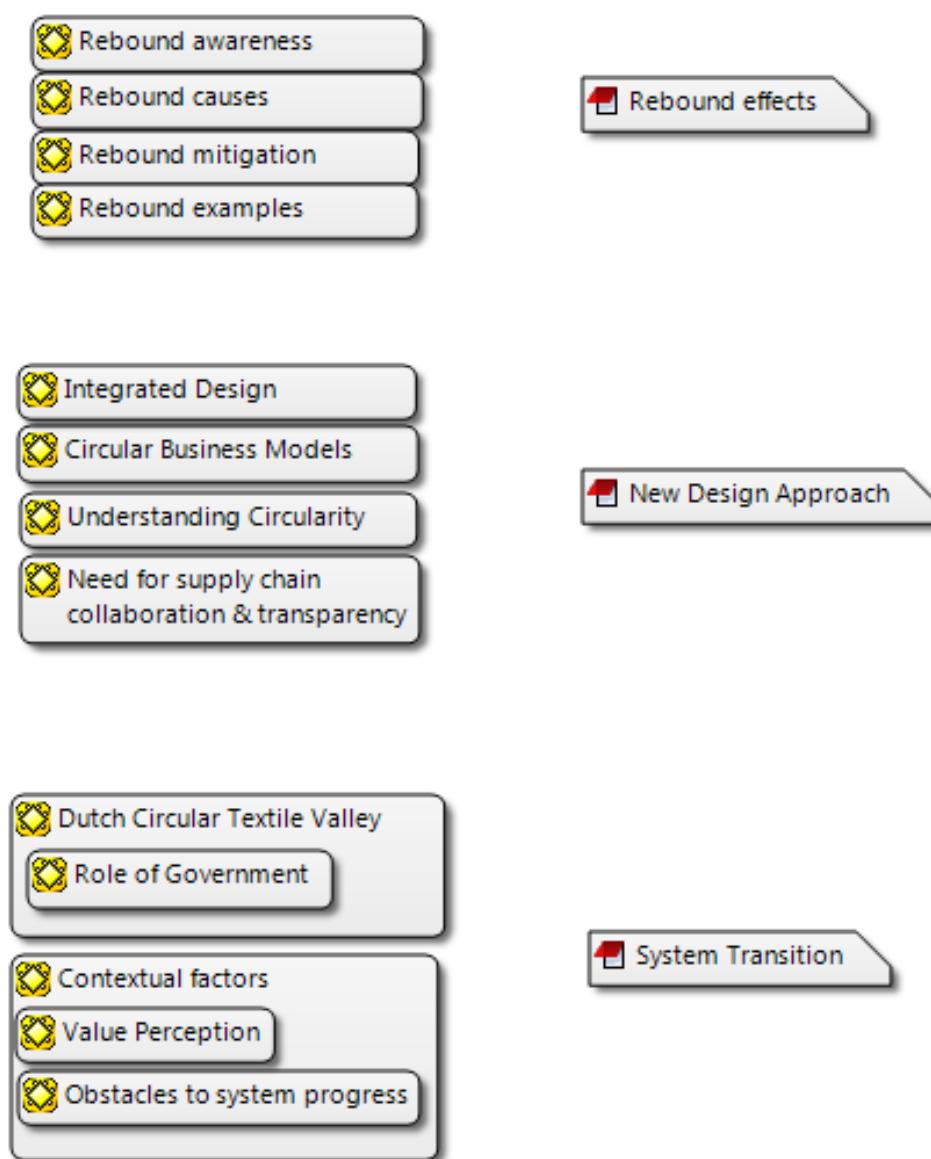
Proposition C: *Current textile industry CE strategies are subject to rebound effects through price effects and insufficient focus on displacement/substitution.* –

Proposition D: *Market cannibalization is necessary to reach the full potential of environmental benefits of CE.* –

Proposition E: *To reduce vulnerability to rebound in the transition towards circularity, goal setting should focus on the displacement and reduction of primary materials.* –

Appendix B: Code families / Second order themes & aggregate dimensions

The underlying graphic represents the data structure that was applied in the Findings chapter, showing the three main dimensions and how they are built up from the second order themes/code families.



The list below is a compilation (in alphabetical order) of all code families and the first order codes that comprise them. The total amount of quotations that in turn comprise the first order codes is mentioned at the bottom of each code family. The actual quotations can be found in Appendix C.

Code Families

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Code Family: Circular Business Models

Codes (12): [banks don't have model to value circular business models] [business as usual cannot be business in circularity] [closing loops lowers primary production unless rebound occurs] [combining new recycling innovations with Primark business model: rebound] [Local brands and designers can influence foreign production to become more circular] [longer lasting circular products require new business models] [need for new focus on use instead of ownership in business models] [need for viable business case for used textiles] [new approach to design / production] [no one size fits all business model solution] [PSS can be situationally successful] [wrong business model for second hand textiles]

Quotation(s): 20

Code Family: Contextual factors

Codes (12): [a fashion purchase is a vote for the organization] [abundance orientation] [banks don't have model to value circular business models] [clearly communicating measures/legislation is important] [communicate being a gamechanger] [focusing on recycling strengthens/optimizes current system] [involving science in design] [it is irresponsible to make profit out of second hand clothing] [job creation and policy can help make circularity real] [radical change does not resonate in existing industry because it means developing something that will replace you] [sustainable fashion includes a new consciousness] [technical and behavioral change work hand in hand]

Quotation(s): 18

Code Family: Dutch Circular Textile Valley

Codes (30): [banks don't have model to value circular business models] [circular design is seeing entire supply chain] [circular transition is dependent on international collaboration] [circularity ambitions] [circularity creates opportunities] [circularity did not negatively affect competitiveness] [circularity has social, societal, cultural component] [connector / director needs to ask right questions and place things in right context] [DCTV connecting optimization of current system with new innovations] [difficulty to assess contributions to circular system] [economic context is focused on individual organizations; other contexts are shared] [energy transition precedes circular transition] [fully circular example: glass] [importance of origins, (chemical) composition of textiles] [incurring the costs of circularity] [job creation and policy can help make circularity real] [lack of deep understanding on circularity/sustainability] [lack of deep understanding on circularity/sustainability: lack of understanding rebound] [Local brands and designers can influence foreign production to become more circular] [longer lasting circular products require new business models] [market forces pushed second hand textiles abroad] [need for viable business case for used textiles] [need to more accurately measure circularity] [negative rebound effect: developing new local industry / jobs] [rebound example: enlarging application of textile to facilitate suboptimal reuse] [rebound is a useful criticism to circular initiatives] [risks and opportunities for DCTV] [textile as secondary material for different industry] [Thrift shops are highest rank of circular value] [wrong business model for second hand textiles]

Quotation(s): 48

Code Family: Integrated Design

Codes (15): [circular design is better design] [circular design is seeing entire supply chain] [competition in the front, cooperation in the back] [how to stimulate substitution?] [involving science in design] [Local brands and designers can influence foreign production to become more circular] [need for supply chain integration / transparency] [new approach to design / production] [new materials substitution potential] [placing technological innovations in process and system perspective] [practicality, safety and comfort go above circularity] [recycling optimization leads to comfort in bad design] [recycling optimization without design consideration facilitates current system] [take responsibility for staying within planetary boundaries] [the goal is to phase out or minimize virgin material use]

Quotation(s): 31

Code Family: Need for supply chain collaboration & transparency

Codes (29): [circular design is seeing entire supply chain] [circular transition is dependent on international collaboration] [circularity shapes systems] [competition in the front, cooperation in the back] [connector / director needs to ask right questions and place things in right context] [cooperating companies could take initiative for change] [economic context is focused on individual organizations; other contexts are shared] [exporting environmental burdens] [have to make problem visible and keep it here: don't get tempted by feel-good statistics] [importance of origins, (chemical) composition of textiles] [Local brands and designers can influence foreign production to become more circular] [lowering prices inhibits creating awareness on true pricing] [market forces pushed second hand textiles abroad] [narrow/isolated sustainability measures: need for supply chain orientation] [need for accurate safety standards and legislation] [need for director/overview of supply chain] [need for radical change] [need for supply chain integration / transparency] [placing technological innovations in process and system perspective] [Politics and competition within the industry can be inhibiting factors] [rebound as a linear behavior] [rebound as consequence of narrow focus] [rebound mitigation through sector cooperation?] [rebound occurs between actors in the supply chain] [responsibility of EoL with individual consumer] [role of government: to organize meeting of stakeholders] [stakeholders realize that collaboration is essential] [system change progression] [to map/measure rebound you need all the players around the table]

Quotation(s): 50

Code Family: Obstacles to system progress

Codes (15): [accessible/recognizable term useful for communication/awareness purposes] [creating distance from the old model] [distribution of wealth in the world] [doing 100% good is nearly impossible, so how do we decide amongst outcomes] [facilitating current system eliminates urgency for change] [focusing on recycling strengthens/optimizes current system] [improvements to current system eliminate urgency for change] [narrow focus on one solution / stream cannot work] [new materials vs optimizing installed base] [no clothing production in the Netherlands] [perverse stimuli] [practical problems of new materials] [radical change does not resonate in existing industry because it means developing something that will replace you] [transition to PSS is very capital intensive] [we cannot continue growing, so who needs to make concessions?]

Quotation(s): 26

Code Family: Rebound awareness

Codes (8): [eliminating rebound to determine narrower transition path] [familiarity with rebound effect] [important to create awareness about rebound] [lack of deep understanding on circularity/sustainability: lack of understanding rebound] [organizations are probably not considering rebound] [rebound has behavior and technical dimension] [rebound is a useful criticism to circular initiatives] [rebound might oversimplify circularity]

Quotation(s): 23

Code Family: Rebound causes

Codes (15): [circularity needed to satisfy increasing demand: rebound?] [collecting waste to sell to highest bidder is continuing linear system on global scale] [combining new recycling innovations with Primark business model: rebound] [does reusing reduce producing?] [government subsidies as cause of rebound] [market forces pushed second hand textiles abroad] [rebound as a linear behavior] [rebound as a prisoner's dilemma] [rebound as consequence of narrow focus] [rebound as side effects from strategic choices] [rebound as trade-off between environmental pressures: less water used, more waste produced] [rebound due to lack of social and cultural considerations] [rebound is reverting back to / getting stuck in old behavior] [rebound occurs between actors in the supply chain] [recycling optimization leads to rebound (behavioral, comfort)]

Quotation(s): 23

Code Family: Rebound examples

Codes (14): [DCTV rebound] [negative rebound effect: developing new local industry / jobs] [rebound example algae] [rebound example algae 1] [rebound example behavior] [rebound example biodegradable] [rebound example biomaterials] [rebound example light bulbs] [rebound example PET] [rebound example return logistics and disassembly] [rebound example second hand clothing] [rebound example unnecessary down cycling] [rebound example: enlarging application of textile to facilitate suboptimal reuse] [rebound example: useless new items]

Quotation(s): 21

Code Family: Rebound mitigation

Codes (16): [closing loops lowers primary production unless rebound occurs] [eliminating rebound means losing profits] [eliminating rebound requires sacrifices, incentives are not in place yet] [fully circular economy does not necessarily eliminate rebound] [making progress is more important than avoiding rebound] [need for accessible framework/structure to measure/identify/predict rebound] [rebound mitigation could have negative social consequences] [rebound mitigation through limiting turnover/demand] [rebound mitigation through positioning in the market] [rebound mitigation through sector cooperation?] [rebound will decline when circularity increases past threshold] [rebound within planet boundaries is no problem?] [rebound: two steps ahead and one back: still progress] [satisfiable demand: lower rebound proneness?] [to map/measure rebound you need all the players around the table] [transition of values will push decline of rebound]

Quotation(s): 28

Code Family: Role of Government

Codes (8): [everyone has their own role in the system] [government subsidies as cause of rebound] [role of government] [role of government: buy-in] [role of government: creating awareness] [role of government: facilitating and stimulating] [role of government: legislative flexibility] [role of government: to organize meeting of stakeholders]

Quotation(s): 10

Code Family: Understanding Circularity

Codes (17): [business as usual cannot be business in circularity] [circular design is better design] [circular design is seeing entire supply chain] [circularity creates opportunities] [circularity did not negatively affect competitiveness] [circularity has social, societal, cultural component] [circularity is about resources] [circularity shapes systems] [difficulty to assess contributions to circular system] [how to stimulate substitution?] [lack of deep understanding on circularity/sustainability] [lack of deep understanding on circularity/sustainability: lack of understanding rebound] [need to more accurately measure circularity] [practicality, safety and comfort go above circularity] [rebound is a useful criticism to circular initiatives] [rebound might oversimplify circularity] [transition to circular economy is transition of values]

Quotation(s): 28

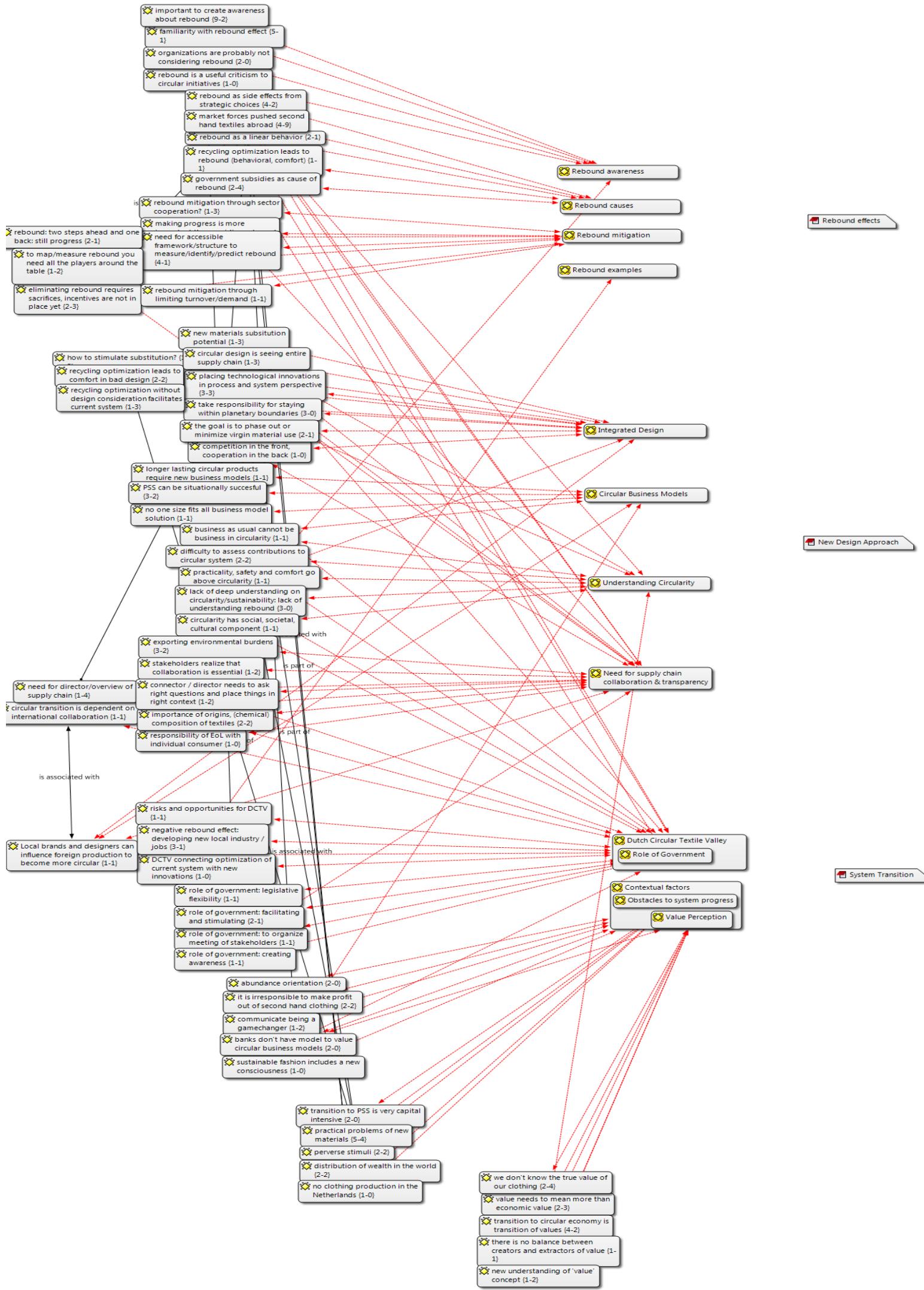
Code Family: Value Perception

Codes (12): [banks don't have model to value circular business models] [increased focus on raw material value of collected waste] [new understanding of 'value' concept] [our perception of value is not evolved enough] [there is no balance between creators and extractors of value] [Thrift shops are highest rank of circular value] [transition of values will push decline of rebound] [transition to circular economy is transition of values] [valorizing elimination of waste] [value concept has become diluted] [value needs to mean more than economic value] [we don't know the true value of our clothing]

Quotation(s): 19

The figure on the next page graphically illustrates the connections between the code families and their respective first order codes as listed above, representing the complete Data

Structure, complementary to the simplified version in chapter 3.4. Links between first order codes are included, and the interconnectedness of the data structure can be seen. Appendix C links the first order codes to the original quotations from the interviews.



Appendix C: Codes & Quotations list

This appendix lists all first order codes, what code family/families they are part of, what quote(s) they are based on and who is the informant behind the quote. It is retrieved from the Atlas.TI program that was used for data analysis. The full interview transcripts are available upon request. The structure of this appendix is repeated as follows, listing all codes in alphabetical order:

Code name: “...” {#Quotations that it is based on - #links to other codes}

P #document relating to specific interview: Name of informant – P# : #code appearing in text [quote..] (From #line in doc P: to #line in doc P)

Codes: [first order code – Family/Families it is part of]

- Original quotation from the interview transcript

Code: a fashion purchase is a vote for the organization {1-1}

P 3: Esther Munoz Grootveld - 3:2 [dat elke aankoop die je doet e..] (11:11)

Codes: [a fashion purchase is a vote for the organization - Family: Contextual factors]

dat elke aankoop die je doet een stem is voor een bepaalde koers van spelers in het mode veld, als je bij de Primark koopt stem je eigenlijk ervoor dat wat zij doen goed is

Code: abundance orientation {2-0}

P 5: Peter Koppert - 5:7 [Ja dat is ook weer het denken ..] (62:62)

Codes: [abundance orientation - Family: Contextual factors]

Ja dat is ook weer het denken vanuit C2C: je gaat uit van de overvloed.

P 8: Michiel Westerhoff - 8:18 [en je kunt je daar een toekoms..] (82:82)

Codes: [abundance orientation - Family: Contextual factors]

en je kunt je daar een toekomst voorstellen waarin eigenlijk, abundance, zoals de cradle to cradle guru's ook zeggen, van we gaan niet minderen, we gaan juist veel meer consumeren, maar we doen dat in een soort perfecte technische omgeving waarin we geen afval meer produceren, waar alle problemen van recycling zijn opgelost, zo'n soort utopisch beeld.

Code: accessible/recognizable term useful for communication/awareness purposes {1-0}

P 6: Gerard Taat - 6:22 [maar een behapbare term zou mi..] (151:151)

Codes: [accessible/recognizable term useful for communication/awareness purposes - Family: Obstacles to system progress]

maar een behapbare term zou misschien wel een idee zijn om uit communicatief oogpunt er iets mee te kunnen....

Code: banks don't have model to value circular business models {2-0}

P 7: Luc Kikkert - 7:36 [en de banken hebben niet een m..] (290:290)

Codes: [banks don't have model to value circular business models - Families (4): Circular Business Models, Contextual factors, Dutch Circular Textile Valley, Value Perception]

en de banken hebben niet een model hierop omdat ze waarderen.

P 7: Luc Kikkert - 7:37 [. Want ons huidige waarderings..] (298:298)

Codes: [banks don't have model to value circular business models - Families (4): Circular Business Models, Contextual factors, Dutch Circular Textile Valley, Value Perception]

Want ons huidige waarderingssystemen en onze banksystemen zijn gebaseerd op lineaire business modellen! En dat maakt het zo lastig.

Code: business as usual cannot be business in circularity {1-1}

P 1: Traci Kinden - 1:9 [business as usual cannot be b..] (45:45)

Codes: [business as usual cannot be business in circularity - Families (2): Circular Business Models, Understanding Circularity]

business as usual cannot be business in circularity,

Code: circular design is better design {1-4}

P 9: Iris van Wanrooij - 9:19 [Nou wij hadden dus bijvoorbeeld..] (128:130)

Codes: [circular design is better design - Families (2): Integrated Design, Understanding Circularity]

Nou wij hadden dus bijvoorbeeld 6 hele nieuwe modellen uitgebracht, en daardoor hebben we ook weer een paar, ik denk 2 of 3, modellen vervangen. Maar je hebt dus wel een paar nieuwe, en voor de rest is het zo dat het hoe we nu verder gaan zijn het eigenlijk allemaal vervangers. Naar ons idee zijn het ook allemaal niet alleen circulaire producten maar ook gewoon echt verbeterde producten dus... wij zien het alleen maar als een verbetering, we zien het niet alsof we onszelf in de voet schieten

Code: circular design is seeing entire supply chain {1-3}

P 3: Esther Munoz Grootveld - 3:4 [circulair ontwerpen, dus eigen..] (15:15)

Codes: [circular design is seeing entire supply chain - Families (4): Dutch Circular Textile Valley, Integrated Design, Need for supply chain collaboration & transparency, Understanding Circularity]

circulair ontwerpen, dus eigenlijk de keten doorzien en kijken hoe jouw ontwerp dus niet lineair maar circulair kan zijn

Code: circular transition is dependent on international collaboration {1-1}

P 5: Peter Koppert - 5:10 [maar eigenlijk kan Nederland a..] (108:108)

Codes: [circular transition is dependent on international collaboration - Families (2): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency]

maar eigenlijk kan Nederland alleen maar circulair worden als er ook wereldwijd een beweging naar circulariteit zich gaat voltrekken.

Code: circularity ambitions {4-1}

P 6: Gerard Taat - 6:1 [nee, dat maakt dat niet zoveel..] (30:30)

Codes: [circularity ambitions - Family: Dutch Circular Textile Valley]

nee, dat maakt dat niet zoveel uit dat vindt hoogstens in de uitwerking met een kleurtje plaats maar ik denk dat het vooral plaatsvindt bij de politicus die het straks onder z'n hoede gaat nemen. Maar dat we er met z'n allen iets mee moeten daar is iedereen wel van overtuigd.

P 8: Michiel Westerhoff - 8:2 [maar met circulariteit hebben ..] (9:9)

Codes: [circularity ambitions - Family: Dutch Circular Textile Valley]

maar met circulariteit hebben we eigenlijk vooral de ambitie om de grondstofstromen die we of de potentiele grondstofstromen die we in handen krijgen want er moet vaak nog een hoop aan gebeuren om die zo hoog mogelijk te valoriseren. Dus, valoriseren kan economisch betekenen maar ook maatschappelijk sociaal, werkgelegenheid, kansen voor mensen met een afstand op de arbeidsmarkt, draagt allemaal in onze ogen bij tot een meer circulaire oplossing, dus daar zijn we naar op zoek. Het sluiten van ketens, daar waar dat kan, zullen we dan zeker doen,

P 9: Iris van Wanrooij - 9:3 [Dan hebben we natuurlijk colle..] (10:10)

Codes: [circularity ambitions - Family: Dutch Circular Textile Valley]

Dan hebben we natuurlijk collectie die helemaal circulair moet worden, we hebben nu 10 circulaire modellen en we hebben ongeveer 80 modellen in het assortiment, dus we hebben nog wel schoenen om te zetten, maar volgend jaar moet de hele collectie klaar zijn

P11: Pals Brust - 11:5 ['Revolutionize the set-up of t..] (5:5)

Codes: [circularity ambitions - Family: Dutch Circular Textile Valley]

'Revolutionize the set-up of the textile industry from the inside out. UPSET will guarantee the use of 100% recycled materials in a controlled- and transparent circular and socially responsible textile value chain. Hereby making future proof apparel available to the mainstream markets'.

Code: circularity creates opportunities {2-0}

P 8: Michiel Westerhoff - 8:4 [onze belangrijkste taak is om ..] (9:9)

Codes: [circularity creates opportunities - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

onze belangrijkste taak is om te kijken hoe we met die grondstoffen kansen kunnen ontwikkelen, innovaties kunnen bereiken in de verschillende deelmarkten zodat die valorisatie op gang komt en de toepassing en het gebruik van die grondstoffen ook inderdaad weer in de keten aan de orde kan zijn.

P 9: Iris van Wanrooij - 9:10 [Dus ja onze positie in de mark..] (37:37)

Codes: [circularity creates opportunities - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Dus ja onze positie in de markt is daardoor in ieder geval niet veranderd, je merkt juist dat het juist weer een ingang is naar andere bedrijven die ook duurzaam bezig zijn en het heeft ook een pre bij aanbestedingen, dat je daar weer extra punten mee kunt verdienen, dus dat is alleen maar positief.

Code: circularity did not negatively affect competitiveness {1-1}

P 9: Iris van Wanrooij - 9:9 [Ja, we staan hetzelfde in de c..] (37:37)

Codes: [circularity did not negatively affect competitiveness - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Ja, we staan hetzelfde in de competitie als drie jaar geleden zegmaar, dus eh, we zijn een a-merk in de markt, we zijn vergelijkbaar met een Bate, een Atlas of een Elte bijvoorbeeld..

Code: circularity has social, societal, cultural component {1-1}

P 8: Michiel Westerhoff - 8:3 [valoriseren kan economisch bet..] (9:9)

Codes: [circularity has social, societal, cultural component - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

valoriseren kan economisch betekenen maar ook maatschappelijk sociaal, werkgelegenheid, kansen voor mensen met een afstand op de arbeidsmarkt

Code: circularity is about resources {1-0}

P 5: Peter Koppert - 5:8 [circulariteit is een grondstof..] (80:80)

Codes: [circularity is about resources - Family: Understanding Circularity]

circulariteit is een grondstoffen vraagstuk.

Code: circularity needed to satisfy increasing demand: rebound? {1-0}

P 5: Peter Koppert - 5:9 [En dan dus, circulariteit is e..] (84:84)

Codes: [circularity needed to satisfy increasing demand: rebound? - Family: Rebound causes]

En dan dus, circulariteit is enerzijds nodig om met gerecyclede vezels te voldoen aan de toegenomen vraag.. rekent dat tot het rebound effect?

Code: circularity shapes systems {2-2}

P 1: Traci Kinden - 1:2 [Circularity is a balance of va..] (17:17)

Codes: [circularity shapes systems - Families (2): Need for supply chain collaboration &

transparency, Understanding Circularity]

Circularity is a balance of values, the environmental value, the human value, which is most consistently overlooked at the moment, and the economic value so there's really a balance of those three things..

P 1: Traci Kinden - 1:4 [Circular systems design waste ..] (17:17)

Codes: [circularity shapes systems - Families (2): Need for supply chain collaboration & transparency, Understanding Circularity]

Circular systems design waste out, so it's not just about the market impacts or the market influences and the environmental impacts of reuse and recycling... Circularity is about shaping systems, entire systems in such a way that waste really isn't a factor anymore.. It has to do with decoupling economic growth from constrained or finite resources, natural resources...

Code: clearly communicating measures/legislation is important {1-0}

P 7: Luc Kikkert - 7:8 [de overheid neemt een harde ma..] (45:45)

Codes: [clearly communicating measures/legislation is important - Family: Contextual factors]

de overheid neemt een harde maatregel, legt dit niet voldoende uit, en de bevolking komt massaal in opstand. Dus er iets niets zo moeilijk als een waardetransitie bij mensen neerleggen en inderdaad waar spender je je geld aan.. Als je iemand heel duidelijk stelt van goh, of je kleinkinderen hebben geen leven meer, of wel maar dan moet je nu 1000€ extra betalen dan zegt iedereen ja, maar als je zegt nee we gaan de brandstofprijzen omhoog gooien want co2 is te laag, dan zegt iedereen nee.

Code: closing loops lowers primary production unless rebound occurs {1-1}

P 8: Michiel Westerhoff - 8:16 [us ja, echt helemaal sluiten v..] (74:74)

Codes: [closing loops lowers primary production unless rebound occurs - Families (2): Circular Business Models, Rebound mitigation]

us ja, echt helemaal sluiten van kringlopen op materiaalniveau is draagt sowieso bij tot minder virgin productie en een minder grote footprint, als het tenminste niet tegelijkertijd een rebound effect heeft dat er nog veel meer van gehaald wordt

Code: collecting waste to sell to highest bidder is continuing linear system on global

scale {1-2}

P 8: Michiel Westerhoff - 8:29 [eigenlijk is dat gewoon doorga..] (124:124)

Codes: [collecting waste to sell to highest bidder is continuing linear system on global scale - Family: Rebound causes]

eigenlijk is dat gewoon doorgaan met het lineaire model, en dat dan mondial gezien...

Code: combining new recycling innovations with Primark business model: rebound {1-0}

P11: Pals Brust - 11:4 [ja want heel theoretisch gespr..] (147:147)

Codes: [combining new recycling innovations with Primark business model: rebound - Families (2): Circular Business Models, Rebound causes]

ja want heel theoretisch gesproken stel dat wij dit proces volledig aan.. de Zeemannen en de Primark en Bristols van deze wereld gaan verkopen, dan krijg je dus idd een vervangingseffect, en sterker nog mensen zouden er een heel goed gevoel bij hebben ook, maar de post consumer berg wordt hoger en die co2 uitstoot door het verbranden daarvan die wordt groter en dat is echt een rebound effect.

Code: communicate being a gamechanger {1-2}

P 9: Iris van Wanrooij - 9:2 [Dan hebben we nog het project ..] (8:8)

Codes: [communicate being a gamechanger - Family: Contextual factors]

Dan hebben we nog het project dat heet eigenlijk Emma neerzetten als de gamechanger. Dat gaat meer over communicatie, dus daar steken we ook heel veel tijd en energie in.

Code: competition in the front, cooperation in the back {1-0}

P 9: Iris van Wanrooij - 9:13 [: ja, we hebben wel gezegd dat..] (76:76)

Codes: [competition in the front, cooperation in the back - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

: ja, we hebben wel gezegd dat wij aan de voorkant natuurlijk concurreren met onze concurrenten, maar dat we eigenlijk aan de achterkant veel meer willen samenwerken. Daarom ook hun schoenen terughalen, maar wellicht dat we ook voor derden kunnen gaan produceren..

Code: connector / director needs to ask right questions and place things in right context {1-2}

P 2: Douwe Jan Joustra - 2:14 [Tussen deze twee modelletjes, ..] (41:41)

Codes: [connector / director needs to ask right questions and place things in right context - Families (2): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency]

Tussen deze twee modelletjes, daar moet een verbinder tussen zitten, die de goede vragen stelt, en de goede context neerzet. En mensen laat nadenken over die context, en vervolgens als die context duidelijk is over de condities voor ontwikkeling nadenkt, en dan kom je bij uitwerkingen van oplossingen.

Code: cooperating companies could take initiative for change {1-1}

P 3: Esther Munoz Grootveld - 3:25 [Ik zou het heel krachtig vinden..] (188:188)

Codes: [cooperating companies could take initiative for change - Family: Need for supply chain collaboration & transparency]

Ik zou het heel krachtig vinden als dat een convenant van bedrijven zou zijn, en dat is dan wel weer goed aan zo'n GFA, en die zou je bijvoorbeeld op nationale schaal kunnen maken dat je zegt wij verenigen ons als bedrijven en we zetten ons eigen belang opzij voor het gemeenschappelijke belang, en dan krijg je een soort natuurlijke selectie van bedrijven die iets goeds gaan doen, en dan krijg je misschien ook consumenten makkelijker mee..

Code: creating distance from the old model {1-1}

P 4: Jeroen van den Eijnde - 4:1 [dat aan het begin van het opze..] (16:16)

Codes: [creating distance from the old model - Family: Obstacles to system progress]

dat aan het begin van het opzetten van Future Makers, heeft het altijd een doel gehad om afstand te nemen van wat toen al gezien werd als oud model,

Code: DCTV connecting optimization of current system with new innovations {1-0}

P 2: Douwe Jan Joustra - 2:11 [proberen te koppelen van de op..] (34:34)

Codes: [DCTV connecting optimization of current system with new innovations - Family: Dutch Circular Textile Valley]

proberen te koppelen van de optimalisering en de vernieuwende innovaties die er zijn, experimenteer ruimte bieden, zorgen dat er een koppeling ontstaat waardoor die experimenten ook bij hun terechtkomen

Code: DCTV rebound {1-1}

P 2: Douwe Jan Joustra - 2:18 [Douwe: de DCTV ontwikkeling he..] (55:57)

Codes: [DCTV rebound - Family: Rebound examples]

Douwe: de DCTV ontwikkeling heeft in potentie een hoge potentieel rebound effect.

Thomas: Hoezo?

Douwe: Omdat je technologie gaat ontwikkelen in het bestaande, en eigenlijk het bestaande faciliteert om gewoon door te gaan, in plaats van te veranderen.

Code: difficulty to assess contributions to circular system {2-2}

P 8: Michiel Westerhoff - 8:40 [ik denk dat we nog heel veel m..] (170:170)

Codes: [difficulty to assess contributions to circular system - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

ik denk dat we nog heel veel moeite hebben om uit te leggen van wat dan de bijdrage is van dat circulaire initiatief in termen van een meer circulaire economie, dus dat we eigenlijk niet

P 8: Michiel Westerhoff - 8:39 [Maar het is voor organisaties ..] (193:193)

Codes: [difficulty to assess contributions to circular system - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Maar het is voor organisaties dus heel moeilijk aan te tonen wat hun bijdrage is.

Code: distribution of wealth in the world {2-2}

P 3: Esther Munoz Grootveld - 3:9 [Het gaat aan het eind van de d..] (37:37)

Codes: [distribution of wealth in the world - Family: Obstacles to system progress]

Het gaat aan het eind van de dag volgens mij heel vaak mondert deze discussie uit op de verdeling van middelen en rijkdom over de wereld,

P 8: Michiel Westerhoff - 8:24 [D'r is een enorme accumulatie ..] (107:107)

Codes: [distribution of wealth in the world - Family: Obstacles to system progress]

D'r is een enorme accumulatie van welvaart gekomen bij heel weinig mensen, en dat staat eigenlijk die bredere ontwikkeling in de weg.

Code: does reusing reduce producing? {1-4}

P 6: Gerard Taat - 6:18 [je circuleert wel wat je hebt ..] (115:115)

Codes: [does reusing reduce producing? - Family: Rebound causes]

je circuleert wel wat je hebt en wat je natuurlijk op moet passen is het aspect tijd, en op het moment dat je teveel materiaal maakt dan heb je ook veel snijafval, dan kun je zeggen dat blijft circuleren maar wordt daarmee ook mijn grondstof stroom minder?

Code: doing 100% good is nearly impossible, so how do we decide amongst outcomes {1-1}

P 3: Esther Munoz Grootveld - 3:7 [en het is heel moeilijk om met..] (33:33)

Codes: [doing 100% good is nearly impossible, so how do we decide amongst outcomes - Family: Obstacles to system progress]

en het is heel moeilijk om met in de textiel maar ook de industrie erheen om het 100% goed te doen.. Dus je moet eigenlijk op elk moment beslissen van ben je goed of ben je slecht, dus als je 80% goed doet ben je dan goed genoeg? of eigenlijk niet? En iemand die 80% goed doet en iemand die het 70% goed doet maar op hele andere vlakken, hoe maak je dat weer gelijk?

Code: economic context is focused on individual organizations; other contexts are shared {1-1}

P 6: Gerard Taat - 6:27 [; ja, de economische context i..] (191:191)

Codes: [economic context is focused on individual organizations; other contexts are shared - Families (2): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency]

; ja, de economische context is veel te veel op het bedrijf gericht en niet op het hele systeem gericht.

Code: eliminating rebound means losing profits {2-2}

P 3: Esther Munoz Grootveld - 3:19 [we zien wel dat het nodig is o..] (68:68)

Codes: [eliminating rebound means losing profits - Family: Rebound mitigation]

we zien wel dat het nodig is om het rebound effect uit te schakelen, maar misschien als we echt ons business model kunnen veranderen dat we dat uitschakelen dan lopen we winst mis bijvoorbeeld, dus ja wat voor incentive heb je dan nodig en van wie moet dat komen,

P 7: Luc Kikkert - 7:17 [ik denk dat het onontkoombaar i..] (81:81)

Codes: [eliminating rebound means losing profits - Family: Rebound mitigation]

ik denk dat het onontkoombaar is in een transitiefase, omdat we natuurlijk gaan.. ik bedoel laten we wel wezen we zitten in een wereld waar aan de ene kant grote gedeelten nog steeds gewoon economisch winstbejag nagaat

Code: eliminating rebound requires sacrifices, incentives are not in place yet {2-3}

P 3: Esther Munoz Grootveld - 3:18 [ouja echt het ontwikkelen van ..] (68:68)

Codes: [eliminating rebound requires sacrifices, incentives are not in place yet - Family: Rebound mitigation]

ouja echt het ontwikkelen van nieuwe business modellen waarmee je het rebound effect volledig uitschakelt, ik denk dat daar concessies voor nodig zijn en ik denk dat die incentive er gewoon nog niet is

P 7: Luc Kikkert - 7:16 [ik denk dat het onontkoombaar i..] (81:81)

Codes: [eliminating rebound requires sacrifices, incentives are not in place yet - Family: Rebound mitigation]

ik denk dat het onontkoombaar is in een transitiefase, omdat we natuurlijk gaan.. ik bedoel laten we wel wezen we zitten in een wereld waar aan de ene kant grote gedeelten nog steeds gewoon economisch winstbejag nagaat,

Code: eliminating rebound to determine narrower transition path {1-0}

P 5: Peter Koppert - 5:17 [Nou, ik hoop dat jouw onderzoe..] (192:192)

Codes: [eliminating rebound to determine narrower transition path - Family: Rebound awareness]

Nou, ik hoop dat jouw onderzoek, of jouw rapport, bijdraagt aan het toch echt goed scherp nadenken van wat willen nu eigenlijk met de circulariteit, en hoe gaan we dat bewerkstelligen

zonder dat we in de val trappen dat we laten we zeggen op product niveau hele mooie dingen aan het doen zijn, maar dat het in de grote kringen eigenlijk niks uitmaakt want er komt weer iets als, je houdt de bevolkingsgroei en de welvaartsgroei niet bij, of je raakt het kwijt aan andere productgroepen... naja, dat je die weglek effecten dus krijgt..

Code: energy transition preceeds circular transition {1-0}

P 8: Michiel Westerhoff - 8:21 [I ik vind de discussie over de..] (98:98)

Codes: [energy transition preceeds circular transition - Family: Dutch Circular Textile Valley]

I ik vind de discussie over de energietransitie op dat punt heel erg leerzaam, want die gaat in een zekere zin de CE discussie nog wat vooruit,

Code: everyone has their own role in the system {1-0}

P 6: Gerard Taat - 6:28 [dat het ook goed is dat je je ..] (206:206)

Codes: [everyone has their own role in the system - Family: Role of Government]

dat het ook goed is dat je je realiseert dat iedereen z'n eigen rol in het systeem heeft,

Code: exporting environmental burdens {3-2}

P 5: Peter Koppert - 5:2 [Nou nee gewoon een deel van de..] (9:9)

Codes: [exporting environmental burdens - Family: Need for supply chain collaboration & transparency]

Nou nee gewoon een deel van de textielproductie in Nederland heeft gewoon de strengere wet en regelgeving ten aanzien van waterverontreiniging niet overleefd, omdat die technieken waren toen nog onvoldoende ontwikkeld, dus het is naar landen gegaan waar soepeler omgegaan werd met die milieuregelgeving.

P 8: Michiel Westerhoff - 8:11 [Nouja, dat exporteren we dan g..] (48:48)

Codes: [exporting environmental burdens - Family: Need for supply chain collaboration & transparency]

Nouja, dat exporteren we dan gewoon, dat komt dan in andere landen terecht en dan hebben wij er geen last van, maar andere landen wel.

P 8: Michiel Westerhoff - 8:26 [. Met als gevolg dat we over d..] (112:112)

Codes: [exporting environmental burdens - Family: Need for supply chain collaboration &

transparency]

. Met als gevolg dat we over de recycling van die textiel a helemaal niks meer hadden, sterker nog, die prijs opdrijving en het tegen elkaar opbieden leidde er toe dat uiteindelijk ook aantoonbaar textiel kwam in landen waar met kinderarbeid en met hele volstrekt onverantwoorde manieren textiel werd behandeld. Dat betekent dus dat als je aan de voorkant van de keten van die recycling heet, begint met een, met die te hoge prijs, ja dan kan het dus nooit meer komen in een circulaire stroom in Nederland..

Code: facilitating current system eliminates urgency for change {2-2}

P 2: Douwe Jan Joustra - 2:3 [En faciliteer je dus ook het b..] (4:4)

Codes: [facilitating current system eliminates urgency for change - Family: Obstacles to system progress]

En faciliteer je dus ook het bestaande systeem en is er dus eigenlijk geen noodzaak tot verandering meer.

P 2: Douwe Jan Joustra - 2:16 [Als je groots investeert in ee..] (49:49)

Codes: [facilitating current system eliminates urgency for change - Family: Obstacles to system progress]

Als je groots investeert in een nieuwe recyclingtechniek die niet vereist dat er anders wordt ontworpen zodat het basismateriaal beter en hoogwaardiger gerecycled kan worden, dan blijft het een suboptimale oplossing, die eigenlijk faciliteert wat er allemaal fout is in al het materiaalgebruik.

Code: familiarity with rebound effect {5-1}

P 6: Gerard Taat - 6:2 [.. het effect wat je met een m..] (35:35)

Codes: [familiarity with rebound effect - Family: Rebound awareness]

.. het effect wat je met een maatregel teweeg brengt dat dat door een ehh een soort reactie eigenlijk onder de streep tot 0 winst leidt, zal ik het maar zo zeggen.

P 6: Gerard Taat - 6:3 [ik ken het niet qua naam maar ..] (41:41)

Codes: [familiarity with rebound effect - Family: Rebound awareness]

ik ken het niet qua naam maar het effect wel vanuit een andere hoek

P 7: Luc Kikkert - 7:14 [nou ik snap het concept,] (81:81)

Codes: [familiarity with rebound effect - Family: Rebound awareness]

nou ik snap het concept,

P 8: Michiel Westerhoff - 8:13 [a ja ja, ik begrijp het heel g..] (58:58)

Codes: [familiarity with rebound effect - Family: Rebound awareness]

a ja ja, ik begrijp het heel goed, en ik had het niet, ik kende de term niet, moet ik eerlijk zeggen, dus in die zin was het een... maar het mechanisme wat je schetst met het rebound effect kende ik natuurlijk wel, en wij vragen ons natuurlijk ook wel eens af van, is het nou uiteindelijk echt milieu winst.

P11: Pals Brust - 11:3 [, er zijn allerlei leuke plaat..] (32:32)

Codes: [familiarity with rebound effect - Family: Rebound awareness]

, er zijn allerlei leuke plaatjes over circulaire zaken enzovoort en welke milieu - positieve milieu effecten er zijn, maar er zijn in sommige gevallen ook nadelige effecten, en zoals ik dat heb begrepen, noemen we dat rebound effecten, waarmee dus ook uiteindelijk die ... wat is het circulaire effect en wat is het rebound effect, en als die balans natuurlijk negatief uitslaat, ja dan hoef je dat circulaire effect op dat product of die stroom ook niet toe te passen, dan wel moet je kijken of je dat ook in je keten kunt optimaliseren, zo heb ik dat een beetje begrepen.

Code: focusing on recycling strengthens/optimizes current system {1-2}

P 2: Douwe Jan Joustra - 2:2 [Dus zegmaar DCTV heeft een eno..] (4:4)

Codes: [focusing on recycling strengthens/optimizes current system - Families (2): Contextual factors, Obstacles to system progress]

Dus zegmaar DCTV heeft een enorme focus op recycling, en dat er investering moet komen in de recycling technologie, maar daarmee optimaliseer je eigenlijk het bestaande systeem.

Code: fully circular economy does not necessarily eliminate rebound {2-0}

P 1: Traci Kinden - 1:7 [So let me ask you [] rebound e..] (39:41)

Codes: [fully circular economy does not necessarily eliminate rebound - Family: Rebound mitigation]

So let me ask you [] rebound effect will be nonexistent or not relevant anymore in a system that is fully circular, or at least after significant steps have been made?

Traci: Uhm i think it's nuanced regardless. You'll see instances of it sometimes and others where it doesn't apply anymore. I think one of things the article didn't take into account, specifically technological advancements which will reduce the delta between primary and secondary materials, i think that's really important.

P 1: Traci Kinden - 1:8 [There are just some of these m..] (41:41)

Codes: [fully circular economy does not necessarily eliminate rebound - Family: Rebound mitigation]

There are just some of these mitigating factors that could make those rebound effect pieces from a marketing consumption perspective less of an important focus.

Code: fully circular example: glass {1-0}

P 8: Michiel Westerhoff - 8:15 [ik vind dus glas, is een mooi ..] (70:70)

Codes: [fully circular example: glass - Family: Dutch Circular Textile Valley]

ik vind dus glas, is een mooi voorbeeld van hoe recycling uiteindelijk zelfs de hele virgin productie om zeep helpt, wat je eigenlijk wilt, want je wil gesloten kringlopen hebben. Er wordt natuurlijk nog wel glas geproduceerd, maar in Nederland in ieder geval niet meer..

Code: GFA are only companies {1-1}

P 3: Esther Munoz Grootveld - 3:20 [Nou ik denk ten eerste dat het..] (119:119)

Codes: [GFA are only companies]

Nou ik denk ten eerste dat het een neveneffect is van het feit dat die Global Fashion Agenda alleen maar gemaakt wordt door bedrijven. Dat is echt een, ook de Copenhagen fashion summit, dat zijn alleen maar bedrijven, dus daar kom je weinig onderwijs tegen, weinig andere stakeholders..

Code: GFA is visionary without technical know-how {1-0}

P 1: Traci Kinden - 1:6 [It is window dressing in a way..] (29:29)

Codes: [GFA is visionary without technical know-how]

It is window dressing in a way, but the way that I would spin that is that it's visionary, it

points in the direction that things should go, with a fundamental lack of the technical how. And what it will look like, if implemented. So, typically, in stuff like the GFA, and all of these goals that are set, that how piece doesn't necessarily factor into the drafting of those goals..

Code: government subsidies as cause of rebound {2-4}

P 6: Gerard Taat - 6:14 [zegmaar de belastingen op dat ..] (87:87)

Codes: [government subsidies as cause of rebound - Families (2): Rebound causes, Role of Government]

zegmaar de belastingen op dat soort producten wat lager te maken dan de niet circulaire producten, maar dat is op rijks niveau, net zoals met elektrische auto's en support met bijtelling gebeurt. maar dan nog blijft de consument degene die bepaalt wat ie koopt. Ja en of je daarmee het rebound effect... ja ik denk dat dat vooral in de voorlichting zit.. Waar je dan ook nog, oja, dat is trouwens ook nog zo'n rebound effect, dat van die hybride lease auto's, ken je dat?

P 6: Gerard Taat - 6:15 [ja een paar jaar geleden toen ..] (90:90)

Codes: [government subsidies as cause of rebound - Families (2): Rebound causes, Role of Government]

ja een paar jaar geleden toen werd de bijtelling voor, toen had je nog niet zo veel elektrisch auto's en toen kreeg je een soort variant, een tussenvorm tussen elektrisch en diesel, de hybride, die reed deels op benzine en deels op elektriciteit. En er was een financiële bijtelling die was best gunstig voor ondernemers en je zag dus dat veel ondernemers zon auto gingen aanschaffen, de populairste was volgens mij de Mitsubishi Outlander, dat was best een grote auto, maar je had dus en een benzine motor en een elektrische aandrijving, en wat je in de praktijk zag is dat ze met subsidie zo'n auto gingen aanschaffen in de hoop dat ze dan vervolgens allemaal elektrisch gingen rijden, en uiteindelijk bleken ze in de praktijk overwegend op benzine te rijden want dat was prijstechnisch toch weer meer gunstig.. dat was dus ook een soort rebound effect waar het bijna helemaal de verkeerde kant op gaat omdat ze eigenlijk net zoveel fossiel rijden maar dan wel profiteren van het belastingvoordeel.

Code: have to make problem visible and keep it here: don't get tempted by feelgood statistics {1-1}

P 8: Michiel Westerhoff - 8:32 [je moet het hier zichtbaar mak..] (136:136)

Codes: [have to make problem visible and keep it here: don't get tempted by feelgood statistics - Family: Need for supply chain collaboration & transparency]

je moet het hier zichtbaar maken, en het probleem hier houden en niet het exporteren en als het dan over de grens is dan telt het leuk mee voor onze feelgood-statistieken, maar moet je

het hier onder ogen zien en aanpakken,

Code: how to stimulate substitution? {1-3}

P 3: Esther Munoz Grootveld - 3:13 [. hoe zorg je dat mensen een b..] (49:49)

Codes: [how to stimulate substitution? - Families (2): Integrated Design, Understanding Circularity]

. hoe zorg je dat mensen een bepaald product even goed vinden als het product dat ze al hadden.

Code: importance of origins, (chemical) composition of textiles {2-2}

P11: Pals Brust - 11:1 [maar een van de meest belangri..] (18:18)

Codes: [importance of origins, (chemical) composition of textiles - Families (2): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency]

maar een van de meest belangrijke dingen is dat je de herkomst van de textiel weet, en dat je dus weet wat de exacte content is, en ook wat voor een chemicaliën en dergelijke en gebruikt zijn.

P11: Pals Brust - 11:2 [Hier begint het al mee dat met..] (91:91)

Codes: [importance of origins, (chemical) composition of textiles - Families (2): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency]

Hier begint het al mee dat met het fiber sorten we veel meer zouden moeten weten, we weten niet welke chemicaliën er gebruikt zijn, dus we kunnen ze er niet uit halen

Code: important to create awareness about rebound {9-2}

P 3: Esther Munoz Grootveld - 3:22 [als ik je zo hoor, is het voor..] (160:160)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

als ik je zo hoor, is het vooral die eerste stap om al die spelers in het DCTV verhaal bewust te maken van het feit dat het rebound-effect bestaat, en niet zozeer laten zien het kan hier hier of hier bestaan.. Maar meer zo van denk er over na, en probeer je ketens te doorkijken en te onderzoeken

P 5: Peter Koppert - 5:21 [Nou, ik denk dat daar nog wel ..] (224:224)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

Nou, ik denk dat daar nog wel een wereld te winnen valt.

P 5: Peter Koppert - 5:23 [Onder de professionals, waarto..] (232:232)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

Onder de professionals, waartoe ik dan ook behoor, die deze ontwikkeling aansturen en bevorderen, daar is het wel belangrijk dat er mogelijk ook op het concept rebound gekeken wordt wat het kan betekenen en wat er op de loer ligt. Als we een fantastisch systeem verzinnen en we erachter komen dat er achter onze rug iets gebeurt wat we eigenlijk hadden kunnen zien en weten, en dan nog even extra een rem op moeten zetten ofzo..

P 6: Gerard Taat - 6:11 [a, ja zeker, in ieder geval de..] (71:71)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

a, ja zeker, in ieder geval de bewustwording, ik kan me voorstellen dat je lang niet al die effecten kunt voorzien, wat er gaat gebeuren, maar ik denk wel dat het uh een item is wat je in gedachten moet blijven houden,

P 6: Gerard Taat - 6:31 [, want ik denk als je van te v..] (225:225)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

, want ik denk als je van te voren wat erover nadenkt dat het überhaupt kan gaan optreden dat je dan een bewustere keuze kan gaan maken van accepteer ik dat of, of niet.

P 7: Luc Kikkert - 7:15 [n ik denk ja die effecten zull..] (81:81)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

n ik denk ja die effecten zullen gaan optreden, ook omdat mensen het niet overzien en omdat ze het niet weten,

P 7: Luc Kikkert - 7:23 [Kennis is wat dat betreft een ..] (116:116)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

Kennis is wat dat betreft een van de factoren waarmee je mensen, of waarmee je het effect tegen zou kunnen gaan denk ik..

P 7: Luc Kikkert - 7:28 [Ja, ik denk dat het een inval..] (222:222)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

Ja, ik denk dat het een invalshoek is die meegewogen moet worden.

P 7: Luc Kikkert - 7:40 [Het is zeker relevant in de tr..] (312:312)

Codes: [important to create awareness about rebound - Family: Rebound awareness]

Het is zeker relevant in de transitie

Code: improvements to current system eliminate urgency for change {1-1}

P 2: Douwe Jan Joustra - 2:10 [. Maar met ietsjes beter maken..] (20:20)

Codes: [improvements to current system eliminate urgency for change - Family: Obstacles to system progress]

. Maar met ietsjes beter maken, maak je het nog niet goed, en sterker nog, je blokkeert ook nog eens enigszins de weg naar goed, omdat het al beter is.

Code: increased focus on raw material value of collected waste {1-0}

P 8: Michiel Westerhoff - 8:5 [dus we gaan veel meer kijken n..] (16:16)

Codes: [increased focus on raw material value of collected waste - Family: Value Perception]

dus we gaan veel meer kijken naar de grondstofwaarden van wat we inzamelen.

Code: increasing share of recycled content {1-1}

P 5: Peter Koppert - 5:4 [En design is ook belangrijk om..] (25:25)

Codes: [increasing share of recycled content]

En design is ook belangrijk omdat je dus stapsgewijs steeds meer zult kunnen doen met gerecycled materiaal, op dit moment heb je nog niet de rijke keuze uit allerlei garen en doek varianten, in gerecyclede vormen, d'r is natuurlijk nog maar een beperkt aanbod van gerecycled materiaal, dus we moeten vanuit die beschikbare materialen moet je gaan kijken nou hoe kan ik er een mooi product mee maken, niet alleen vanuit een mooi product denken van welke materialen heb ik nodig, maar ook echt circular material based design.

Code: increasing share of recycled content can allow higher consumption {1-1}

P 5: Peter Koppert - 5:6 [Nee dat zou dus betekenen als ..] (58:58)

Codes: [increasing share of recycled content can allow higher consumption]

Nee dat zou dus betekenen als je dat dus voor een groot deel dat productsysteem voor een groot deel kunt gaan voeden met herwonnen vezels, nou dan maken we al een hele flinke stap richting circulariteit. We kunnen ons misschien wel permitteren om inderdaad net ff een beetje teveel en te vaak kleren te kopen.

Code: incurring the costs of circularity {1-0}

P 9: Iris van Wanrooij - 9:8 [Onze circulaire schoenen zijn ..] (29:29)

Codes: [incurring the costs of circularity - Family: Dutch Circular Textile Valley]

Onze circulaire schoenen zijn voor ons iets duurder om te produceren, maar die prijs hebben wij niet doorberekend aan de klant, de retourlogistiek is voor hun ook gratis.

Code: involving science in design {2-1}

P 3: Esther Munoz Grootveld - 3:21 [ik denk dat ze daar wetenschap..] (144:144)

Codes: [involving science in design - Families (2): Contextual factors, Integrated Design]

ik denk dat ze daar wetenschap bij moeten betrekken,

P 4: Jeroen van den Eijnde - 4:3 [Maar nou we zijn nu aan het ki..] (20:20)

Codes: [involving science in design - Families (2): Contextual factors, Integrated Design]

Maar nou we zijn nu aan het kijken in het kader van grote onderzoeksprojecten ook samen met Wageningen om te kijken wat er aan agrarisch basismateriaal is om daar weer vezels van te maken.

Code: it is irresponsible to make profit out of second hand clothing {2-2}

P 8: Michiel Westerhoff - 8:27 [, zo van ja jongens het is eig..] (116:116)

Codes: [it is irresponsible to make profit out of second hand clothing - Family: Contextual factors]

, zo van ja jongens het is eigenlijk onverantwoord om te willen verdienen aan tweedehandskleding.

P 8: Michiel Westerhoff - 8:30 [wij zijn dus begonnen om die v..] (128:128)

Codes: [it is irresponsible to make profit out of second hand clothing - Family: Contextual factors]

wij zijn dus begonnen om die verantwoordelijkheid ook te pakken en te zeggen tegen gemeentes ja het is pijnlijk, het kost een paar ton, maar dat textiel wat je ervoor wint is overigens wel

Code: job creation and policy can help make circularity real {1-0}

P 1: Traci Kinden - 1:5 [it's a simple way to talk abou..] (21:21)

Codes: [job creation and policy can help make circularity real - Families (2): Contextual factors, Dutch Circular Textile Valley]

it's a simple way to talk about all of the potential implications, but job creation is something that government really cares about, government and policy are going to be such an important piece of really making circularity real.. And viable.

Code: lack of deep understanding on circularity/sustainability {2-0}

P 7: Luc Kikkert - 7:9 [Nou, mensen kunnen die link ni..] (49:49)

Codes: [lack of deep understanding on circularity/sustainability - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Nou, mensen kunnen die link niet leggen op de een of andere manier.. Of begrip over de hele problematiek is gewoon niet aanwezig..

P 8: Michiel Westerhoff - 8:37 [kijk, allerlei energie optimal..] (170:170)

Codes: [lack of deep understanding on circularity/sustainability - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

kijk, allerlei energie optimalisaties en grondstof optimalisaties worden ook al circulair genoemd, terwijl dat naar mijn idee daar helemaal niks mee te maken heeft, het is wel goed voor het milieu, maar het heeft met circulariteit niet zoveel te doen..

Code: lack of deep understanding on circularity/sustainability: lack of understanding rebound {3-0}

P 4: Jeroen van den Eijnde - 4:15 [Nou ik denk dat je ook de stap..] (143:143)

Codes: [lack of deep understanding on circularity/sustainability: lack of understanding rebound - Families (3): Dutch Circular Textile Valley, Rebound awareness, Understanding Circularity]

Nou ik denk dat je ook de stap ervoor nog kan zetten, een groot aantal bedrijven wel voeden dat ze iets met die duurzaamheid moeten maar zelfs dat al niet snappen, de stap ervoor nog, dus laat staan dat ze nadenken over rebound effecten ja, dus ik denk dat die hypothese wel klopt ja.

P 8: Michiel Westerhoff - 8:36 [, ik denk het iets breder dan ..] (170:170)

Codes: [lack of deep understanding on circularity/sustainability: lack of understanding rebound - Families (3): Dutch Circular Textile Valley, Rebound awareness, Understanding Circularity]

, ik denk het iets breder dan alleen specifiek rebound, ik denk dat er nog veel en dan kom ik weer op het punt van het meten, ik denk dat we nog heel veel moeite hebben om uit te leggen van wat dan de bijdrage is van dat circulaire initiatief in termen van een meer circulaire economie, dus dat we eigenlijk niet.

P 9: Iris van Wanrooij - 9:16 [Ja, ik denk ze inderdaad daar ..] (107:107)

Codes: [lack of deep understanding on circularity/sustainability: lack of understanding rebound - Families (3): Dutch Circular Textile Valley, Rebound awareness, Understanding Circularity]

Ja, ik denk ze inderdaad daar niet van op de hoogte zijn, ook omdat ik ook vaak merk dat mensen denken dat circulariteit hetzelfde is als duurzaamheid bijvoorbeeld. En, ja er worden ook nog niet zo heel veel LCAs uitgevoerd.

Code: Local brands and designers can influence foreign production to become more circular {1-1}

P 5: Peter Koppert - 5:11 [En van de andere kant kunnen w..] (108:108)

Codes: [Local brands and designers can influence foreign production to become more circular - Families (4): Circular Business Models, Dutch Circular Textile Valley, Integrated Design, Need for supply chain collaboration & transparency]

En van de andere kant kunnen we laten we zeggen voor een klein deeltje vanuit NL aanzwengelen doordat we vanuit NL met veel brands actief zijn met het laten produceren van kleding, die dus beslissen hoe kleding gemaakt wordt en welke stoffen er gebruikt worden, en zo kunnen we beslissen van ik wil zoveel mogelijk gerecyclede content in mijn producten hebben zitten, en je kunt ook beslissen om producten te ontwerpen die inderdaad kwalitatief langer mee gaan, en modisch langer meegaan.

Code: longer lasting circular products require new business models {1-1}

P 9: Iris van Wanrooij - 9:20 [ja is ook het zelfde, het vers..] (134:134)

Codes: [longer lasting circular products require new business models - Families (2): Circular Business Models, Dutch Circular Textile Valley]

ja is ook hetzelfde, het verschil is dat we nu een product creëren met een langere levensduur en dat mensen daarom minder snel een nieuw product zullen kopen van ons, maar dan is het weer van belang om te gaan kijken naar andere business modellen.

Code: lowering prices inhibits creating awareness on true pricing {3-1}

P 3: Esther Munoz Grootveld - 3:14 [stel je voor dat je de prijs h..] (53:53)

Codes: [lowering prices inhibits creating awareness on true pricing - Family: Need for supply chain collaboration & transparency]

stel je voor dat je de prijs heel erg omlaag gooit, dan creëer je nog steeds niet het bewustzijn bij de consument dat je kleding wat waard is,

P 4: Jeroen van den Eijnde - 4:14 [Het grappige in mode is, dat j..] (109:109)

Codes: [lowering prices inhibits creating awareness on true pricing - Family: Need for supply chain collaboration & transparency]

Het grappige in mode is, dat je in een mode als systeem zeg maar, soms beter een prijs kunt verhogen, dan verlagen, want dat heeft ook meteen met een soort belevingswaarde te maken van producten en merken, en als je een bepaald merk zegmaar onder een bepaalde prijs gaat aanbieden wordt het merk bij wijze van spreke niet meer serieus genomen

P11: Pals Brust - 11:13 [a ik denk dat je met je prijs ..] (199:199)

Codes: [lowering prices inhibits creating awareness on true pricing - Family: Need for supply chain collaboration & transparency] [we don't know the true value of our clothing - Family: Value Perception]

a ik denk dat je met je prijs positioneren toch wel enigszins iets aan kan doen, en bewustwording van de consument dan het geen wegwerpitem is,

Code: making progress is more important than avoiding rebound {5-1}

P 5: Peter Koppert - 5:15 [Ja absoluut, er moet gewoon be..] (124:124)

Codes: [making progress is more important than avoiding rebound - Family: Rebound mitigation]

Ja absoluut, er moet gewoon beweging komen om uit te vinden van, wat nou precies de goede richting is.

P 5: Peter Koppert - 5:22 [: Ja, maar dat wil ik wel heel..] (228:228)

Codes: [making progress is more important than avoiding rebound - Family: Rebound mitigation]

: Ja, maar dat wil ik wel heel erg strategisch en heel erg tactisch gaan doen, want ik wil zo weinig mogelijk drempels opwerpen om in beweging te komen

P 6: Gerard Taat - 6:20 [voorlopig heb ik meer het gevo..] (130:130)

Codes: [making progress is more important than avoiding rebound - Family: Rebound mitigation]

voorlopig heb ik meer het gevoel van nou je kunt beter stappen zetten, dan geen stappen zetten, want de perfecte wereld die komt toch niet, dus het zal altijd beter kunnen.

P 6: Gerard Taat - 6:30 [denk ik dat het goed is dat je..] (220:220)

Codes: [making progress is more important than avoiding rebound - Family: Rebound mitigation]

denk ik dat het goed is dat je herkent als je keuzes moet gaan maken, van gaan we dit doen of dat doen, maar ik denk ook wel dat het belangrijk is dat we het proces in gang blijven houden, en dat je het dus niet al te zwaar moet gaan tellen, niet dat het niet belangrijk is, maar om het proces op gang te houden dat je het ook wel nou, moet accepteren dat het dan optreedt.

P 7: Luc Kikkert - 7:29 [Maar ik zou het niet te vroeg ..] (222:222)

Codes: [making progress is more important than avoiding rebound - Family: Rebound mitigation]

Maar ik zou het niet te vroeg inbrengen. Want het is belangrijker dat mensen in beweging komen, ik denk dat we nog in die fase zitten, en dat van daaruit de bewustwording wel gaat ontstaan.

Code: market forces pushed second hand textiles abroad {4-9}

P 8: Michiel Westerhoff - 8:25 [dat textiel bijna allemaal voo..] (112:112)

Codes: [market forces pushed second hand textiles abroad - Families (3): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency, Rebound causes]

dat textiel bijna allemaal voor 70% naar het buitenland vertrok, omdat als je al heel veel geld

aan de voorkant weggeeft aan een partij die zegt anders krijg je het niet, en wij maakten daar deel van uit, wij vroegen ook in de markt voor ons tweedehands textiel de hoogste prijs, en het gevolg daarvan was dat de sorteer instellingen in Nederland de textiel niet meer kregen, het naar het buitenland werd gestuurd omdat daar goedkoper arbeid is.

P 8: Michiel Westerhoff - 8:28 [ja precies, die, vanuit circul..] (120:120)

Codes: [market forces pushed second hand textiles abroad - Families (3): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency, Rebound causes]

ja precies, die, vanuit circulair oogpunt en het sluiten van de keten van textiel is dat een hopeloos proces.

P11: Pals Brust - 11:6 [de prijs wat je voor 1 kg moet..] (83:83)

Codes: [market forces pushed second hand textiles abroad - Families (3): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency, Rebound causes]

de prijs wat je voor 1 kg moet betalen is al bijna hoger dan in Amsterdam de kiloprijs van nieuw katoen, worldwide. Je moet betalen voor de afvalstroom. Als jij van de gemeente je bak er mag neerzetten, maar dat moet je betalen.

P11: Pals Brust - 11:7 [Dat gaat dus niet want uiteind..] (87:87)

Codes: [market forces pushed second hand textiles abroad - Families (3): Dutch Circular Textile Valley, Need for supply chain collaboration & transparency, Rebound causes]

Dat gaat dus niet want uiteindelijk heb je hier al net zoveel betaald wat een kilo katoen is op de markt, dan kun je naar elke c&a of elke h&m gaan, die zijn dan niet meer geïnteresseerd. Want er komen nogal wat op want wat erbij komt is natuurlijk dat je - kijk dit model- de kostprijs van de input die is al hoger dan de textielprijs/katoenprijs. dan moet je nog je proceskosten gaan maken, en dan moet je nog uiteindelijk een kostprijs van een product, en wie is er dan nog geïnteresseerd in jouw product?

Code: narrow focus on one solution / stream cannot work {1-1}

P 2: Douwe Jan Joustra - 2:13 [Maar we focussen te erg op die..] (37:37)

Codes: [narrow focus on one solution / stream cannot work - Family: Obstacles to system progress]

Maar we focussen te erg op die ene oplossing, die ene stroom

Code: narrow/isolated sustainability measures: need for supply chain orientation {1-0}

P 6: Gerard Taat - 6:29 [Dus op het moment dat je een p..] (216:216)

Codes: [narrow/isolated sustainability measures: need for supply chain orientation - Family: Need for supply chain collaboration & transparency]

Dus op het moment dat je een papierfabriek wilt afrekenen op een verduurzamingsslag wordt er alleen maar meegerekend wat er binnen dat hek gebeurt en niet dat er ergens anders een effect plaatsvindt, met als gevolg dat ze het dus niet gaan doen, want ze worden er toch niet voor beloond. Dat is ook weer zo'n keten traject, en ja eigenlijk een ongewenst effect, maar wat dus wel in de keten alleen maar kan worden opgelost als je echt grote stappen wilt maken

Code: need for accessible framework/structure to measure/identify/predict rebound {4-1}

P 4: Jeroen van den Eijnde - 4:8 [dus ik zou eigenlijk veel meer..] (81:81)

Codes: [need for accessible framework/structure to measure/identify/predict rebound - Family: Rebound mitigation]

dus ik zou eigenlijk veel meer geïnteresseerd zijn in een toegankelijke structuur, dat als er een concrete casus is, dat we dan die multidisciplinaire club bij elkaar hebben om eens inschatting te maken wat de mogelijke rebound effecten kunnen zijn.

P 5: Peter Koppert - 5:19 [En dan moeten we ook gewoon in..] (196:196)

Codes: [need for accessible framework/structure to measure/identify/predict rebound - Family: Rebound mitigation]

En dan moeten we ook gewoon in dat keuzeproces met alle alternatieven die zich aanbieden, moeten we ook gewoon inderdaad een ticking box of checking box hebben van, leidt dit tot rebound, of weglek effecten, of hoe ik het precies moet noemen, maar leidt dit wezenlijk tot het doel van de vermindering van de vraag op virgin grondstoffen. En op welk niveau. Op productniveau, land niveau, industrie of zelfs wereldwijd systeem niveau... En ook natuurlijk al die niveaus, op al die niveaus kan je impact meten.

P 6: Gerard Taat - 6:13 [kun je natuurlijk wel kijken u..] (79:79)

Codes: [need for accessible framework/structure to measure/identify/predict rebound - Family: Rebound mitigation]

kun je natuurlijk wel kijken uit het verleden om te kijken niet alleen wat de effecten zijn geweest maar ook welk zeg maar voorspellende factoren erin zitten, en dan zou je natuurlijk eens kunnen kijken van op welke vlakken zou dat nog meer plaats kunnen vinden en kunnen herkennen,

P 6: Gerard Taat - 6:17 [Maar ik denk wel dat het inter..] (98:98)

Codes: [need for accessible framework/structure to measure/identify/predict rebound - Family: Rebound mitigation]

Maar ik denk wel dat het interessant zou zijn om te kijken of je een aantal voorspellende factoren zou kunnen benoemen, van waaraan zou je vooraf aan kunnen herkennen dat er misschien zo'n rebound effect optreedt?

Code: need for accurate safety standards and legislation {3-1}

P 8: Michiel Westerhoff - 8:6 [dus daar zijn wel wegen voor e..] (28:28)

Codes: [need for accurate safety standards and legislation - Family: Need for supply chain collaboration & transparency]

dus daar zijn wel wegen voor en er zijn ook al af en toe wat initiatieven, we worden ook heel vaak uitgenodigd om te zeggen welke regels hinderen bijvoorbeeld bij circulaire initiatieven, en soms worden er ook wel eens uitzonderingen gemaakt.

P 8: Michiel Westerhoff - 8:10 [we kennen ook voorbeelden van ..] (40:40)

Codes: [need for accurate safety standards and legislation - Family: Need for supply chain collaboration & transparency]

we kennen ook voorbeelden van initiatieven die totaal mislukken omdat men eigenlijk chemisch afval gaat verwerken alsof het niet chemisch afval is, en dan heb je ook een groot probleem, als je毒ische stoffen, als je daarmee gaat hobbyen of gaat knoeien, ja dan heb je een volksgezondheid probleem..

P 8: Michiel Westerhoff - 8:12 [.. Dus regelgeving is nodig in..] (51:51)

Codes: [need for accurate safety standards and legislation - Family: Need for supply chain collaboration & transparency]

.. Dus regelgeving is nodig in deze sector, je kunt niet alles zomaar als grondstof betitelen maar tegelijkertijd kan dat ook een beperking opleveren in de circulaire ambities ja, klopt.

Code: need for director/overview of supply chain {1-4}

P 3: Esther Munoz Grootveld - 3:17 [dat het belangrijk is dat je r..] (64:64)

Codes: [need for director/overview of supply chain - Family: Need for supply chain collaboration & transparency]

dat het belangrijk is dat je regisseurs hebt die de hele keten doorzien en die mensen wijzen op elkaar.. dat het rebound effect ook tussen twee spelers in kan ontstaan, want iedereen kijkt misschien snel naar zijn eigen stukje van de keten en kijkt misschien niet helemaal verder... Ik denk dat je daar een soort tolk voor nodig hebt die, zorgt dat mensen elkaar begrijpen,

Code: need for new focus on use instead of ownership in business models {1-0}**P 8: Michiel Westerhoff - 8:41 [ja dat de belangen veranderen ..] (203:203)**

Codes: [need for new focus on use instead of ownership in business models - Family: Circular Business Models]

ja dat de belangen veranderen en de financiële stromen veranderen, dat gaat heel veel impact hebben want dat gaat betekenen dat het verdienmodel niet meer gekoppeld is aan nieuw nieuw nieuw, maar aan gebruik gebruik gebruik, want als gebruik dus het verdienmodel wordt in plaats van nieuw en verkoop, ja dan verander je de spelregels en dan goed ja je kent de voorbeelden enzo.

Code: need for radical change {1-3}**P 4: Jeroen van den Eijnde - 4:2 [omdat toen wel al zichtbaar wa..] (16:16)**

Codes: [need for radical change - Family: Need for supply chain collaboration & transparency]

omdat toen wel al zichtbaar was dat die industrie eigenlijk totaal niet goed bezig was, en er radicale veranderingen moeten plaatsvinden, dus we hebben altijd op dat duurzaamheidsaspect ook gezeten.

Code: need for supply chain integration / transparency {6-5}**P 1: Traci Kinden - 1:13 [Because right now what happens..] (45:45)**

Codes: [need for supply chain integration / transparency - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

Because right now what happens is that brands and retailers typically don't own their factories, fine, and those factories have second and third, fourth tier suppliers as well...

P 3: Esther Munoz Grootveld - 3:24 [: nou zoals jij het omschrijft..] (188:188)

Codes: [need for supply chain integration / transparency - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

: nou zoals jij het omschrijft zou het alleen maar werken als alles hier geproduceerd wordt... maar we hebben totaal geen invloed op bedrijven die hier... d'r wordt van alles geïmporteerd...

P 7: Luc Kikkert - 7:12 [maar ook nog steeds niet trans..] (65:65)

Codes: [need for supply chain integration / transparency - Families (2): Integrated Design,

Need for supply chain collaboration & transparency]

maar ook nog steeds niet transparant genoeg...

P 7: Luc Kikkert - 7:22 [jij adopteert de totale keten ..] (100:100)

Codes: [need for supply chain integration / transparency - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

jij adopteert de totale keten van hetgene wat je doet..

P 9: Iris van Wanrooij - 9:1 [het tweede gaat over Greening ..] (6:6)

Codes: [need for supply chain integration / transparency - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

het tweede gaat over Greening the supply chain, vroeger maakten wij de schoenen helemaal zelf, tegenwoordig wordt de schacht bijvoorbeeld in Brazilië geproduceerd en ook in India, en we willen dat die daar ook verantwoord kunnen werken en dat ze daar ook stappen zetten richting duurzaamheid, dus dat is heel erg belangrijk voor ons,

P11: Pals Brust - 11:14 [wat ik ook veel zie, is dat je..] (199:199)

Codes: [need for supply chain integration / transparency - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

wat ik ook veel zie, is dat je met je stakeholders in de supply-chain gezamenlijk moet acteren. Dat is heel belangrijk. en dat je niet een sub optimalisatie in slechts 1 gedeelte van je supplychain hebt.

Code: need for viable business case for used textiles {1-0}

P 8: Michiel Westerhoff - 8:1 [. Textiel is zo'n stroom waar ..] (5:5)

Codes: [need for viable business case for used textiles - Families (2): Circular Business Models, Dutch Circular Textile Valley]

. Textiel is zo'n stroom waar we tot voor kort eigenlijk helemaal niks mee deden... Milieu impact is wel heel groot, en hoe kun je nou door textiel meer in de regio en meer in Nederland te bewerken, het gebruikte textiel, kun je daar dan ook weer business mee maken en kun je daar ook milieutechnisch meer recycling voor bereiken, dat is nu waar ik me onder andere voor inzet.

Code: need to more accurately measure circularity {3-1}

P 5: Peter Koppert - 5:16 [Nou wat het dichtst bij komt i..] (176:176)

Codes: [need to more accurately measure circularity - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Nou wat het dichtst bij komt is dat er een goede track & trace komen, transparantie, en dus de borging van het percentage gerecyclede content. En laatst bij het duurzaamheidsinitiatief geweest, een grote naam voor ook weer een initiatief van een stel creatieve denkers, en die hebben de circular product footprint ontwikkeld.

P 7: Luc Kikkert - 7:21 [Dan kun je nog steeds een rebo..] (96:96)

Codes: [need to more accurately measure circularity - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Dan kun je nog steeds een rebound effect krijgen... Maar ik heb heel lang gezocht naar hoe kunnen we de vertaalslag maken dat je per persoon, of per bedrijf of per organisatie je footprint kunt neer gaan zetten, en dan weet je gewoon waar je staat..

P 8: Michiel Westerhoff - 8:35 [Nouu... wat daar natuurlijk on..] (161:161)

Codes: [need to more accurately measure circularity - Families (2): Dutch Circular Textile Valley, Understanding Circularity]

Nouu... wat daar natuurlijk onzettend belangrijk voor is, volgens mij zei ik dat ook in de workshop, is dat wij te weinig weten hoe je circulariteit meet.

Code: negative rebound effect: developing new local industry / jobs {3-1}

P 2: Douwe Jan Joustra - 2:17 [Positieve rebound effecten: ge..] (59:59)

Codes: [negative rebound effect: developing new local industry / jobs - Families (2): Dutch Circular Textile Valley, Rebound examples]

Positieve rebound effecten: geen enkele Indiase producent zit te wachten op nederlands gerecycled garen: dat kennen ze niet, is te duur, en heeft een onbekende samenstelling. Positief effect kan dus gaan zijn dat je een nieuwe lokale markt, met lokale productie, gaat ontwikkelen, met veel nieuwe banen, herontwikkeling van de textielindustrie.

P 2: Douwe Jan Joustra - 2:19 [Positieve rebound is dus dan d..] (61:61)

Codes: [negative rebound effect: developing new local industry / jobs - Families (2): Dutch Circular Textile Valley, Rebound examples]

Positieve rebound is dus dan de kans op een nieuwe industrie in Nederland; banen, economische groei: tegelijkertijd niet optimaal voor het milieu in Nederland, maar wereldwijd

wel. Blijven koppelen aan design.

P 8: Michiel Westerhoff - 8:31 [en dat hebben we dus nu met le..] (128:128)

Codes: [negative rebound effect: developing new local industry / jobs - Families (2): Dutch Circular Textile Valley, Rebound examples]

en dat hebben we dus nu met leger des heils zijn we de eerste die het leger des heils zover hebben gekregen om daar een trend-break in te beginnen, die gaan nu een sorteefabriek voor textiel hier in Deventer bouwen, en dat is een stap in de goede richting, daar gaan we het spul dus echt hier in Nederland bekijken, kijken hoe we daar meer circulaire oplossingen, daar hebben we nog veel meer andere gemeentes voor nodig, vandaar dat ik dus ook overal aan iedereen die het horen wil dit verhaal vertel, van jongens, het is niet realistisch om zeg maar 4 a 500 euro voor tweedehands textiel te vragen als gemeente, en ik krijg.. want dan weet je per definitie dat je niks ermee hier mee kan, dan ben je het kwijt.

Code: new approach to design / production {5-2}

P 1: Traci Kinden - 1:12 [just taking a more connected a..] (45:45)

Codes: [new approach to design / production - Families (2): Circular Business Models, Integrated Design]

just taking a more connected approach to how a product is being produced.

P 2: Douwe Jan Joustra - 2:5 [En dus ook design op z'n funda..] (8:8)

Codes: [new approach to design / production - Families (2): Circular Business Models, Integrated Design]

En dus ook design op z'n fundament toepassen, dus ook als je kijkt naar de fashion sector dan is design vooral een kwestie van zijn we bij de tijd en de kleur en de snit en de lengte van de rokken enzo, en vrijwel niet op de samenstelling van het product in de zin van wat voor 'n materiaal, hoe wordt het gebruikt en verwerkt, dus dan kom je weer op het oude voorbeeld op het overhemd van 98% katoen, tsja, maar die 2% polyester garen die erin zit, verkloot het wel.

P 5: Peter Koppert - 5:3 [Maar ook vanuit design, het ge..] (25:25)

Codes: [new approach to design / production - Families (2): Circular Business Models, Integrated Design]

Maar ook vanuit design, het gesloten krijgen van de cirkel is niet alleen een kwestie van recyclingtechnieken, het is dus ook design die gericht is ook design-for-recycling, en het design-for-longevity,

P 5: Peter Koppert - 5:20 [Alleen de adoptie door de mark..] (220:220)

Codes: [new approach to design / production - Families (2): Circular Business Models,

Integrated Design]

Alleen de adoptie door de markt, omdat het een duurder product is, duurder is om weer daadwerkelijk te recyclen, want het is niet voldoende om hem alleen c2c in de markt te zetten maar je moet ook uit de markt terug bewegen om het daadwerkelijk in het recyclesysteem te stoppen... En die marktuptake die is nog te beperkt. Of die markt response.

P 9: Iris van Wanrooij - 9:18 [en ik denk dat het belangrijk ..] (115:115)

Codes: [new approach to design / production - Families (2): Circular Business Models, Integrated Design]

en ik denk dat het belangrijk is dat organisaties ook vooral op een andere manier gaan ontwerpen, dus dat er betere materialen gaan gebruiken die langer meegaan zodat je zo lang mogelijk eigenlijk die waarde kunt behouden.

Code: new materials substitution potential {1-3}

P 4: Jeroen van den Eijnde - 4:9 [, omdat ik zelf merk dat de kw..] (89:89)

Codes: [new materials substitution potential - Family: Integrated Design]

, omdat ik zelf merk dat de kwaliteit en het ambitieniveau binnen een project soms al heel erg verschilt.

Code: new materials vs optimizing installed base {1-0}

P 7: Luc Kikkert - 7:41 [, die zitten heel erg op het m..] (312:312)

Codes: [new materials vs optimizing installed base - Family: Obstacles to system progress]

, die zitten heel erg op het maken van nieuw materiaal, en ik zit juist heel erg op van nee, kijk nu naar je installed base en los dat op.

Code: new understanding of 'value' concept {1-2}

P 8: Michiel Westerhoff - 8:19 [andere waardes, bredere kijk o..] (86:86)

Codes: [new understanding of 'value' concept - Family: Value Perception]

andere waardes, bredere kijk op wat waarde is. Ik kan je, ik ben net begonnen in het boek van mevrouw Mazzucato, "de waarde van alles", dat is een ernstige kritiek op de wijze dat het hele waarde-begrip in de economie verloren is gegaan in de jaren 70, vorige eeuw, echt een

boeiende dame, maar dat bijstellen van het waarde begrip en die consequentie die wordt denk ik door de technische utopisten zoals ik ze dan even noem vergeten

Code: no clothing production in the Netherlands {1-0}

P 5: Peter Koppert - 5:1 [Er wordt vrijwel geen kledings..] (5:5)

Codes: [no clothing production in the Netherlands - Family: Obstacles to system progress]

Er wordt vrijwel geen kledingstuk, bijna geen meter textiel meer in Nederland gemaakt

Code: no one size fits all business model solution {1-1}

P 1: Traci Kinden - 1:16 [But i don't think that there's..] (54:54)

Codes: [no one size fits all business model solution - Family: Circular Business Models]

But I don't think that there's any one solution for alternative business models on the brand side.. There's just no one-size fits all,

Code: organizations are probably not considering rebound {2-0}

P 4: Jeroen van den Eijnde - 4:16 [Nou, om even heel simpel te ze..] (169:169)

Codes: [organizations are probably not considering rebound - Family: Rebound awareness]

Nou, om even heel simpel te zeggen, ik denk dat bedrijven wel steeds weer zich bewustzijn van oke, misschien als ik iets nieuws ga doen moet ik zo'n LCA maken, maar ik denk niet dat ze denken van oh, ik moet eens nagaan wat de mogelijke rebound effecten nou zijn.

P 6: Gerard Taat - 6:21 [op het moment dat je voorbeeld..] (137:137)

Codes: [organizations are probably not considering rebound - Family: Rebound awareness]

op het moment dat je voorbeelden gaat noemen, dat iedereen ze wel herkent, maar ik denk dat het merendeel van de organisaties daar helemaal niet bewust van is dat het überhaupt kan voorkomen, of er wel bewust van zijn en denken nou ja dat is niet zo belangrijk dus daar ga ik mn business niet door laten beïnvloeden.

Code: our perception of value is not evolved enough {1-1}

P 7: Luc Kikkert - 7:3 [. Onze waardeperceptie is nog ..] (37:37)

Codes: [our perception of value is not evolved enough - Family: Value Perception]

. Onze waardeperceptie is nog niet ver genoeg.

Code: perverse stimuli {2-2}

P 6: Gerard Taat - 6:16 [ja dit noemen ze volgens mij e..] (94:94)

Codes: [perverse stimuli - Family: Obstacles to system progress]

ja dit noemen ze volgens mij een perverse prikkel ofzo, iig een prikkel die totaal verkeerd uitpakt

P 7: Luc Kikkert - 7:18 [De verkeerde acties worden bel..] (85:85)

Codes: [perverse stimuli - Family: Obstacles to system progress]

De verkeerde acties worden beloond inderdaad, ik bedoel een hamburger is nog steeds veel te goedkoop, we hebben de Primarks en dat wordt gekocht, dus dat wordt beloond.. En er zijn perverse prikkels, we subsidiëren nog steeds de olie-industrien,

Code: placing technological innovations in process and system perspective {3-3}

P 2: Douwe Jan Joustra - 2:12 [er is een grote liefde voor te..] (35:35)

Codes: [placing technological innovations in process and system perspective - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

er is een grote liefde voor technologische innovaties, maar zorg ervoor dat die technologische innovaties altijd in het perspectief van de proces en systeem- innovaties worden gezet.

P 5: Peter Koppert - 5:18 [Binnen de textile valley wille..] (196:196)

Codes: [placing technological innovations in process and system perspective - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

Binnen de textile valley willen we wel de juiste technologie veranderingen of innovaties en systeem innovaties tot stand brengen en te stimuleren

P 7: Luc Kikkert - 7:45 [Dus wat maakt dat paddestoelen..] (324:324)

Codes: [placing technological innovations in process and system perspective - Families (2): Integrated Design, Need for supply chain collaboration & transparency]

Dus wat maakt dat paddestoelen leer dan zo anders dan koeien leer, behalve dan dat je zegt

van ja met paddestoelen gaan we het bemestingsprobleem tegen, dan los je op microniveau iets op, maar creer je op macro niet een ander probleem..?

Code: Politics and competition within the industry can be inhibiting factors {1-2}

P 1: Traci Kinden - 1:1 [One of the things i see in the..] (7:7)

Codes: [Politics and competition within the industry can be inhibiting factors - Family: Need for supply chain collaboration & transparency]

One of the things i see in the Dutch landscape is.. there are still a lot of politics and competition internally.

Code: practical problems of new materials {5-4}

P 3: Esther Munoz Grootveld - 3:12 [dat een beperking op dit momen..] (45:45)

Codes: [practical problems of new materials - Family: Obstacles to system progress]

dat een beperking op dit moment van nieuwe materialen is dat we nog niet zover zijn dat we de look en feel en de silhouetten kunnen maken zoals we die gewend zijn,

P 4: Jeroen van den Eijnde - 4:11 [at we dat helemaal doordenken ..] (93:93)

Codes: [practical problems of new materials - Family: Obstacles to system progress]

at we dat helemaal doordenken van oke, dan hebben we kombucha of mycelium of algen, maar wat betekent dat dan voor, een ander soort productietechnologie? (Thomas: voor de industrie..) Ja, en wat voor kleding levert dat op, en willen mensen dat? Wat voor beeld zit er rondom die kleding?

P 4: Jeroen van den Eijnde - 4:12 [Ja wat ook Aniela zegt, die vr..] (97:97)

Codes: [practical problems of new materials - Family: Obstacles to system progress]

Ja wat ook Aniela zegt, die vraag krijgt ze voortdurend, is het te wassen, maar dan zegt ze daar ben ik helemaal niet mee bezig want wil je het niet meer hebben dan gooi je het maar weg want het composteert vanzelf... Vervolgens weet je dat de tapijt industrie een totaal composteerbaar tapijt heeft gemaakt, en niemand laat het composteren want niemand heeft in de gaten dat het composteerbaar is, en het komt gewoon tussen het normale vuil terecht.. en het hele effect is weg!

P 7: Luc Kikkert - 7:42 [maar op het moment dat je iede..] (316:316)

Codes: [practical problems of new materials - Family: Obstacles to system progress]

maar op het moment dat je iedere keer nieuwe materialen gaat onderzoeken waarvan je de effecten niet kent en de commercialiteit niet weet...

P 7: Luc Kikkert - 7:44 [maar we kennen de effecten van..] (324:324)

Codes: [practical problems of new materials - Family: Obstacles to system progress]

maar we kennen de effecten van heel veel paddenstoelen op ons leefklimaat kennen we niet! Dus we ontdekken nieuwe dingen waarvan we de impact op het moment dat we dat echt gaan opschalen, niet overzien, dat doen we namelijk niet. Het is wel een natuurlijk product, maar ja dat is koeienhuid ook, maar we weten allemaal dat koeien een van de grootste vervuilers zijn door dat hele gebeuren, maar dat is ontstaan door de jaren heen want primair is de koe gewoon een biologisch product, gewoon een dier...

Code: practicality, safety and comfort go above circularity {1-1}

P 9: Iris van Wanrooij - 9:11 [Kwaliteit staat altijd voorop,..] (44:44)

Codes: [practicality, safety and comfort go above circularity - Families (2): Integrated Design, Understanding Circularity]

Kwaliteit staat altijd voorop, we hebben zelfs gezegd, veiligheid is nummer 1, comfort is nummer 2, en dan pas circulariteit. Schoenen zijn ook zo ontworpen omdat je anders ook je doel voorbij gaat.

Code: PSS can be situationally succesful {3-2}

P 1: Traci Kinden - 1:14 [: I think that if applied stra..] (49:49)

Codes: [PSS can be situationally succesful - Family: Circular Business Models]

I think that if applied strategically, it can be really successful. If it's applied across the board as the solution I don't think it will be. I think it really depends on the product, the quality of the product, the consumer..

P 1: Traci Kinden - 1:15 [ut i think luxury brands have ..] (53:53)

Codes: [PSS can be situationally succesful - Family: Circular Business Models]

But I think luxury brands have the opportunity to really do rental and leasing well because by definition they have a desirable product, theoretically it's a higher quality, better construction etc, so it will last, theoretically, multiple use cycles and retain its value longer, so those things in general just lend it to in my opinion to a rental or leasing mode

P 7: Luc Kikkert - 7:33 [: nee dat is geen probleem, ma..] (282:282)

Codes: [PSS can be situationally succesful - Family: Circular Business Models]

: nee dat is geen probleem, maar dat is dus, daardoor ontstaat dan de incentive, de incentive ontstaat omdat de eigenaar, die kan zn winst optimaliseren, niet omdat ie die klant moet overtuigen het product te kopen, maar omdat ie zo effectief mogelijk dat...dus die effecten ontstaan wel, maar niet als ik hetzelfde matras zou nemen en als product as a service weg zou zetten, zou niet zo nodig meer duurzaam zijn.

Code: radical change does not resonate in existing industry because it means developing something that will replace you {3-3}

P 4: Jeroen van den Eijnde - 4:7 [wij zitten in een kunstcontext..] (65:65)

Codes: [radical change does not resonate in existing industry because it means developing something that will replace you - Families (2): Contextual factors, Obstacles to system progress]

wij zitten in een kunstcontext, en ik vertelde je al dat wij vanuit die kunstcontext juist met nadrukken over meer radicale vernieuwingen. Nou, dat valt nooit goed binnen een industrie, want radicale vernieuwing betekent altijd dat je iets moet gaan ontwikkelen waar je zelf slachtoffer van gaat worden

P 4: Jeroen van den Eijnde - 4:13 [a want hij is nu in het kader ..] (89:89)

Codes: [radical change does not resonate in existing industry because it means developing something that will replace you - Families (2): Contextual factors, Obstacles to system progress]

a want hij is nu in het kader van FOLM, een promotie aan het voorbereiden met een onderzoeksraag, en hij zegt bv ja textiel wordt voornamelijk gedacht vanuit traditioneel textiel, dus garens die via een techniek bij elkaar worden gebracht, en hij zegt ik denk dat de meeste winst te halen is in nonwovens, dus niet geweven structuren, en dat past heel goed bij de inzet van biomaterialen, zoals die mycelium bv, niet geweven structuren, en dan kun je ook totaal nieuwe productietechnologieën gaan toepassen. Daar zal Luc van zeggen, daar zitten onze textielmensen niet op te wachten..

P 6: Gerard Taat - 6:26 [want eigenlijk kun je natuurli..] (187:187)

Codes: [radical change does not resonate in existing industry because it means developing something that will replace you - Families (2): Contextual factors, Obstacles to system progress]

want eigenlijk kun je natuurlijk zeggen het meeste rendement haal je bijvoorbeeld over textiel behalve je het meest rendement als je minder textiel maakt, maar dit is voor een ondernemer natuurlijk niet interessant, om minder te gaan maken, dus je kunt wel kijken hoe kan ik dat dan zo maken dat het ofwel het makkelijkst geheel kan worden hergebruikt of dat mensen er langer mee doen want anders dan ondergrond je natuurlijk z'n eigen business

Code: rebound as a linear behavior {2-1}

P 7: Luc Kikkert - 7:6 [als de hele wereld circulair i..] (41:41)

Codes: [rebound as a linear behavior - Families (2): Need for supply chain collaboration & transparency, Rebound causes]

als de hele wereld circulair is zal dat altijd een circulaire waarde zijn. En daarmee is dus rebound, naar zegmaar een linear gedrag, niet meer aanwezig.

P 7: Luc Kikkert - 7:27 [, rebound effect is dus eigenl..] (198:198)

Codes: [rebound as a linear behavior - Families (2): Need for supply chain collaboration & transparency, Rebound causes]

, rebound effect is dus eigenlijk voorgeprogrammeerd in menselijk gedrag.

Code: rebound as a prisoner's dilemma {1-0}

P 6: Gerard Taat - 6:23 [. uhmm ik denk dat het zegmaar..] (166:166)

Codes: [rebound as a prisoner's dilemma - Family: Rebound causes]

ik denk dat het zegmaar noem het maar stoer is van een ondernemer als ie zegt ik ga dit maken en dan van het ander minder maken, alleen of ie daar dan het rebound effect mee beïnvloed is nog maar de vraag natuurlijk, zolang er nog tig andere producenten zijn die het alsnog welgaan doen..

Code: rebound as consequence of narrow focus {1-1}

P 4: Jeroen van den Eijnde - 4:4 [wat je vaak ziet is dat mensen..] (30:30)

Codes: [rebound as consequence of narrow focus - Families (2): Need for supply chain collaboration & transparency, Rebound causes]

wat je vaak ziet is dat mensen heel hard inzetten op 1 aspect, waarvan het lijkt of dat duurzaam is, maar nooit beseffen dat dat ene aspect in een netwerk van allerlei oorzaak gevolgen en handelingen zitten, waarbij op een andere plek een ander effect gesorteerd kan worden, waardoor het helemaal niet duurzaam is.

Code: rebound as side effects from strategic choices {4-2}

P 2: Douwe Jan Joustra - 2:1 [Het gaat vaak niet over de me..] (4:4)

Codes: [rebound as side effects from strategic choices - Family: Rebound causes]

Het gaat vaak niet over de metrics maar het gaat eigenlijk over de strategische keuzes die gemaakt worden, en de neveneffecten die dat met zich mee brengt.

P 3: Esther Munoz Grootveld - 3:5 [welke stappen je moet en kunt ..] (29:29)

Codes: [rebound as side effects from strategic choices - Family: Rebound causes]

welke stappen je moet en kunt zetten om die gezonder te maken, niet per se circulair maar gezonder, elke keer als je op een knopje drukt in die keten dan zet dat een chain of reaction in gang, dus bijvoorbeeld als een ontwerper kiest voor een bepaald soort materiaal in plaats van een ander materiaal, dan kun je een soort spoor navolgen van wat dat voor consequenties heeft,

P 3: Esther Munoz Grootveld - 3:6 [e moet proberen te doorzien wa..] (29:29)

Codes: [rebound as side effects from strategic choices - Family: Rebound causes]

e moet proberen te doorzien wat voor consequenties jouw keuzes hebben, en ik denk dat je voor elke keuze die je maakt kom je wel een rebound effect, of een negatief effect tegen.

P 4: Jeroen van den Eijnde - 4:17 [Ik denk eigenlijk wel dat een ..] (173:173)

Codes: [rebound as side effects from strategic choices - Family: Rebound causes]

Ik denk eigenlijk wel dat een gezonde ondernemer wel intuitief inschattingen maakt, zonder te weten dat het misschien het rebound effect heet, dat kunnen 'neveneffecten' zijn..

Code: rebound as tradeoff between environmental pressures: less water used, more waste produced {1-0}

P11: Pals Brust - 11:12 [dan krijg je dus, dan ga ik aa..] (188:188)

Codes: [rebound as tradeoff between environmental pressures: less water used, more waste produced - Family: Rebound causes]

dan krijg je dus, dan ga ik aan de ene kant wel veel water besparen, maar de post consumer berg wordt alleen maar hoger en hoger. als je echt over een trap nadenkt, zo van ik doe goed want ik koop gewoon 100%.. ik heb een T-shirt van 2€ normaal en een T-shirt van 2-3 € dat is 100% gerecycled. nou dan kan ik m'n gedrag gewoon als het hetzelfde blijft dan lossen we aan de ene kant wel het water probleem op maar aan de andere kant stoten we nog meer co2 uit omdat de post consumer berg groter wordt..

Code: rebound due to lack of social and cultural considerations {1-2}

P 4: Jeroen van den Eijnde - 4:6 [mijn verklaring vaak, is dat i..] (48:48)

Codes: [rebound due to lack of social and cultural considerations - Family: Rebound causes]

mijn verklaring vaak, is dat innovatie in de meeste gevallen, veel te veel een technologische innovatie is, waarbij er te weinig kennis van zaken is van de culturele en sociale en maatschappelijke kant

Code: rebound example algae {2-2}

P 2: Douwe Jan Joustra - 2:15 [Voorbeeld algen naar garen: he..] (47:47)

Codes: [rebound example algae - Family: Rebound examples]

Voorbeeld algen naar garen: helpen ecosysteem naar de klote want veranderen van natuurlijk naar agrarisch -> voor biodiversiteit meestal niet goed.

P 4: Jeroen van den Eijnde - 4:10 [die is met algenonderzoek bez..] (89:89)

Codes: [rebound example algae - Family: Rebound examples]

die is met algenonderzoek bezig op hoog niveau, die laat alles doorrekenen. Die vergelijkt zijn materiaal bijvoorbeeld met katoen dan, en dan ziet ie oke hier heb ik winst, en daar heb ik een enorm verlies, maar per saldo, gaat het het winnen, dus hij heeft een, nu uit algen laat ie garens maken, en dat vergelijkt ie met katoengarens, en dan zegt ie in het productieproces verlies ik niet zoveel energieverbruik, ik heb meer energie nodig, is niet duurzaam zou je zeggen, hij wint enorm, op waterbesparing (

Code: rebound example behavior {3-1}

P 6: Gerard Taat - 6:5 [en wat je wel merkt is dat men..] (44:44)

Codes: [rebound example behavior - Family: Rebound examples]

en wat je wel merkt is dat mensen die uhm zegmaar producten van dat soort katoenvezels gaan toepassen dat die uhm er wel minder lang mee doen, minder zorgvuldig er mee omgaan.

P 6: Gerard Taat - 6:6 [e wegwerpcultuur laten we het ..] (48:48)

Codes: [rebound example behavior - Family: Rebound examples]

e wegwerpcultuur laten we het zo zeggen, dat die misschien wel toeneemt als je maar laat zien hoe bio-based of hoe circulair dit product is, omdat dan de beeldvorming ontstaat van oke dan kan ik het rustig weggooien, en deels is dat wel zo, maar dan vergeet je snel –

P 9: Iris van Wanrooij - 9:15 [hmm nou ik had alleen gedacht ..] (87:87)

Codes: [rebound example behavior - Family: Rebound examples]

hmm nou ik had alleen gedacht inderdaad als je tweedehands kleding koopt dat je waarschijnlijk meer gaat kopen omdat je denkt van ah ik ben toch duurzaam bezig dat dat dan een verleiding is om toch meer te gaan kopen, of met auto's als je zegt van he ik ga energiezuinig rijden, of ik ga elektrisch rijden, dat je dan meer kilometers gaat maken.

Code: rebound example biodegradable {1-0}

P11: Pals Brust - 11:9 [Ik vind het biodegradable verh..] (158:158)

Codes: [rebound example biodegradable - Family: Rebound examples]

Ik vind het biodegradable verhaal, ik snap dat de c&a en h&m organisaties daar heel graag op willen sturen omdat dan natuurlijk hun verkoop wel nog steeds doorgaat. Je kunt maar gewoon blijven produceren, want ze zeggen het is geen afval meer je kunt het gewoon weggooien.

Code: rebound example biomaterials {2-2}

P 4: Jeroen van den Eijnde - 4:5 [dat is bijvoorbeeld ook zo met..] (38:38)

Codes: [rebound example biomaterials - Family: Rebound examples]

dat is bijvoorbeeld ook zo met het ontwikkelen van biomaterialen, dat kan allemaal heel leuk zijn, en dat suggereert al duurzaamheid bijna, maar wat gebeurt er nou in die hele keten, en is het daarom werkelijk duurzamer?

P11: Pals Brust - 11:10 [het rebound effect is trouwens..] (161:161)

Codes: [rebound example biomaterials - Family: Rebound examples]

het rebound effect is trouwens prachtig, voor biobased,

Code: rebound example light bulbs {1-0}

P 6: Gerard Taat - 6:4 [namelijk bij spaarlampen, daar..] (41:41)

Codes: [rebound example light bulbs - Family: Rebound examples]

namelijk bij spaarlampen, daar heb je ook een rebound effect, spaarlampen toen ze werden

geïntroduceerd dacht iedereen oh ik gebruik nog maar 1/6e van mijn stroom dus als ik 'em een keer een uurtje langer laat branden is dat niet zo erg. Ik weet nu pas dat dat het rebound effect heet alleen.

Code: rebound example PET {1-0}

P 4: Jeroen van den Eijnde - 4:18 [Maar aan de andere kant zie je..] (204:204)

Codes: [rebound example PET - Family: Rebound examples]

Maar aan de andere kant zie je met die PET flessen, dat dat bedacht is vanuit afval materiaal, om het circulair te maken, maar nu is dat zo succesvol geworden dat ze gewoon PET flessen gaan maken, puur om nieuwe fietsen te kunnen maken...

Code: rebound example return logistics and disassembly {3-2}

P 9: Iris van Wanrooij - 9:5 [het enige waar ik dan bijvoorb..] (25:25)

Codes: [rebound example return logistics and disassembly - Family: Rebound examples]

het enige waar ik dan bijvoorbeeld aan zit te denken is onze retourlogistiek, en onze ontmanteling. Ontmanteling gebeurt straks handmatig, dus door mensen met een afstand tot de arbeidsmarkt, maar straks uiteindelijk willen we dat wel machinaal gaan doen en dan gaat dat ook energie kosten natuurlijk en retourlogistiek kost natuurlijk ook energie want je moet vrachtautootjes laten rijden en die zouden anders niet rijden..

P 9: Iris van Wanrooij - 9:7 [Ja onze producten zijn ook qua..] (29:29)

Codes: [rebound example return logistics and disassembly - Family: Rebound examples]

Ja onze producten zijn ook qua prijs hetzelfde gebleven voor de consument. Onze circulaire schoenen zijn voor ons iets duurder om te produceren, maar die prijs hebben wij niet doorberekend aan de klant, de retourlogistiek is voor hun ook gratis. We hebben het wel zo geregeld dat ze andere persoonlijke beschermingsmiddelen ook kunnen inleveren en ook schoenen van andere merken kunnen inleveren maar daar moeten ze wel 35 cent voor betalen, maar dat betalen ze niet aan ons maar dat betalen ze aan onze partner die ook de retourlogistiek doet.

P 9: Iris van Wanrooij - 9:12 [ja precies, dus ja dat is eige..] (64:64)

Codes: [rebound example return logistics and disassembly - Family: Rebound examples]

ja precies, dus ja dat is eigenlijk heel leuk, het wordt ook al in de isolatiemarkt gebruikt, en ja daar wordt natuurlijk ook al vaak gebruikt textiel, dus ja weetje ik zie niet zo negatieve effecten behalve dan dat PU dan naar Portugal gestuurd moet worden, en inderdaad de retourlogistiek en de ontmanteling als we dat machinaal gaan doen.

Code: rebound example second hand clothing {1-0}**P 5: Peter Koppert - 5:5 [kijk als we meer 2ehands kledi..] (34:34)**

Codes: [rebound example second hand clothing - Family: Rebound examples]

kijk als we meer 2ehands kleding gaan gebruiken, en we ons minder in principe, minder verlaten op nieuwe kleding, dan vraag ik me af, wordt de 2^e hands kleding een add-on in onze kledingkast, of gaat dat echt nieuwe kleding vervangen?

Code: rebound example unnecessary downcycling {1-2}**P 5: Peter Koppert - 5:13 [Dus vandaar ook dat we dus van..] (112:112)**

Codes: [rebound example unnecessary downcycling - Family: Rebound examples]

Dus vandaar ook dat we dus van textiel toepassing naar textieltoepassing willen. En niet bijvoorbeeld, oja dat wilde ik zeggen, niet bijvoorbeeld een rebound effect van *klap jongens, we kunnen ook fantastisch behang materiaal of muurmateriaal van maken, dat wordt ineens helemaal hip en ineens iedereen die een muurtje maakt doet dat met jeans plaster ofzo, weetikveel, maar er is zo'n bedrijf die dat doet, ook een circle toegepast in Amsterdam, maar dan lekt die vezel op twee manieren weg. 1, er wordt een toepassing verzonden voor iets waar eerst helemaal geen textiel vezel voor nodig was, dus het vervangt helemaal geen virgin vezel voor het gebruikelijke textiel.

Code: rebound example: enlarging application of textile to facilitate suboptimal reuse {1-2}**P 5: Peter Koppert - 5:14 [dus dan lekt het eigenlijk het..] (116:116)**

Codes: [rebound example: enlarging application of textile to facilitate suboptimal reuse - Families (2): Dutch Circular Textile Valley, Rebound examples]

dus dan lekt het eigenlijk het voordeel, of de doelstelling van minder katoenvezel of minder virgin textielvezels gebruiken lekt dan weg omdat je het gebruik van textielvezels gaat vergroten.

Code: rebound example: useless new items {1-2}**P 7: Luc Kikkert - 7:7 [had bijvoorbeeld een mooi voor..] (41:41)**

Codes: [rebound example: useless new items - Family: Rebound examples]

had bijvoorbeeld een mooi voorbeeld van een busje zeep of deodorant, die helemaal ontworpen was van gerecycled plastic en de inhoud deo was ook het nodige mee gedaan, en dat was dan vele malen beter dan de andere deo. Dan stel ik de vraag: heb je überhaupt deo nodig? Dat is een waarde dat door marketing ons is wijsgemaakt.. In de jaren 30 hadden we een stukje zeep, en dat was het.

Code: rebound has behavior and technical dimension {1-0}

P 8: Michiel Westerhoff - 8:17 [Voor mij zegt dat rebound effe..] (78:78)

Codes: [rebound has behavior and technical dimension - Family: Rebound awareness]

Voor mij zegt dat rebound effect heel erg duidelijk wat ik eigenlijk al heel vaak zeg, er zijn eigenlijk in die hele circulaire wereld zitten er twee denkwerelden, een die heel erg hangt in de richting van gedrag, gedragsaanpassing, bewustwording, draagvlak vorming, een andere vorm van economie die niet meer gericht is op materiële consumptie en welvaart afmeten aan meer meer meer, dus dat is echt een gedragsverandering, en d'r is natuurlijk een lijn van denken die zegt van nee, dit is allemaal een kwestie van innovatie, nieuwe techniek, we kunnen met robots en met AI kunnen we en met allerlei andere zoals nanotechnologie en ga zo maar door wat er aan zit te komen, biochemie en dat soort dingen, kunnen we prachtige circulaire modellen maken

Code: rebound is a useful criticism to circular initiatives {1-0}

P 8: Michiel Westerhoff - 8:14 [, dus in die zin is het een nu..] (66:66)

Codes: [rebound is a useful criticism to circular initiatives - Families (3): Dutch Circular Textile Valley, Rebound awareness, Understanding Circularity]

, dus in die zin is het een nuttige kritische noot bij initiatieven die je neemt

Code: rebound is reverting back to / getting stuck in old behavior {1-0}

P 7: Luc Kikkert - 7:2 [want rebound is teruggaan in o..] (37:37)

Codes: [rebound is reverting back to / getting stuck in old behavior - Family: Rebound causes]

want rebound is teruggaan in oud gedrag,

Code: rebound might oversimplify circularity {1-0}

P 1: Traci Kinden - 1:3 [So I think the rebound effect ..] (17:17)

Codes: [rebound might oversimplify circularity - Families (2): Rebound awareness, Understanding Circularity]

So I think the rebound effect as it's described in the article that you sent is really, it's important to consider and I think it's valuable that these things are being brought up, but it also oversimplifies what real circularity is...

Code: rebound mitigation could have negative social consequences {1-1}

P 3: Esther Munoz Grootveld - 3:8 [laten we zeggen milieu-wise is..] (33:33)

Codes: [rebound mitigation could have negative social consequences - Family: Rebound mitigation]

laten we zeggen milieu-wise is dat een betere oplossing, als mensen dus niet voor de smartphone kiezen op het Afrikaanse continent, maar tegelijkertijd zorg je dan dat de economie daar niet verder gaat bloeien, er een onveiliger omgeving ontstaat, dat er geen vooruitgang staat, weegt dat dan op tegen...

Code: rebound mitigation through limiting turnover/demand {1-1}

P 7: Luc Kikkert - 7:26 [Nou laten we zeggen van goh ik..] (162:162)

Codes: [rebound mitigation through limiting turnover/demand - Family: Rebound mitigation]

Nou laten we zeggen van goh ik ben bezig met iets circulairs neer te zetten, en het is ook duurzaam en dat kan ik aantonen, maar het is dusdanig succesvol dat ik in een snaar niet gecontroleerd eronder moet zetten, want de vraag is gigantisch gestegen. Dan moet ik dus gaan borgen dat ik dus nee moet gaan zeggen tegen die vraag, totdat ik kan borgen dat dezelfde condities gelden als voor de eerste partij.

Code: rebound mitigation through positioning in the market {1-0}

P11: Pals Brust - 11:11 [ik denk dat je in je positione..] (181:181)

Codes: [rebound mitigation through positioning in the market - Family: Rebound mitigation]

ik denk dat je in je positionering van je product, en dat moet je even price-positioning, dus price tussen haakjes, maar het begint met price positining, en je hele positioneren, dat je daar hel erg mee kunt voorkomen dat rebound effect.

Code: rebound mitigation through sector cooperation? {1-3}

P 9: Iris van Wanrooij - 9:14 [. Dus in die zin, en ja en ind..] (83:83)

Codes: [rebound mitigation through sector cooperation? - Families (2): Need for supply chain collaboration & transparency, Rebound mitigation]

. Dus in die zin, en ja en inderdaad dat we met hun gaan samenwerken in de retourlogistiek bijvoorbeeld.

Code: rebound occurs between actors in the supply chain {1-2}

P 3: Esther Munoz Grootveld - 3:23 [laat je eigenlijk al die versc..] (164:164)

Codes: [rebound occurs between actors in the supply chain - Families (2): Need for supply chain collaboration & transparency, Rebound causes]

laat je eigenlijk al die verschillende stakeholders in hun eigen deel van de keten naar de rebound effecten kijken, maar de rebound effecten kunnen ook zitten in de aansluiting van de een op de andere, dus de een kan het heel goed doen, en de ander ook, maar doordat de processen niet op elkaar aangesloten zijn kan er bijvoorbeeld inefficiëntie plaatsvinden...

Code: rebound will decline when circularity increases past threshold {1-0}

P 7: Luc Kikkert - 7:1 [ja dit gaat misschien op maar ..] (33:33)

Codes: [rebound will decline when circularity increases past threshold - Family: Rebound mitigation]

ja dit gaat misschien op maar dit gaat op zolang we in een lineaire wereld zitten. Op het moment dat we zegmaar over het tipping point heen zitten en we zijn volledig circulair, dan denk ik dat de rebound minder zal zijn...

Code: rebound within planet boundaries is no problem? {2-0}

P 7: Luc Kikkert - 7:20 [a maar aan de andere kant, is ..] (89:89)

Codes: [rebound within planet boundaries is no problem? - Family: Rebound mitigation]

Ja maar aan de andere kant, is dat erg? Dat is niet erg op het moment dat het circulair is en binnen zeg maar de bandbreedte van die ene aarde past. Dus alles wat de aarde binnen een jaar kan regenereren.

P 7: Luc Kikkert - 7:30 [p het moment dat het effect oo..] (230:230)

Codes: [rebound within planet boundaries is no problem? - Family: Rebound mitigation]

p het moment dat het effect ook gebeurt op circulaire dingen en binnen de grens van die ene planeet, dan maakt het niet uit, dan mag je rebounden wat je wilt.. De vraag is dan wel, is het dan nog wel rebound?

Code: rebound: two steps ahead and one back: still progress {2-1}

P 6: Gerard Taat - 6:19 [maar je kunt ook redeneren, tw..] (126:126)

Codes: [rebound: two steps ahead and one back: still progress - Family: Rebound mitigation]

maar je kunt ook redeneren, twee stappen vooruit en 1 stap achteruit, dat is per saldo nog steeds een stap vooruit

P 6: Gerard Taat - 6:25 [en dus het proces in dit geval..] (132:132)

Codes: [rebound: two steps ahead and one back: still progress - Family: Rebound mitigation]

en dus het proces in dit geval is net zo belangrijk als het resultaat, en op het moment dat je met weinig stappen maar een groot bereik hebt aan partijen die dan met de transitie meegaan, dan heb je ook een heel belangrijk ding gewonnen, en ook als er nou wat rebound effecten aanzitten, maar het is wel de stap naar de volgende en dat moet je wel met z'n allen doen, dus het effect zit ook een beetje in massa van veel kleintjes maken ook een groot he

Code: recycling optimization leads to comfort in bad design {2-2}

P 2: Douwe Jan Joustra - 2:4 [Terwijl de relatie tussen End ..] (4:4)

Codes: [recycling optimization leads to comfort in bad design - Family: Integrated Design]

Terwijl de relatie tussen End of Use en zegmaar aan de voorkant van de recycling met degene die het design van het product doet, aan de voorkant van het product, dus voor de productiefase eigenlijk, als die connectie niet wordt gemaakt.. dan faciliteert je het bestaande systeem en dan gaat er dus niks veranderen want dan kan iedereen rustig achterover leunen want wat je ook in het afvalstelsel gooit het komt toch wel weer op een of andere manier eruit,

P 2: Douwe Jan Joustra - 2:6 [Maar je lost dus ook iets op w..] (12:12)

Codes: [recycling optimization leads to comfort in bad design - Family: Integrated Design]

Maar je lost dus ook iets op waardoor aan het begin niets hoeft te veranderen, want als je aan

het eind dus een oplossing gaat creeren, dan hoeven de designers er dus ook niet meer over na te denken...

Code: recycling optimization leads to rebound (behavioral, comfort) {1-1}

P 7: Luc Kikkert - 7:19 [En ja je kan inderdaad, en hee..] (85:85)

Codes: [recycling optimization leads to rebound (behavioral, comfort) - Family: Rebound causes]

En ja je kan inderdaad, en heel veel mensen maken nu de vertaalstag nog van ik gebruik veel spullen en die gooai weg, en straks kan ik nog meer spullen gebruiken want ik gooai ze niet meer weg, ze worden toch gerecycled.

Code: recycling optimization without design consideration facilitates current system {1-3}

P 2: Douwe Jan Joustra - 2:7 [Dus als je gaat investeren in ..] (20:20)

Codes: [recycling optimization without design consideration facilitates current system - Family: Integrated Design]

Dus als je gaat investeren in dat soort recyclinginitiatieven dan moet je je realiseren dat dat in principe bedoeld is om een tijdelijk probleem op te lossen, namelijk o al die bestaande kleding zijn op een foute manier gedesigned en geproduceerd, maar intussen ook acties ondernemen om fundamenteel wat te veranderen

Code: responsibility of EoL with individual consumer {1-0}

P 2: Douwe Jan Joustra - 2:8 [. Want nu, ligt de verantwoord..] (20:20)

Codes: [responsibility of EoL with individual consumer - Family: Need for supply chain collaboration & transparency]

. Want nu, ligt de verantwoordelijkheid van EoU bij de individuele consument, en die weet niet veel beter te doen dan het in het afvalstelsel te donderen, waarmee het dus afval wordt, en in principe laagwaardig materiaal, waar je met een beetje recycling nog kunt proberen om het nog iets hogerwaardiger resultaat uit te halen.

Code: risks and opportunities for DCTV {1-1}

P 1: Traci Kinden - 1:17 [great reports on shelves catch..] (68:68)

Codes: [risks and opportunities for DCTV - Family: Dutch Circular Textile Valley]

great reports on shelves catching dust. a lot of re-inventing of the same wheel. Could be a risk for the DCTV. Instead of papers, start doing more, connecting things that are being done to learn from each other. One of the things that will make that initiative really strong is their ability to come together.

Code: role of government {1-1}

P 6: Gerard Taat - 6:9 [Dat kan heel breed zijn, dat w..] (59:59)

Codes: [role of government - Family: Role of Government]

Dat kan heel breed zijn, dat wordt ook, veel voorkomende dingen zijn ook dat je, wetgeving bv die in de weg zit dat we die proberen op te rekken of te lobbyen dat dat ... wordt, of geld dat is ook natuurlijk altijd een belangrijk middel om dingen voor elkaar te krijgen, dat je zegt nou we proberen subsidies in het leven te gaan roepen om initiatieven te ondersteunen zodat het gaat werken,

Code: role of government: buy-in {1-0}

P 6: Gerard Taat - 6:8 [dus het systeem moet op gang w..] (59:59)

Codes: [role of government: buy-in - Family: Role of Government]

dus het systeem moet op gang worden gebracht, en daar zijn wij als overheid, we doen natuurlijk ook inkoop dus we zijn ook wel een kleine partij als je het over inkoop hebt, maar over het algemeen zijn we vooral degene die nja, de boel moeten aanjagen of en eventueel belemmeringen moeten proberen weg te nemen.

Code: role of government: creating awareness {1-1}

P 6: Gerard Taat - 6:12 [een rol van overheid kan ook z..] (71:71)

Codes: [role of government: creating awareness - Family: Role of Government]

een rol van overheid kan ook zijn, is informatie delen of informatie laten delen, dus bewustwording laten groeien.

Code: role of government: facilitating and stimulating {2-1}

P 6: Gerard Taat - 6:7 [Ik denk dat wij vooral een fac..] (59:59)

Codes: [role of government: facilitating and stimulating - Family: Role of Government]

Ik denk dat wij vooral een faciliterende rol hebben, maar ook een aanjagende rol hebben.

P 8: Michiel Westerhoff - 8:9 [En ook heel belangrijk in afva..] (24:24)

Codes: [role of government: facilitating and stimulating - Family: Role of Government]

En ook heel belangrijk in afval-land: wat is het beleid? Welke stimuli geeft de overheid, welke vergunning technische beperkingen zijn er.

Code: role of government: legislative flexibility {1-1}

P 8: Michiel Westerhoff - 8:8 [r, En ook heel belangrijk in a..] (24:24)

Codes: [role of government: legislative flexibility - Family: Role of Government]

r, En ook heel belangrijk in afval-land: wat is het beleid? Welke stimuli geeft de overheid, welke vergunning technische beperkingen zijn er.

Code: role of government: to organize meeting of stakeholders {1-1}

P 6: Gerard Taat - 6:10 [ja precies, ja dus wij zien he..] (63:63)

Codes: [role of government: to organize meeting of stakeholders - Families (2): Need for supply chain collaboration & transparency, Role of Government]

ja precies, ja dus wij zien het ook als een rol voor ons om dat soort kennismakingen te gaan organiseren. zoals nu ook met DCTV gaan doen, dat we willen gaan kijken of met de andere partij hoe je die partij die anders niet zo snel elkaar tegen waren gekomen hoe je die toch met elkaar kunt gaan verbinden, en dan te kijken wat komt daar dan uit, en wat voor een vorm van een ondersteuning is er nog nodig om dan daadwerkelijk iets te gaan laten vliegen.

Code: satiable demand: lower rebound proneness? {1-0}

P 9: Iris van Wanrooij - 9:6 [.. Maar aan de andere kant vei..] (25:25)

Codes: [satisfiable demand: lower rebound proneness? - Family: Rebound mitigation]

.. Maar aan de andere kant veiligheidsschoenen die gaan ongeveer een jaar mee, en die circulaire veiligheidsschoenen die gaan nog langer mee, dus het is bij ons niet het geval dat mensen dus meer veiligheidsschoenen gaan kopen, zoals je dat met kleding misschien wel

zou doen,

Code: stakeholders realize that collaboration is essential {1-2}

P 3: Esther Munoz Grootveld - 3:16 [n dat die ronde tafel gesprekk..] (64:64)

Codes: [stakeholders realize that collaboration is essential - Family: Need for supply chain collaboration & transparency]

dat die ronde tafel gesprekken over die circular textile valley een bewijs zijn van het feit dat alle losse spelers in de mode productie keten beginnen te beseffen dat ze met elkaar, beter met elkaar moeten praten,

Code: sustainable fashion includes a new consciousness {1-0}

P 3: Esther Munoz Grootveld - 3:1 [dus als ik het heb over duurza..] (11:11)

Codes: [sustainable fashion includes a new consciousness - Family: Contextual factors]

dus als ik het heb over duurzame mode heb ik het ook over een nieuwe bewustzijn onder consumenten

Code: system change progression {3-8}

P 1: Traci Kinden - 1:10 [so rethinking the business mod..] (45:45)

Codes: [system change progression - Family: Need for supply chain collaboration & transparency]

so rethinking the business model from the brand side of things, fundamentally rethinking and reshaping consumption and usage and valorization of resources, all of that actually needs to come along, it won't be just one big click over and everyone will be happy, it will be a progression, that actually needs to come along to make it feasible, but also reshaping the supply chain.

P 2: Douwe Jan Joustra - 2:9 [En daar hebben ze 6 pathways g..] (20:20)

Codes: [system change progression - Family: Need for supply chain collaboration & transparency]

En daar hebben ze 6 pathways geïdentificeerd, en op ieder van die pathways moet je iets gaan doen, want als je maar op 1 concentreert, dan gaat er geen versnelling plaatsvinden, dan ga je hooguit een onderdeeltje optimaliseren.

P 6: Gerard Taat - 6:24 [ook wel belangrijk is om te re..] (132:132)

Codes: [system change progression - Family: Need for supply chain collaboration & transparency]

ook wel belangrijk is om te realiseren is dat dit eigenlijk een hele systeem verandering met zich mee moet brengen,

Code: take responsibility for staying within planetary boundaries {3-0}

P 7: Luc Kikkert - 7:24 [dus je moet op een gegeven mom..] (134:134)

Codes: [take responsibility for staying within planetary boundaries - Family: Integrated Design]

dus je moet op een gegeven moment zeggen van oke, als je dan ieder seizoen of half seizoen zelfs een veranderd modebeeld wilt gaan creeren, dan moet je dat binnen de grenzen van de planeet doen. En, maar dan wel voor verantwoordelijkheid voor je volledige keten, anders ben je inderdaad alleen maar aan het vermeerderen.

P 7: Luc Kikkert - 7:25 [er zijn wel tools waarmee je, ..] (142:142)

Codes: [take responsibility for staying within planetary boundaries - Family: Integrated Design]

er zijn wel tools waarmee je, ik weet dat.. hoe heten ze ookalweer die zijn bezig met one planet thinking, en binnen one planet thinking probeert men terug te komen naar die ene Aarde. Dat kun je alleen maar doen als je totale verbruik van natuurlijke waarde dusdanig is, je energie gebruik, grondstoffen gebruik dusdanig is dat de aarde het kan regenereren in de periode van gebruik.

P 7: Luc Kikkert - 7:43 [Maar op dit moment zijn zulke ..] (320:320)

Codes: [take responsibility for staying within planetary boundaries - Family: Integrated Design]

Maar op dit moment zijn zulke dingen misschien wel 100% natuurlijk maar dat wil niet zeggen dat het 100% circulair is en dat wil ook niet zeggen dat ze binnen de grenzen van onze planeet blijven.

Code: technical and behavioral change work hand in hand {1-0}

P 8: Michiel Westerhoff - 8:20 [het is meer een wisselwerking,..] (90:90)

Codes: [technical and behavioral change work hand in hand - Family: Contextual factors]

het is meer een wisselwerking, wij denken op de manier die de techniek ons toelaat, de invloed op ons denken bijvoorbeeld van de computers, het feit dat wij onze.. gaan denken in termen van onze harde schijf zit tussen de oren, zo'n soort wereldbeeld, dat komt door de techniek. Aan de andere kant is er natuurlijk ook heel veel wensdenken die zeg maar uit de verbeelding komt die techniek vormt, dus het is een wisselwerking.

Code: textile as secondary material for different industry {1-0}

P 9: Iris van Wanrooij - 9:17 [Ik vind het wel belangrijk dat..] (115:115)

Codes: [textile as secondary material for different industry - Family: Dutch Circular Textile Valley]

Ik vind het wel belangrijk dat het wel uiteindelijk, dat er meer gebruik wordt gemaakt van secundair materiaal, maar dat mag van mij ook zo zijn dat textiel ervoor zorgt dat het een secundair materiaal voor een andere industrie wordt.

Code: the goal is to phase out or minimize virgin material use {2-1}

P 5: Peter Koppert - 5:12 [De doelstelling van die circul..] (112:112)

Codes: [the goal is to phase out or minimize virgin material use - Family: Integrated Design]

De doelstelling van die circulariteit is, minder beslag op virgin grondstoffen.

P 8: Michiel Westerhoff - 8:38 [Uiteindelijk wil je natuurlijk..] (177:177)

Codes: [the goal is to phase out or minimize virgin material use - Family: Integrated Design]

Uiteindelijk wil je natuurlijk virgin materiaal uitfaseren, of minimaliseren,

Code: there is no balance between creators and extractors of value {1-1}

P 8: Michiel Westerhoff - 8:23 [s de balans in onze economie t..] (107:107)

Codes: [there is no balance between creators and extractors of value - Family: Value Perception]

de balans in onze economie tussen de mensen die waarde creëren en mensen die waarde onttrekken is helemaal zoek.

Code: Thriftshops are highest rank of circular value {1-0}

P 8: Michiel Westerhoff - 8:33 [Kringloop bedrijven in Nederla..] (141:141)

Codes: [Thriftshops are highest rank of circular value - Families (2): Dutch Circular Textile Valley, Value Perception]

Kringloop bedrijven in Nederland draaien voor het overgrote deel van de opbrengst die ze van textiel krijgen. Die worden niet gesubsidieerd door het rijk, terwijl vanuit circulair oogpunt is kringloop, is het allerhoogste dinges, die zou de grootst mogelijke waarde moeten hebben,

Code: to map/measure rebound you need all the players around the table {1-2}

P 3: Esther Munoz Grootveld - 3:15 [, denk ik, om dat rebound effe..] (57:57)

Codes: [to map/measure rebound you need all the players around the table - Families (2): Need for supply chain collaboration & transparency, Rebound mitigation]

, denk ik, om dat rebound effect echt heel goed in kaart te hebben, moet je echt alle stemmen aan tafel hebben,

Code: transition of values will push decline of rebound {1-0}

P 7: Luc Kikkert - 7:4 [En op het moment dat je de waa..] (37:37)

Codes: [transition of values will push decline of rebound - Families (2): Rebound mitigation, Value Perception]

En op het moment dat je de waarde transitie hebt gedaan, want het moet een transitie van waarde zijn, dan zul je het rebound effect zien afnemen.

Code: transition to circular economy is transition of values {4-2}

P 7: Luc Kikkert - 7:5 [voor mij is de transitie naar ..] (41:41)

Codes: [transition to circular economy is transition of values - Families (2): Understanding Circularity, Value Perception]

voor mij is de transitie naar de circulaire economie, voor mij is het geen materialen transitie, het is een waarde transitie.

P 7: Luc Kikkert - 7:10 [het is een waardetransitie, he..] (57:57)

Codes: [transition to circular economy is transition of values - Families (2): Understanding Circularity, Value Perception]

het is een waardetransitie, het is geen materiaal-transitie

P 7: Luc Kikkert - 7:31 [Het diepere probleem zal waard..] (234:234)

Codes: [transition to circular economy is transition of values - Families (2): Understanding Circularity, Value Perception]

Het diepere probleem zal waarde zijn. Waardepercepsie.

P 7: Luc Kikkert - 7:38 [Hoe kijk je dus tegen de waarde..] (302:302)

Codes: [transition to circular economy is transition of values - Families (2): Understanding Circularity, Value Perception]

Hoe kijk je dus tegen de waarde van het product aan, kijk je tegen de waarde van het product aan vanuit een bezit principe, want daar is ons model op gebaseerd, het is niet gebaseerd op wat voor een functie heeft het voor mij en wat voor waarde hecht ik aan die functie, nee, het is gebaseerd op de waarde van het bezit.

Code: transition to PSS is very capital intensive {2-0}

P 7: Luc Kikkert - 7:34 [Het is wel zo dat de transitie..] (286:286)

Codes: [transition to PSS is very capital intensive - Family: Obstacles to system progress]

Het is wel zo dat de transitie van product leveren aan een klant naar product as a service, die is gigantisch kapitaal intensief..

P 7: Luc Kikkert - 7:35 [Nou ja wel ook een kapitaalpro..] (290:290)

Codes: [transition to PSS is very capital intensive - Family: Obstacles to system progress]

Nou ja wel ook een kapitaalprobleem, want de transitie kost eenmalig heel veel geld.

Code: valorizing elimination of waste {1-1}

P 1: Traci Kinden - 1:11 [valorizing economically the re..] (45:45)

Codes: [valorizing elimination of waste - Family: Value Perception]

Valorizing economically the reduction or elimination of waste,

Code: value concept has become diluted {2-3}

P 7: Luc Kikkert - 7:11 [Het werd toen gewoon een verbr..] (61:61)

Codes: [value concept has become diluted - Family: Value Perception]

Het werd toen gewoon een verbruikseconomie, en daardoor is het begrip waarde, of iets waardevol vinden is vervaagd.

P 7: Luc Kikkert - 7:39 [En dat is wat fundamenteel mis..] (302:302)

Codes: [value concept has become diluted - Family: Value Perception]

En dat is wat fundamenteel miszit in ons waardepatroon, en dat is ook waarom veel bezit = rijkdom, denken we. Terwijl ik denk, nee, intensieve belevenis is rijkdom. Maar dat is de klim die we als mensheid moeten gaan maken. En daar dan ook, ons verbruik van producten aan koppelen..

Code: value needs to mean more than economic value {2-3}

P 7: Luc Kikkert - 7:13 [Dus we moeten een veel beter b..] (77:77)

Codes: [value needs to mean more than economic value - Family: Value Perception]

Dus we moeten een veel beter begrip van die waarde hebben en weggaan van alleen maar die economische waarden van winst en verlies..

P 7: Luc Kikkert - 7:32 [er zit een andere drive achter..] (256:256)

Codes: [value needs to mean more than economic value - Family: Value Perception]

er zit een andere drive achter dan alleen geld maken, en daar zul je tegenaan gaan lopen.. maar dat is dan ook gelijk de waarde discussie.. Massa bedrijven, zoals Action en Primark, die zijn er puur om zoveel mogelijk massa om te zetten, zoveel mogelijk materiaal rondstromen, zodat ze daar een lage marge op kunnen houden, dus dan gaat het om massa. Maar dat is een perverse waardedrijver, en op het moment dat je daar echt de waarde van de materialen en het misbruik van de aarde in weet te stoppen, dan stopt dat vanzelf.

Code: we cannot continue growing, so who needs to make concessions? {2-1}

P 3: Esther Munoz Grootveld - 3:10 [we mogen gewoon eigenlijk niet..] (37:37)

Codes: [we cannot continue growing, so who needs to make concessions? - Family: Obstacles to system progress]

we mogen gewoon eigenlijk niet meer groeien, we zouden moeten krimpen, maar dat wil niemand,

P 3: Esther Munoz Grootveld - 3:11 [Ja, wie gaat er concessions doe..] (41:41)

Codes: [we cannot continue growing, so who needs to make concessions? - Family: Obstacles to system progress]

Ja, wie gaat er concessions doen..

Code: we don't know the true value of our clothing {2-4}

P 3: Esther Munoz Grootveld - 3:3 [we kennen de waarde van het kl..] (6:6)

Codes: [we don't know the true value of our clothing - Family: Value Perception]

we kennen de waarde van het kledingstuk niet mee

P11: Pals Brust - 11:13 [a ik denk dat je met je prijs ..] (199:199)

Codes: [lowering prices inhibits creating awareness on true pricing - Family: Need for supply chain collaboration & transparency] [we don't know the true value of our clothing - Family: Value Perception]

Ja ik denk dat je met je prijs positioneren toch wel enigszins iets aan kan doen, en bewustwording van de consument dan het geen wegwerpitem is,

Code: wrong business model for second hand textiles {2-1}

P 8: Michiel Westerhoff - 8:34 [ook door de exporteren en voor..] (145:145)

Codes: [wrong business model for second hand textiles - Families (2): Circular Business Models, Dutch Circular Textile Valley]

ook door de exporteren en voor de hoogste bieder weg te doen want dat is het geld dat ze gebruiken om hun kringloopwinkel te runnen, dat is natuurlijk een helemaal verkeerd financieringsmodel,

P11: Pals Brust - 11:8 [Dus er zijn heel veel dingen d..] (97:97)

Codes: [wrong business model for second hand textiles - Families (2): Circular Business Models, Dutch Circular Textile Valley]

Dus er zijn heel veel dingen die daar spelen, je zult hier met incentives moeten werken, a) voor de inzamelaars om te zeggen ja die prijs moet lager, zodat zij ook daarmee aan de slag kunnen gaan, het tweede is ook dat je misschien als overheid wel net als bij karton en bij glas, een statiegeld principe toepassen, waardoor je fondsen kunt krijgen om dingen mee te gaan ontwikkelen en om business modellen te realiseren. wat dacht je bijvoorbeeld als je circulair

garen op 6% zet, het laagste btw tarief, ook dan zul je zien dat er een aantal business modellen gaan werken.
