

# “The sustainable development way of implementing circular economy”

A system thinking approach

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## **Abstract**

This study aims to develop an understanding of how circular economy should be implemented to result in sustainable development and to analyze the potential of one particular implementation to result in sustainable development. “The sustainable development way of implementing circular economy” is presented by understanding circular economy with system thinking and considering the factors affecting the implementation of circular economy. Interviews and text-analysis are conducted to analyze the character and potential of ReTuna, a reused items mall in Eskilstuna, to result in sustainable development. Results show circular economy should be implemented as a way of reasoning that can result in a systemic transformation of the economic system to result in eco-centric sustainability. Implementations that do not explicitly derive from an understanding of circular economy as a new way of reasoning are despite this valuable due to a system’s character of interconnectedness. ReTuna is implemented as a set of practices and an organizational structure but it also demonstrates an honorable effort to change people’s perception of the human-nature relationship. It is concluded that way of implementation has to reflect and be synchronized with the aspiration behind implementing circular economy. ReTuna has potential to result in sustainability but does not yet.

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# 1. INTRODUCTION

## 1.1. Background

Sustainable development is on the agenda around the world. Globally, nationally and locally, governments as well as other concerned actors are looking for the right ways to address climate change and other environmental as well as social and economic problems. One solution that has gained a lot of ground during the last couple of years is to implement and facilitate a transition of society to circular economy. Circular economy has been adopted by the EU and in the EU Action Plan for Circular Economy, ‘Closing the Loop’ circular economy is described as “...an essential contribution to the EU's efforts to develop a sustainable, low carbon, resource efficient and competitive economy. Such transition is the opportunity to transform our economy and generate new and sustainable competitive advantages for Europe” (European Commission, 2015). Although there are some critics that dismiss the idea entirely, mostly because of different perceptions of what sustainability really is, it has become a political priority to work with circular economic principles as a way to ensure sustainable development. Acknowledging the critique but yet accepting that circular economy seems to be perceived as the path forward, the focus of this study is to understand how circular economy can be implemented to make best use of its potential to result in sustainability.

Abson et al. stress that today, *humanity remains on largely unsustainable development trajectories. Partly [this is] due to the failure of sustainability science to engage with the root causes of sustainability* (Abson et al., 2017:30). To ensure a sustainable development Abson et al. argue that sustainability interventions have to be more powerful than many of them are today due to their limited potential to result in transformational change (Abson et al., 2017). This view is in line with an eco-centric understanding of what sustainability is meaning development has to occur within the Earth's planetary boundaries to be sustainable (Folke et al., 2016). For circular economy, this implies that its potentiality to result in sustainable development will depend on what types of innovations are brought forward and implemented. This in turn, depends on how the concept of circular economy is understood and defined which has appeared to be an increasingly debated topic.

As it turns out, many scholars state that there is still no unanimous understanding of circular economy (Kirchher et al., 2017; Murray et al., 2015; Prieto-Sandoval et al., 2018). The definitions vary widely between a set of practices in production and waste management, a new business model and an economic system that represents a new way of thinking about the human-nature relationship. The general aim is to redefine growth, decouple economic activity from resource extraction and start to introduce a waste equal food way of thinking about material (Webster, 2013). Sometimes the definition is a compilation of all the above constituents and other times only a few are included in the definition which as will be seen in this study has an impact on how circular economy is implemented and on its potential to result in sustainable development. Realizing and accepting the variances abound to the interpretation of the concept of circular economy, the way forward in this study will be to make use of the perspective of system thinking when trying to understand circular economy. Ultimately, or initially maybe, circular economy is an idea of a system that structures economic activity in new ways (Huamao

& Fengqi, 2007). This makes it relevant and helpful to use the perspective of system thinking and the model of the “iceberg” as a way to structure and conceptualize the constituents of circular economy. The “iceberg”, as Kim describes it, consists of systemic structures, patterns and events (Kim, 1999) and using this framework will provide a method for understanding circular economy as a concept that can be described as events and patterns as well as systemic structures simultaneously. Using this framework might also serve to offer an explanation for the wide variety of definitions that exist of circular economy. Really, the many definitions describe the same thing but at different levels of the “iceberg” making them hard to compare and unify into one single understanding of the concept.

## **1.2. Aim and research questions**

The aim of this study is twofold. First, it is to understand how circular economy should be implemented to result in sustainable development and to provide an analytical framework describing “The sustainable development way of implementing circular economy”. This requires a review of and understanding for how circular economy is implemented differently depending on how it is defined and understood as well as to investigate what affects the potential of a circular economy implementation to result in sustainable development. This in turn includes understanding what contextual factors affect the implementation of circular economy and how the character of an implementation affects what outcomes can be expected. As will be seen, understanding the concept differently has big implications for what eco-innovations are brought forward and at what points of the system they are intervening. The system thinking perspective that will be further introduced later on in the paper will be used to explain how circular economy is implemented differently depending on how it is defined and what outcome can be expected from different implementations of circular economy. The dependency on eco-innovations for a transition towards circular economy (Prieto-Sandoval et al., 2018; de Jesus & Mendonça, 2018) also makes it relevant to include what contextual factors that constrain or facilitate eco-innovations in the understanding of what affects the potential of circular economy to result in sustainable development. The analytical framework that suggests what “The sustainable development way of implementing circular economy” is will be informed by the findings of the following two research questions:

- How is circular economy implemented differently depending on how the concept is understood and defined?
- What affects the potential of an implementation of circular economy to result in sustainable development?

The second aim of the study is to analyze the character of a particular implementation of circular economy and what potential it has to result in sustainable development. The chosen case of interest is ReTuna, a reused goods mall in Eskilstuna. The implementation of circular economy by the way of ReTuna will be described in terms of its character and the context it is implemented too. ReTuna has become a flagship for the municipality’s work with circular economy and the establishment has been acknowledged as an interesting and inspiring way to facilitate a transition to a circular economy nationally as well as globally. Using the analytical framework presented in this study the bits and parts of the implementation of circular economy by the way of ReTuna will be analyzed for its potential to result in sustainable development. ReTuna

is observed in awe and wonder around the world but what is really the potential of this kind of implementation to result in sustainable development? This question will be addressed by applying the analytical framework developed from the findings in the first part of the study. The following research questions reflect the second aim of the study:

- How can the implementation of ReTuna be understood and explained?
- How does the implementation of ReTuna reflect “The sustainable development way of implementing circular economy”?

### **1.3. Disposition**

The paper will start with a description of the research design and the methods that have been applied in the study. It includes a critical review of the methods chosen and how it affects the reliability and validity of the study. After reviewing the research design, attention is turned to the theoretical ground of the thesis. Starting with outlining what system thinking is the following part addresses the general traits of circular economy by describing the implementation of circular economy from an eco-innovations perspective and the principles of circular economy; closing the loop and the 3R’s principles. Hereafter, the first research question posed in the study is addressed; how is circular economy implemented differently depending on how the concept is understood and defined? The concept is defined in accordance with the metaphor of the “iceberg” and results in a conceptualization of circular economy into three categories; as a set of practices, an organizational structure and a way of reasoning all of which entail different ways of implementing circular economy. Next, the second research question; what affects the potential of an implementation of circular economy to result in sustainable development?, is addressed from a system thinking perspective and by identifying the drivers of and barriers for circular economy. Also, some of the critical viewpoints on the potentiality of circular economy to result in sustainability are presented. Analyzing the theoretical contributions add up to a concluding understanding of what “The sustainable development way of implementing circular economy” is. Having defined what “The sustainable development way of implementing circular economy” is, the paper continues by describing the results of the third research question; how can the implementation of ReTuna be understood and explained? First, ReTuna, the chosen implementation of circular economy in the study, is described according to the categories used when addressing the first research question, as a set of practices, an organizational structure and a way of reasoning. The analysis of what implementations of circular economy ReTuna consist of is followed by a review of the contextual factors that have contributed to the implementation and existence of ReTuna. In the forthcoming section, the results from the previous analysis are discussed in relation to the analytical lens presented in the paper, “The sustainable development way of implementing circular economy” thereby addressing the fourth research question posed in the study; how does the implementation of ReTuna reflect “The sustainable development way of implementing circular economy”? Lastly, the conclusions that are allowed to be drawn are presented by discussing the results of the study.

## **2. RESEARCH DESIGN**

This qualitative study uses a system thinking perspective to explain and understand the concept of circular economy and how it can be implemented most successfully if the object is to deliver the changes necessary to ensure a sustainable development of

society. After a narrative review of literature, system thinking was used to frame the definitions and implementations of circular economy found in academic contributions in a way that put light on their potential to result in sustainability. The method offers a restructured way of how to understand circular economy and an analytical lens that suits the second purpose of this study, to analyze the potential of circular economy to result in sustainable development.

The conceptualization of circular economy in terms of how it should be implemented to result in sustainable development is applied in a case study of ReTuna, a reused items mall in Eskilstuna municipality in Sweden. The case study design allows for a thorough analysis of one special object of interest and in this study ReTuna represents an exemplifying case (Bryman, 2012) describing a way of implementing circular economy. ReTuna was chosen because it is considered a successful implementation of circular economy making it interesting to analyze what the true potential of this type of implementation to result in sustainability really is.

## **2.1. Establishing an analytical framework**

In this study, a theoretical explanation or hypotheses (Bryman, 2012) for how circular economy should be implemented to result in sustainable development is carried forward as “The sustainable development way of implementing circular economy”. This is done by combining a new, system thinking based conceptualization of circular economy with theoretical views on what affects if an implementation of circular economy can be facilitated and result in sustainable development.

To understand and define circular economy from a system thinking perspective, a new conceptualization of circular economy on the basis of system thinking were established. With system thinking and the model of the “iceberg” which suggests the society consist of events, patterns and systemic structures the purpose was to identify a new way of categorizing circular economy that would show how differently circular economy is implemented on different system levels.

To suggest a new conceptualization, literature were reviewed and analyzed qualitatively by content for the purpose of identifying common ways of defining circular economy as well as different implementations of circular economy. Different definitions and implementations of circular economy were defined, and each connected to three categories which were re-categorized over time.

The literary contributions that were included in the analysis are academic articles presenting research in which a large number of articles on the subject of circular economy have been reviewed. This has allowed for an inclusion of a lot of material that would otherwise not have been possible to include within the time frame of this study. The character of the articles as secondary sources poses an increased risk that the authors’ way of presenting their material has an impact on what definitions and implementations of circular economy have been put forward in the material, possibly affecting the conceptualization of circular economy that is provided in this study. The definitions and implementations identified in the literature were then combined with the model of the “iceberg” which resulted in a conceptualization of circular economy as a set of practices, an organizational structure or a way of reasoning. This way, the new categorization of circular economy has been grounded in theoretical contributions which

increase the validity of the conceptualization of circular economy that is put forward in the study.

After circular economy had been conceptualized into three new categories; as a set of practices, an organizational structure and a way of reasoning, the different implementations of circular economy found in the literature review were coded and presented accordingly. The categorization reflects their potential to result in sustainable development from a system thinking perspective. The three categories represent different implementations of circular economy in terms of where they intervene in a system and accordingly in terms of their potential to result in sustainable development.

After a review of literature that poses critique on the possibility for circular economy to result in sustainability, challenges were identified and analyzed from a system thinking perspective and with the new conceptualization of circular economy in mind. This way, the critique was connected to the different categories and implementations of circular economy rather than to the whole concept. The content analysis of critique towards circular economy contributes to the understanding of how circular economy should be implemented to result in sustainable development.

The outcome that can be expected from implementing circular economy as described in the different categories is explained theoretically with system thinking and with regards to the reliance on eco-innovations. These theoretical contributions in combination with the analysis of critique towards circular economy and the new conceptualization of circular economy add up to the establishing of an analytical framework that describes “The sustainable development way of implementing circular economy”.

## **2.2. Case study**

The second part of the study is conducted as a case study in which the analytical framework that has been established in the study is applied to analyze the potential of an implementation circular economy to result in sustainable development. Case study data was collected with a multi-method approach by conducting interviews and by doing text analysis of public documents and other public information about ReTuna.

The sampling of interviewees and documents in the case study was purposive (Bryman, 2012) meaning they were chosen for the purpose of answering the research questions posed in the study. More material was added sequentially as new data that pointed towards the meaning of analyzing other data emerged in the interviews. To answer the questions posed in the study, data about what ReTuna is and what activities it consists of was needed as well as answers to why ReTuna was implemented. Second, data about what have contributed to make the implementation possible as well as what actors have been involved were needed. To withhold this data, information about ReTuna on the website of ReTuna, on the municipality’s website and on the municipal company EEM’s (Eskilstuna energi och miljö) website were first analyzed. Then, interviews were conducted with the manager of ReTuna, Anna Bergström, and an environmental strategist at the municipality who were involved when ReTuna was established, Lars Wiklund. The Eskilstuna municipality’s waste plan was also reviewed.

The interviews were semi-structured interviews conducted by phone. The lengths of the interviews were about 30 minutes each and questions were asked about what ReTuna is, how and why it exists and what has contributed to its existence. In addition to this,

questions were asked about the municipality's, as well as other actors' role in the existence and implementation of ReTuna. The data used in the case study mostly provided a view of what ReTuna is from the eyes of the interviewees. By conducting more interviews or doing an observational study, the analysis might have taken another direction. On the other hand, the interviewees that were chosen for the study are probably among the people who have the most knowledge about what ReTuna is and what it consist of since they are running the organization daily and were involved in the implementation phase respectively. It also gave insight in the future of plans of ReTuna. The view they give of what ReTuna is and consist of is though a subjective and perhaps a bit partial one. It could be interesting to include how local citizens or visitors to ReTuna perceive what ReTuna is or how the business managers would describe ReTuna. By doing an observational study the information provided by the interviewees about what ReTuna is could be double-checked as a way of interpreting the objectivity of the interviewees' responses.

The texts and documents that were studied were analyzed by content. A qualitative content analysis signifies "*a searching-out of underlying themes*" (Bryman, 2012:557) and in this study the theme was circular economy by reflection of ReTuna with special attention given to the system thinking conceptualization of circular economy.

The data withheld in the case study was presented and structured in accordance with the categorization made of circular economy implementations from a system thinking perspective. Data was analyzed and presented in regards to how ReTuna reflects implementations that can be fitted into one of the three categories. An analysis of what contextual factors that have contributed to the existence of ReTuna is also made from the data withheld. Lastly, the results of the case study analysis are discussed in terms of how the implementation of ReTuna corresponds to the analytical framework presented in the study.

### **2.3. Critical review of research design**

It is valuable to conduct qualitative research due to the opportunity it gives to provide explanations and descriptions of things (Bryman, 2012). Also, it provides the opportunity to understand the context and settings of the case studied. By describing and understanding contextual details, information that would not have been made accessible with quantitative methods are made visible. For the purpose of this study the qualitative approach makes it possible to understand the small parts and details of the implementation of ReTuna which is necessary to analyze in order to understand what it is that makes ReTuna an implementation that reflects "The sustainable development way of implementing circular economy" or not. A risk when describing the details of things is to become too subjective and allowing underlying meanings and understandings of things inform the result (Bryman, 2012). To make sure the analysis of the implementation of ReTuna remained objective, a framework well-grounded in theory were used to identify what types of circular economy ReTuna reflects. Including other material in the development of the theoretic framework might have given other results but the theoretical contributions that have formed the understanding of what "The sustainable development way of implementing circular economy" is are explicitly reviewed for throughout the presentation of the study clarifying what findings are made and why.

Qualitative research is also criticized for bringing about results that are hard to generalize (Bryman, 2012). For this study, being a description of one particular case, the ability to contribute with generalizations is improved due to the detailed analysis carried out. The details about the context explain the setting and help to understand why the results are what they are. This makes it possible to use parts of the results in other contexts, being aware of what has contributed to and affected the results. The reliability of the results could be improved by enlarging the study by including more data material in the case study and literature contributions to the conceptualization of circular economy.

### **3. THEORETIC FRAMEWORK**

#### **3.1. System thinking**

It is not only relevant to discuss the theory of system thinking due to the fact that circular economy in many ways has emerged from system theory (Huamao & Fengqi, 2007) but also because it offers another perspective for how to understand the world and activities around us, including circular economy. With systems thinking, change and processes can be described and analyzed as parts of a whole system, meaning that the system itself and its characteristics are also important to understand in order to explain the outcome of intervening in a particular part of a system. The importance of a comprehensive approach which considers the interaction of different dimensions has been acknowledged for the purpose of addressing sustainability issues (Abson et al., 2017). Often, sustainability is addressed in disciplinary perspectives with the result that the important, structural problems that cause the problems remain impossible to solve (Abson et al., 2017).

In the field of sustainability science the aim is innovating solutions to the problems of environmental degradation, natural resource depletion and societal issues etc. Acknowledging a systemic structure of society, the solutions can become system-oriented and interventions can be directed to the components of the systems that most effectively will result in change of the entire system. Depending on what system properties an intervention acts upon, the transformational change that can be expected of that intervention to the system differs (Abson et al., 2017). To understand to where in the system interventions should be targeted to obtain structural and comprehensive change the characteristics of a system will first be described.

#### ***System characteristics***

A system has a specific purpose, known or unknown, and consists of interrelated and interacting parts that together form a whole, a system (Kim, 1999). The purpose given to a system does not necessarily reflect the purpose of the system itself but are namely the result of the mindset of actors that shape the direction to which a system is oriented (Abson et al., 2017). Abson et al. use the word intent to describe the system characteristics that reflect the norms, values and goals of the system (Abson et al., 2017).

The arrangement of the parts of a system strives towards optimality and if changes occur the systems performance is affected. Changing the structure of the system or the design of a system (Abson et al., 2017) entails changing the social structures and

institutions that inform information flows, rules, power and self-organization. Likewise, the input and output of parts will affect the structure and functioning of a system (Kim, 1999).

Also, a system is characterized by its aim towards stability through feedback which is important to understand to be able to understand how a system reacts to change. Feedback is most commonly information that tells the system it has diverted from its desired state aiming to make the system restore (Kim, 1999). The feedbacks drive the internal dynamics of a system and what it means is that a system's stability will be withheld by actions that push back when change occur. Balancing loops produce change that can counteract change that has caused a gap between the actual and desired level of the system (Kim, 1999). There are also reinforcing processes that explain the functioning of a system. In these cases, the system is informed to successively add to the changes making the process of change continue towards whatever optimality the system strives for. The system can behave in desirable as well undesirable ways as a result of reinforcing processes and when they are undesirable, there are hopefully balancing loops ready to kick in and restore the system (Kim, 1999). Feedbacks can be delayed for physical, transactional, informational or perceptual reasons making the system's behavior unpredictable and difficult to foresee (Kim, 1999). According to Kim, not giving attention to the delays of a system adds a layer of misperception to the production of aspired results (Kim, 1999).

There are also mechanistic parameters of a system, for example taxes, subsidies and standards (Abson et al., 2017). These along with the physical elements of a system are system characteristics that tend to be easier to change since their connectivity with the rest of the system is small, thus also implying that the overall functioning of the system will stay the same.

Using the metaphor of an iceberg, Kim describe how deep systemic structures have a large impact on what patterns and events humans are faced with in their daily lives. (Kim, 1999). The tip of the iceberg is the events or occurrences that people meet with on a daily basis. The events are simple and taken out of their relationship with other events but put together more than one event form a pattern. Patterns reveal observable trends and are although difficult to see, structured by the way the system is organized, the bottom of the iceberg. Realizing this, it becomes clear that interacting with and imposing change to a system will have different outcomes depending on what level of the system is affected. It also entails, as Kim states, that it is far more efficient to work on the system than within the system (Kim, 1999) if the goal is to create social transformative change.

### ***Leverage points***

The system characteristics presented above reflect the places to intervene in a system. Abson et al divide the places into deep and shallow leverage points; the deeper into the system intervention is implemented the wider and more systemic will the change be. Although interventions made in the shallow parts of the system are easier to implement, the effect of those interventions will be less effective (Abson et al., 2017). Imposing change to the intent or design of a system reflects deep leverage whereas changing the feedbacks or parameters of a system reflects shallow leverage.

The strength of using a systems thinking perspective is that it allows for an understanding of things that goes beyond the cause and effect model of addressing problems. With system's thinking the understanding of *what* can develop to an understanding of *why* and *how* things happen (Kim, 1999). For the study described in this paper, the framework for systems thinking will first be used to define the concept of circular economy. Second, systems thinking will be used to understand how a system reacts to change, to enlighten what can be expected from implementing different eco-innovations. Being aware of the different potential of establishing system wide change at different levels of the system, understanding circular economy from a systems thinking perspective will clarify what outcomes can be expected when implementing circular economy differently depending on how the concept is defined.

## **3.2. Understanding circular economy**

### **3.2.1. Implementing circular economy from an eco-innovations perspective**

Some say circular economy is a way of delivering a new industrial revolution (de Jesus & Mendonça, 2018) It represents a transition that will change the system of production and consumption as well as how communities function, maybe the entire economic system. At the core of the proposed systemic shift of society are eco-innovations that have the potential to deliver value for human and nature simultaneously, that way contributing to the goal of sustainable development (Prieto-Sandoval et al, 2018; de Jesus & Mendonça, 2018; European Union, 2015). In de Jesus and Mendonça's words, eco-innovations are "*new or improved socio-technological solutions that preserve resources, mitigate environmental degradation and /or allow recovery of value from substances already in use in the economy*" (de Jesus & Mendonça, 2018:77). The eco-innovations should be systemic and contribute to the creation of new functional systems that enables a holistic transformation of society in order to result in an eco-centric type of sustainable development (European Union, 2015).

The eco-innovations acquired to facilitate the move forward for circular economy are according to Prieto-Sandoval et al. ranging from product- and process innovations, business model and service innovations, organizational and network innovations to market innovations as well as customer engagement innovations (Prieto-Sandoval et al., 2018). Process and product innovations refers to companies' production patterns and business model and service innovations signify developing new ways for companies to create value as well as ways of decreasing ownership and enabling that products are used more than once by different people. Network innovations regard how companies can find ways of interacting and working in symbiosis with each other and organizational innovations signifies finding new ways of managing environmental strategy. Market innovations aim towards creating brand value and positioning certain products in the market and customer engagement innovations aim towards finding ways of meeting the needs and desires of customers (Prieto-Sandoval et al., 2018). In more general terms, eco-innovations are needed in the production and consumption system as well as in regulation and policy. For an implementation of circular economy to be successful, comprehensive and systemic eco-innovations that involve interaction between all actors in the system are to aim for (de Jesus & Mendonça, 2018). This is also emphasized in the EU-report 'From niche to norm, suggestions by the group of experts on a systemic approach to eco-innovation to achieve a low-carbon, circular economy' by stating: "*Europe will need to focus more than ever on creating the right*

*conditions for innovation, making necessary changes to the legislative landscape, and encouraging community engagement” (European Union, 2015:10).*

The principles that inform the design of circular economy eco-innovations are the closing the loop principle and the 3R's – reduce, reuse and recycle principle. These principles clarify the ideas behind circular economy and what circular economy aims to address.

### **3.2.2 The principles of circular economy**

#### ***Closing the loop***

As oppose to in the traditional linear economic system, characterized by a take-make-dispose mentality, materials and products are part of a closed loop system in the circular economic system. The closed loop frames many of the practices that circular economy consist of and strongly relates to waste management, a sector in which the concept of circular economy is of high relevance. Murray et al. concur that circular economy has its base in resource cycling and state that the circular economic principles frame different ways of keeping resources within their biochemical cycles for a longer time as well as to decrease the overall material use and output of waste (Murray et al., 2015). A circular flow of goods and materials, which the closed loop demonstrates, allows for a reduction in resource-extraction and minimized waste through activities such as reuse and recycling. Some materials are part of the biochemical cycle entailing extracted natural resources that should be returned to the system while others are part of a technological cycle. In the technological cycle the aim is to have the material circulate without generating waste. This puts pressure on industry and businesses to innovate new practices when designing their processes and products so that it happens in a way that does not generate waste nor has an impact on the environment in the production process (Murray, et al., 2015).

The circular economy cycle, as described by Prieto-Sandoval et al., starts with firms' extraction of resources from the environment, followed by the transformation of resources into products and services. The products and services are then distributed to consumers in the market and after being used they are recovered in different ways (Prieto-Sandoval et al., 2018). The cycle is turned into a closed loop by designing products and practices that are informed by the 3R principles, reduce, reuse and recycle. The 3R principles will now be further described.

#### ***The 3Rs principle – reuse, reduce and recycle***

The 3Rs principles form a hierarchy describing how to treat resources and material in the circular economic system. It suggests prioritizing reduction followed by reuse and recycle of materials and aims towards a zero-waste ideal. The reduce principle refers to both input and output in the production processes. Reduction activities aim to reduce the input of energy and raw materials as well as the output of waste through efforts aiming to improve efficiency in the production and consumption chain (Ghisellini et al., 2016). Reusing products and goods in the same way as they were conceived to be used contributes to the avoidance of emissions and extraction of materials that would be connected with the production of entirely new goods. Reusing products is also environmentally beneficial in terms of decreased disposal of waste. Recycling decreases the amount of waste as well as the environmental impacts related to waste disposal. It is done by recovering and reprocessing waste materials into products or materials that will

be used for the same or another purpose (Ghisellini et al., 2016). Although being the principle mostly referred to when addressing circular economy (Kirchher et al., 2017) recycling is the least sustainable of the 3R's principles in regards to resource efficiency and profitability. All materials cannot be recycled too many times and some materials cannot be recycled at all. Also, due to the design of products some products are unrecyclable due to their material complexity and at other times the presence of contaminants and chemicals in products make them unrecyclable (Ghisellini et al., 2016:16). Despite this, many tend to define circular economy solely as recycling which according to Kirchher et al. denotes an entirely wrong understanding of circular economy (Kirchher et al., 2017). Understanding the concept differently in this way might have implications for what the potential benefits of circular economy implementations are.

In the following section the analysis of how circular economy is implemented differently depending on how it is defined is presented. With the system thinking perspective and the metaphor of the iceberg (Kim, 1999) the different ways the concept can be defined and understood will be elucidated. The different types of eco-innovations presented in the above section can be found in different implementations at different levels.

## **4. HOW IS CIRCULAR ECONOMY IMPLEMENTED DIFFERENTLY DEPENDING ON HOW THE CONCEPT IS UNDERSTOOD AND DEFINED?**

### **4.1. The “iceberg” of circular economy**

Using the “iceberg model” for describing circular economy results in a description of circular economy similar to when using the micro- meso and macro levels to describe the concept. Prieto-Sandoval et al. state as a result of their review of different definitions of circular economy that the concept and its implementation are commonly analyzed at these three different levels (Prieto-Sandoval et al., 2018) and Ghisellini et al do too (Ghisellini et al., 2016). On the micro-level, as described by Prieto-Sandoval et al., circular economy as it is adopted in companies is described and analyzed. Understanding circular economy on this level includes understanding what practices the companies change in order to obtain more circular flows and the new set of practices is guided by the principles of circular economy. This corresponds to the top of the iceberg, the events. It reflects how single companies individually decide to change their way of doing business in particular ways but do not necessary relate to a pattern of events or a systemic change in society. Except for practices adopted by businesses, events can also consist of single consumer practices (Ghisellini et al., 2016). The meso-level on the other hand, is where more than one event forms a pattern and circular economic principles start to yield regional benefits for both the economy as well as nature. When circular economy turn into a pattern, it becomes easier for companies to uphold and succeed with their circular economic practices as some working alone-limitations are removed (Huamao & Fengqi, 2007). On this level, the benefits of industrial symbiosis, a way for companies to collaborate and make efficient use and reuse of resources in symbiosis tend to be the subject of analysis (Prieto-Sandoval et al., 2018). On the meso-level regional circular economy is also relevant to address, that is when cycling of

material has reached outside of industries and is also a part of people's life activity (Huamao & Fengqi, 2007). The type of circular economy described on the macro-level mostly concerns how environmental policies and institutional influence can be part of the implementation of circular economy (Prieto-Sandoval et al., 2018). That signifies an implementation of circular economy as a systemic structure, a new basis of the iceberg, which in turn will have an impact on forthcoming patterns and events. In Huamao and Fengqi's words, at this stage, circular economy is seen as a way of governing which informs all social and economic development (Huamao & Fengqi, 2007).

With the micro- meso and macro division of analysis and implementation of circular economy as presented by Prieto-Sandoval et al. the constituents of the concept are further enlightened (Prieto-Sandoval et al., 2018). Relating them to the framework of events, patterns and systemic structure implementations of circular economy will be divided into three categories; first, adopted practices of circular economy will be described, that is the single events that reflect the principles of circular economy. It entails a definition of circular economy as a set of practices. Second, circular economy will be defined as an example of industrial organization which describes how circular economy can be implemented to become a pattern of events. Third, circular economy implementations that result from a definition of circular economy as a way of reasoning that has resulted in an idea of a new economic system, or in other words, a new systemic structure will be accounted for. These new system thinking inspired ways of framing and conceptualizing circular economy will contribute to a better understanding of what outcome can be expected of different implementation of circular economy.

#### **4.1.1. The tip of the iceberg – circular economic practices**

When companies adopt new practices inspired by circular economy their aim is mainly to find ways of continuously creating value in a resource-scarce world (de Angelis, 2018) It can be explained as a response to institutional pressure meaning that adopting circular economic practices is a way of keeping customers happy or it can be a response to the threat of losing competitive advantage when the resources they use run out (de Angelis, 2018). Led by the principles of circular economy, businesses can find new sources for their competitive advantage allowing them to pursue their value-creation, only in a slightly different way. New practices can be adopted in production and on the consumption side as well in the way resources are returned which is mostly controlled in systems for waste management (Prieto-Sandoval et al., 2018).

The new practices that have emerged on the production side reaches from eco-design, green design or design for environment to cleaner production which aims to prevent pollution and reduce the use of toxics in design and production processes (Ghisellini et al., 2016). Part of the goal of these practices are to improve products in a way that considers if they can be disassembled and disposed of without environmental impacts as well as to make changes in the distribution and return, the durability and the reliability of products (Ghisellini et al., 2016). According to Ghisellini et al. design and production practices that aim towards this will result in environmentally friendly products of high quality and performance (Ghisellini et al., 2016). Prieto-Sandoval et al. turn focus to sustainable design strategies when discussing the practices adopted to implement circular economy and define them as catalyzers for forthcoming reduce, reuse and recycle of material and products (Prieto-Sandoval et al., 2018). Besides changing practices of design and production, businesses can also adopt new practices that aim

towards affecting consumer choices. Such practices are for example to introduce labeling schemes that informs consumer choice pushing towards the consumption of products that have been produced with respect to the principles of circularity (Ghisellini et al., 2016). It can also be to adopt a business model that is based on sharing, lending or co-ownership of any kind which would require less extraction of resources since a smaller amount of products would have to be produced. The events of individuals deciding to consume responsibly are also an important reflection of circular economy as well are individuals' choice to consume less, buy reused products or recycle (Huamao & Fengqi, 2007).

To summarize, the practices adopted by businesses or individuals that are guided by the principles of circular economy vary at scope and often require innovative measures. The adoption of these practices affect the single business or single individual but do not have a significant impact on other businesses, nature or society as a whole or whether an individual will consume in a similar way the next time. The practices are single events and do not necessarily relate to a pattern in society which means that the relative change that can be withheld by adopting single practices are low.

#### **4.1.2. The formation of patterns – symbiotic networks that stipulate the events**

When the event of one company adopting innovations inspired by circular economic principles has taken place there is not necessarily a notable change in the entire system. Although the company itself will change and maybe make a winning, the outcome for nature is small and neither is other companies affected, they can continue as usual. Since there are limitations to what one company can do on its own when it comes to the cycling of resources, industrial systems in the form of ecological industrial parks emerge which allows separate entities to collaborate with others. These symbiotic networks allow companies to exchange by-products and other resources between them and are a way of achieving increased economic and environmental benefits (Ghisellini et al., 2016). Making simultaneous usage of resources can help to decrease the input of material and energy in production processes as well as to decrease the output of waste. It allows companies to create higher value, both for themselves and for nature and society. Having companies and other entities working in symbiosis with each other improves the utilization of resources and contribute to the creation of a closed loop ecosystem inside an industrial park but the organization can also reach outside a park area or between parks (Huamao & Fengqi, 2007).

Industrial organization schemes can emerge spontaneously as bottom-up initiatives from companies themselves or top-down as a planning incentive from governments (Ghisellini et al., 2016). In China, eco-industrial parks have been politically incentivized as a solution to the problem of heavy pollution in industrial zones and entail working towards closed loops, the minimization of waste and overall eco-efficiency (Ghisellini et al., 2016). In other cases around the world collaboration between companies have emerged as a way of minimizing costs by making use of each other's by products as well as a way to manage environmental regulations that otherwise would entail increasing costs and the environmental effects have appeared later as an additional benefit (Ghisellini et al., 2016). The economic incentives to organize industrial symbiosis networks are the direct as well as indirect economic benefits that can be withheld. First, costs are reduced directly by decreasing virgin material input and avoiding disposal fees and income is made from selling by-products as resources.

Second, the benefits of collaborating in symbiosis with other companies have shown to yield indirect economic benefits due to the “*avoidance of investments, increase of supply-security and flexibility, better reputation, innovation, operational resiliency and ability to attract and retain employees*” (Ghisellini et al., 2016:114).

This way, circular economy can be understood as an organizational structure that facilitates the cycling of resources and thereby reduce material input and waste. When trespassing the limits of what one company can do on its own and more than one company forms a pattern, the outcome can be expected to be bigger at scope. The formation of circular economic patterns does not only relate to the creation of industrial parks or symbiotic networks but also signifies that the cycling of resources is affecting and contributing to the regional society (Huamao & Fengqi, 2007). The cycling of material in the industrial organizations schemes can result in products that are not only reclaimed within the parks but also provide products to other companies as well as individuals. This means circular economy becomes regional at scope and involve more actors in the society also influencing the potential and outcome of circular economy.

#### **4.1.3. The emergence of a new way of reasoning about the economic system**

Huamao and Fengqi address circular economy as a concept that has emerged from humans’ re-knowing of nature (Huamao & Fengqi, 2007) signifying a new way of reasoning about the human-nature relationship. The starting point for such a new reasoning was the reaction to the many environmental problems caused by the increased levels of consumption that followed by industrialization in the 1960’s (Prieto-Sandoval et al., 2018). At that time of neoclassical economics natural resources were thought of as limits for production that could be removed and expanded by doing progress in technological development (Hofstra & Huisingh, 2014) entailing a human-nature relationship in which nature is subordinate human. As a reaction to the negative externalities of the linear consumption economy, concerned environmentalists as well as economists presented ideas that described new ways for how the economy could strive without risking a depletion of natural resources. Boulding (1966) suggested that Earth could function as a cyclical ecological system in which resources were made unlimited, by many seen as the starting point for the further development of the idea of a circular economy (Prieto-Sandoval et al., 2018; Ghisellini et al., 2016). What the idea first and foremost entail, is to treat Earth as a closed system of which human is an integral part. It emphasizes a way of thinking about nature and human as part of one single ecosystem with limits that cannot be overstepped if humanity and nature are to survive (Ghisellini et al., 2016). The human-nature relationship would be characterized by connectivity and unity in such a system instead of contradiction and separation (Hofstra & Huisingh, 2014). As Huamao and Fengqi put it, humans have to start seeing themselves as part of the larger system in a circular economy (Huamao & Fengqi, 2007).

Circular economy as an economic system should be understood from the principles of the 3Rs and the closed loop. Aiming to develop in a way that “*makes full use of matter and energy to the maximum limit, improves the quality and performance of economic operations, achieves a harmonious relationship between the economic system and the natural ecological system and keep the natural ecological balance*” (Huamao & Fengqi, 2007:93) circular economy represents a new form of economic development. Instead of emphasizing economic profit, the circular economic system is more concerned with creating value for the environment, society and economy simultaneously and aims to do

so by developing in a mode of low depletion, low exhaust and high efficiency (Huamao & Fengqi 2007). It is an idea of an economic system that decouples growth from resource extraction aiming to decrease environmental impacts (Ghisellini et al., 2016). In addition to this reasoning, which is in line with other economic models such as steady state or degrowth economics too, circular economy is characterized by functioning around the laws of nature; networks of interacting components, exchange of material and energy flows, recycling patterns and environmental mimicry (Ghisellini et al., 2016). Circular economy does not dismiss growth though, it should just happen in a way that is restorative and regenerative for human and nature at the same time.

To successfully create value for the environment, society and economy while keeping the economic processes of production and consumption within the boundaries of the Earth's ecosystem demands for an eco-centric rather than anthropocentric worldview. This signifies to reach a way of thinking of nature as a system of which humans are only a small part rather than thinking of human as the core and center of the system. To succeed with that entails a paradigm shift (Hofstra & Huisingh, 2014). Implementing circular economy as a way of reasoning about what is an appropriate economic system implies aiming for that paradigm shift. Huamao and Fengqi refer to the social layer of circular economy when addressing the concept as a way of thinking and describe how circular economy influence economic as well as social development on this level (Huamao & Fengqi, 2007). It is on this level that political and institutional incentives have an impact and can affect what patterns and practices are visible in the society. In systems thinking words implementation of circular economy at this level suggests a shift of purpose and intent (Abson et al., 2017). Nature is assigned another purpose than to serve human or another purpose is given material that used to be treated as waste. Another example of a systemic change is the introducing of collaborative consumptions models implying a questioning of current ownership structures (Ghisellini et al., 2016). Removing the purpose of ownership when consuming allows for other business models that are based on the reduce-, reuse and recycle principles of circular to take place and affect both consumption as well as the production side. Also, understanding circular economy as a way of reasoning about nature and the economic system makes it a knowledge and awareness project. To implement circular economy as understood on this level, as a way of reasoning, entails making people aware and knowledgeable about the topic.

The above conceptualization of circular economy reflects the system thinking perspective which can serve to explain what outcome to expect from different interventions to a system. By relating different implementations of circular economy to the three categories presented here, it can be better understood what outcome can be expected from the different implementations. It helps when analyzing the potential of an implementation to result in sustainability. For the purpose of defining "The sustainable development way of implementing circular economy", this conceptualization of circular economy and examples of implementations that have been provided will be combined with theoretical stances that describe what affects the potential of an implementation of circular economy to result in sustainable development. In the next chapter, the theoretical contributions will be reviewed for and in the end an analysis is provided that concludes what "The sustainable development way of implementing circular economy" is.

## **5. WHAT AFFECTS THE POTENTIAL OF AN IMPLEMENTATION OF CIRCULAR ECONOMY TO RESULT IN SUSTAINABLE DEVELOPMENT?**

### **5.1. A system thinking approach to explain the outcome of circular economy implementations**

Depending on how circular economy is understood and defined, the implementation of the concept will vary. As have been shown in the previous section of this paper, circular economy is a concept that depending on how it is defined and understood is ascribed different aims. For the single business adopting circular economic principles the aim is likely to sustain income and profit in a resource scarce world whereas when defining circular economy as a new way of reasoning about the economy and the human-nature relationship there are bigger aspirations involved such as redefining growth entirely. The result of this is that the potential for circular economy implementations to accomplish systemic change is dependent on how the eco-innovations that are implemented are intervening on the system. This is not to say that one or the other implementation of circular economy is good or bad, only that the result will depend on the leverage point where the intervening in the system occurs. On the opposite, all implementations of circular economy are important. As systems thinking entails, systems have to be understood as an entity consisting of different parts and elements that all contribute to the special function of the system. For the implementation of circular economy, this means that every element of circular economy have to be considered as interdependent parts of the system (Huamao & Fengqi, 2007) for the implementation to be successful. Huamao and Fengqi who offer an exploration of the concept of circular economy from the view of system theory uses a model of levels or in their case layers, similar to the iceberg model when describing circular economy (Huamao & Fengqi, 2007) They define the different layers of circular economy and state that the behavior and request of circular economy are different on the basic, elementary, regional and social layer respectively (Huamao & Fengqi, 2007) implying that different types of implementations of circular economy are necessary. The Ellen MacArthur Foundation proposes four building blocks of circular economy (EMAF, 2018). These are circular economy design, new business models, reverse cycles and enablers and favorable system conditions. The foundation stresses the importance of including all four building blocks of circular economy which again entails the importance of working with all types and definitions of circular economy simultaneously to reach the most preferable outcomes. In its systemic structure, the layers of circular economy are influencing and interacting with each other and Huamao & Fengqi describe that the “*higher layers take the lower layers as the basis and guide the development of the latter*” (Huamao & Fengqi, 2007:96). Providing an example of this, Prieto-Sandoval et al. describe how eco-innovations in the market resulting in new business models can motivate regulatory and policy changes and likewise does the legal framework of the system affect what is being done by companies and individuals (Prieto-Sandoval et al., 2018). Innovations are intervening at one point of the system but they are likely to influence, namely they should influence other parts of the system too. Changes to the system by one innovation are expected to be complex (Abson et al, 2017).

## **5.2. Drivers of and barriers for circular economy**

A system in itself is also complex and de Jesus & Mendonça raises the necessity to understand how system characteristics are interacting and affecting the potential of eco-innovations to intervene successfully in the system (de Jesus & Mendonça, 2018). They define what factors can facilitate and constrain the transition towards circular economy by focusing on hard and soft types of drivers and barriers (de Jesus & Mendonça, 2018). Emphasizing that eco-innovations are more than green technology and that it is necessary to re-discover non-technical meanings of innovations, the analytical framework de Jesus and Mendonça put forward is taking technical and economic factors *and* institutional and social drivers and barriers into consideration (de Jesus & Mendonça, 2018). Giving attention to both technical and economic as well as social and institutional drivers and barriers are especially important from a systems thinking perspective as all these factors are part of the system which sets the conditions for eco-innovations. The local context plays an important part in shaping the conditions and the relative impact of the barriers and drivers presented by de Jesus and Mendonça differs in different contexts (de Jesus & Mendonça, 2018). Their framework might not be exclusive and other drivers and barriers could be found in other contexts. Being aware of the most common barriers and drivers gives a direction for what eco-innovations are possible to implement successfully and also indicates what can be done to make the conditions for eco-innovations more beneficial.

### **Technical factors**

*“Changes are often perceived as triggered by the rise of new technologies: the steam engine impelled the industrial revolution; and, the development of computers, digital communication and microchips launched the 20<sup>th</sup> century information revolution”* (de Jesus & Mendonça, 2018:81).

Technological knowledge and technical solutions are important drivers of the transition to a circular economy, especially for the potential it has to facilitate the production of durable and high quality products. Not only product and process innovations are dependent on technological knowledge though, service innovations require for example that technological potential to re-place different parts of a leasing-product exists. Another important technology that enables service innovations as well as other innovations are the availability of information and communication technology that facilitates a dematerialization of the economy. As seen in recycling and waste management, technological knowledge is also a facilitator of new innovations that have resulted in an increase in material recovery by enabling the reuse of different products (de Jesus & Mendonça, 2018).

Due to the importance of technological capacity for many eco-innovations, technological challenges are a key-barrier for a transition to a circular economy (de Jesus & Mendonça, 2018). Sometimes it is the existence of technological solutions that are lacking but other times it is the practical implementation of technology that is hindered by economic or market limitations.

### **Economic, financial and market factors**

The changes in market trends and consumer preferences increase consumption and reflect the constant flow of resources that circular economy aims to address. In combination with the need to create value without depletion of resources the market

presents the business case and gives economic drivers for adopting reduce-types of circular economic practices such as leasing, sharing or co-owning products (de Jesus & Mendonça, 2018)

The innovations required for circular economy many times requires capital to be developed and implemented which makes poor financial means a direct barrier for circular economy. Also, path-dependencies on the linear-economic market sometimes make innovations difficult to implement (de Jesus & Mendonça, 2018).

### **Institutional and regulatory factors**

Governmental institutions act as a driver for circular economy by constituting the goals and priorities of politics. Laws as well as regulations are reformed by governments and they can also promote new environmental technologies and organize public education in a way that increases environmental knowledge (de Jesus & Mendonça, 2018). Establishing an environment for innovation and entrepreneurship by regulatory means is also a way of facilitating circular economy. de Jesus and Mendonça emphasizes the important role of governments as a driver for circular economy namely by facilitating cooperation between enterprises and public actors and by funding tools (de Jesus & Mendonça, 2018).

Without the proper taxes, rules and infrastructure, legal systems become a barrier of circular economy. Policies define for instance what is to be accounted for as waste which affects if resources can be reused and recycled (de Jesus & Mendonça, 2018). Also, insufficient education and awareness about sustainability issues are raised as an institutional barrier for circular economy (de Jesus & Mendonça, 2018).

### **Social and cultural factors**

On the demand side, consumer preferences for sustainable products are affected by consumers' environmental awareness as well as by the social perception of the value of such products. The demand for and cultural acceptance of service-based circular business models as well as increased awareness of environmental problems and available information about sustainable products are all drivers of circular economy (de Jesus & Mendonça, 2018). Possible reputational gains are also a driver for businesses to adopt circular economic principles (de Jesus & Mendonça, 2018).

de Jesus and Mendonça finds that lack of information and awareness about circular economy is a social and cultural barrier (de Jesus & Mendonça, 2018). Without knowledge about alternative choices people are hindered from engaging and taking part in the transition towards circular economy.

The above described factors are helpful when analyzing the context in which circular economy is implemented. The barriers and drivers identify the parts of the system that can facilitate or constrain the implementation and outcome of eco-innovations that aim towards a transition of society towards circular economy. Realizing how contextual factors affect the implementation of different eco-innovations adds another layer to the analysis of what outcomes can be expected from different implementations of circular economy. The general belief is that the outcome of circular economy will be sustainability but as have been seen here, whether or not the implementation of circular economy will be successful is affected by a number of factors. Critique has also been

raised towards the potential of circular economy to result in sustainable development particularly, those viewpoints will be reviewed of in the following section.

### **5.3. The potential of circular economy to result in sustainable development**

What is really the potential of circular economy to result in sustainable development? So far, issues concerning what affects the implementation of circular economy have been discussed, assuming circular economy has the potential to be the solution for sustainable development if only making sure it is implemented properly. Several authors conclude this, that circular economy implementations have potential to pave the way towards sustainability for its character of benefitting the economy, society and environment simultaneously (Prieto-Sandoval et al., 2018; Ghisselini et al., 2016). It is not a unanimous belief though, that circular economy can constitute a path towards sustainable development. In the following some of the critical standpoints towards the concept of circular economy will be reviewed and discussed. The focus on implementation will be withheld by reviewing the critique in terms of how a better way of implementation could make the critique invalid. Understanding the challenges will add extra insights into what are the better ways of implementing circular economy if the goal is to withhold a sustainable development. After this section a concluding understanding of what the best way of implementing circular economy that result in sustainable development is will be provided.

By analyzing the relationship between the two concepts circular economy and sustainable development, Geissdoerfer et al. find similarities as well as differences between them that point towards what ability circular economy has to contribute to a sustainable development (Geissdoerfer et al., 2017). One important but possibly troublesome similarity is the emphasis on global problems that ought to be addressed in coordination between actors with shared responsibilities and another similarity is the integration of non-economic aspects in development as well as a strong belief in the central role of private business and business model innovation (Geissdoerfer et al., 2017). The differences found are several and starts at the different goals of the two concept. Circular economy aims towards a closed loop resource system whereas the goals assigned sustainable development depend on different agents' varying interests. The motivation behind the two concepts is also differently described which according to Geissdoerfer et al. affect what gains to be expected. Geissdoerfer et al suggest that in circular economy "*primary benefits for the environment and only implicit gains for social aspects*" (Geissdoerfer et al., 2017:764) are expected from prioritizing economic systems while the more holistic and contextualized viewpoint of sustainability allows prioritizing differently depending on needs and context (Geissdoerfer et al., 2017). In general, the sustainability concept is broader and more flexible than circular economy. The implications of the more narrow coverage of circular economy are, according to Geissdoerfer et al., environmental issues of all types are not included in circular economy and that the social benefits that circular economy can contribute to are badly understood due to lack of research in the area (Geissdoerfer et al., 2017). On the other hand though, some find circular economy easier to implement thanks to its narrower framework. It is popular among policy makers and it presents a strong business case for many companies but the attractiveness of the concept as "an easy one" also poses the threat of leaving out other, more holistic approaches to sustainability (Geissdoerfer et

al., 2017). The circular economy concept's lack of holism implies that the outcome of the concept will not be the same as for sustainable development but that is not enough to entirely dismiss circular economy as a path towards some sort of sustainable development. Geissdoerfer et al. conclude that viewing circular economy in a subset relationship to sustainable development as "*one among several solutions for fostering a sustainable system*" circular economy can be combined with complementary strategies and that way constitute part of a path towards sustainable development (Geissdoerfer et al., 2017). As highlighted by Geissdoerfer et al., the definition of sustainability has many variations though (Geissdoerfer et al., 2017) and what definition is chosen will also affect whether or not it is reasonable to say that circular economy can contribute to sustainable development. Different definitions of sustainability relate differently to an eco-centric vs anthropocentric worldview and the way of implementing circular economy will also reflect one or the other worldview, thereby affecting what is reasonable to expect from the implementation. What can be taken from this is that to ensure a successful outcome of circular economy, however success is defined, definitions and aspirations as well as implementation have to be synchronized.

Hobson and Lynch find circular economy to be a concept that entails a socio-economic remake of the society in which citizens are given the role of consumers that ought to adopt sustainable lifestyles including consuming sustainably and taking part in sustainable waste practices (Hobson & Lynch, 2016). This line of thought is similar to ecological modernization, a take on the future which allows for economic growth to continue by increasing efficiency in production and by relying on consumers to buy green. Hobson and Lynch suggest that circular economy does not capture the roots of the problem but instead allows for a continuing modernization of society that is still in alignment with an anthropocentric worldview (Hobson & Lynch, 2016). This "greening of capitalism" is framed by Hobson and Lynch as a transformation that can only be related to a weak form of sustainability (Hobson & Lynch, 2016). To obtain a strong type of sustainable development, the planetary boundaries of the Earth have to be respected and instead of creating opportunities for people to consume "better", Hobson and Lynch raise the importance of decreasing the absolute levels of consumption (Hobson & Lynch, 2016). Hobson and Lynch argue that circular economy is not always radical enough to successfully transform society and consumption habits in the way needed and find that it requires new forms of consuming, such as bartering, sharing, renting, trading, borrowing, lending, leasing and swapping for circular economy to contribute to *real* sustainable outcomes (Hobson & Lynch, 2016). What is really sustainable though is a question of perspectives and as already familiar, sustainable development is a concept that is defined and described in a variety of ways.

Also, there has been critique presented towards circular economy from technical and biological perspectives. Skene expresses critique towards the way of understanding circular economy as a system similar to the natural biosphere and says that the fundamental differences between the two makes it unlikely that circular economy will result in a sustainable future (Skene, 2018). For example he problematizes the global market structure and explains that even though the incentive is to generate cyclical resource flows in which material are continuously treated as a resource, it is not done in alignment with the resource flows of the biosphere when goods and material are not made, bought, disposed of and recycled at the same geographic location (Skene, 2018). Nature consists of local resource flows as oppose to the global flows that often

characterize production and consumption patterns. Also, it is a difficult task to match natural resource flows with production flows due to the differences in tempos of extraction and re-deposition (Skene, 2018). What is entailed is that returning biological nutrients to the biosphere is not necessarily restorative, which is one of the aims of circular economic practices. Neither can the cyclical production flows and return of nature's material ensure that extraction will not endanger the ecosystem in the first place. The trouble of matching the human-made resource flows with those of nature makes Skene question the role of circular economy in sustainable development (Skene, 2018). Despite acknowledging the limits and challenges of circular economy to be something that keeps within the planetary boundaries, Korhonen et al. state that circular economy is a promising concept and path towards sustainability due to the logic it presents for businesses to start working with sustainability issues (Korhonen et al., 2018). There is an obvious business case in making use of the value embedded in extracted resources and products produced thereof more than once which according to Korhonen et al makes it easy to argue for why businesses should adopt circular economic practices (Korhonen et al., 2018). At least, the challenges that the concept poses do not remove the logic and value of pursuing business in a circular economic manner.

The above theoretical contributions inform the analytical framework that suggests what "The sustainable development way of implementing circular economy" is. By combining them with the new conceptualization of circular economy which was previously presented the understanding of how circular economy should be implemented is better informed and can be exemplified.

#### **5.4. "The sustainable development way of implementing circular economy"**

Analyzing the preceding theory of what affects the potential of circular economy to result in sustainable development has resulted in an understanding of what "The sustainable development way of implementing circular economy" is. The results of that analysis will now be presented. In the theory presented there are several arguments for concluding that the potential for circular economy to contribute to sustainable development depends on how it is implemented. It should be realized though, that what is perceived as a sustainable outcome differs a lot depending on perspectives and definitions of sustainable development. Therefore, it is important to emphasize that what the potential of an implementation to result in sustainability is might be differently interpreted. Depending on how sustainable development is defined the variety of implementations that are assumed to result in a sustainable outcome are of different range. Therefore, some space will be given here to elaborate on the definitions and perceptions of sustainable development and what that entail for the meaning of "The sustainable development way of implementing circular economy".

Sustainability is defined in the WCED's Brundtland report as "*development that meets the needs of present generations without compromising the ability of future generations to meet their own needs*" (WCED, 1987). The Brundtland report is a commonly accepted definition of sustainable development but there is a wide range of ideas of what the appropriate way of getting there is. Sustainable development is informed by the triple bottom line which consists of people, profit and the planet and was introduced as a goal for sustainable development to equally balance emphasis on society, economy

and environment (Geissdoerfer et al., 2017). Over time, it has been shown societal, economic and environmental needs are not always equally balanced in development but instead the internal hierarchy between the three pillars differs depending on perspectives of what sustainable development really is. Depending on perspectives, the perception of what strategies and solutions are assumed to deliver sustainability differs.

The different internal hierarchies of the environment, society and economy are a reflection of anthropocentric vs eco-centric worldviews (Imran et al., 2014). Sustainable development is often illustrated with three circles each representing one of the three pillars of sustainability. With an anthropocentric worldview, the circles are interconnected in the middle and the environment, society and economy are supposedly given equal emphasis and space, although that is not always the case either. This way of viewing the sustainability concept has been criticized for making trade-offs between the environment, economy and society in a way that prioritizes human welfare while continuously overexploiting nature (Imran et al., 2014). Another way of illustrating the three pillars of sustainable development has emerged though, emphasizing that the economy and the society are integral parts of nature and the environment. With this eco-centric worldview, the environment is illustrated as a big circle within which the society and the economy are located. It emphasizes an interpretation of sustainability that is based on humanity's dependence on nature and presents a line of thinking that increases the importance of making sure development occurs within the Earth's biosphere (Folke et al., 2016).

Depending on how the human-nature relationship is viewed, what sustainable development is and what the potential for circular economy to result in sustainability is are differently interpreted. With an eco-centric inspired idea of what sustainability is circular economy has to deliver solutions that express high value of nature implying an absolute decrease in resource extraction in order to not challenge the limits of the biosphere. Economic development has to be subordinate nature's wellbeing and societies have to strive within nature and not on the expense of nature. Hobson and Lynch mean that this would entail an alteration of consumption patterns which implies finding solutions for new ways of consuming (Hobson & Lynch, 2016). Only relating circular economy to sustainable consumption and sustainable waste practices is according to Hobson and Lynch not enough as that would only entail a greening of capitalism and not contribute to a societal change radical enough to result in sustainability (Hobson & Lynch, 2016).

The idea behind circular economy is not explicitly related to a greening of capitalism though. As have been seen, circular economy when understood as a new way of reasoning about the economy reflects an eco-centric worldview and the aim is to find ways of addressing nature as a system in which human is only a small part. The emphasis is on creating value for the economy, society and environment simultaneously and to give nature another meaning and purpose than to serve humanity with resources. For that to happen, a paradigm shift or in other words a systemic transition of society is needed (Hofstra & Huisingh, 2014). According to Abson et al. too, solutions that can deliver sustainability need to be systemic and contribute to a transition of society (Abson et al., 2017). The authors claim this because when sustainability sciences research different dimensions of sustainability separately, the root causes of unsustainability are never addressed.

It has come across though that is far from always that circular economy is implemented as a way of reasoning; sometimes it is implemented as innovations that facilitate businesses to continuously make profit in a resource scarce world. Although these practices alone might not change the systemic structure of production and consumption in society, they can contribute to a decrease in natural resource depletion or that material continues to be used and is not ascribed as waste. The change of the system might be small and the motivations behind the practices might be the same as for the rest of the system; to increase profit, but despite this, it is an effort made to develop sustainably. As Korhonen et al. state, it is appreciated by companies that circular economic practices offer a possibility of being sustainable within the current system (Korhonen et al., 2018) and everything that is being done should be perceived as better than not doing anything at all. From a system thinking point of view, considering all parts of a system are important, all innovations that are implemented contribute to the functioning of the system. The basis of the iceberg informs what patterns and events are observed in the system but likewise, implementations aimed at shallow leverage points can influence the development of innovations at the deeper leverage points (Abson et al., 2017). It is not damaging that circular economy is not always implemented systemically, but it is good when that is the aim.

For circular economy to result in an eco-centric type of sustainable development, it has to be implemented in a way that facilitates a new way of thinking about the human-nature relationship. People have to be encouraged to connect with nature and should feel that they are part of a bigger system for the necessary paradigm shift to occur. They should also be made aware and knowledgeable about their role in nature and the environment. This is concurred by Abson et al. that emphasize the value of institutional change, connections to nature and knowledge production for the sake of accomplishing the systemic change needed for a sustainability transition to be facilitated (Abson et al., 2017). The authors emphasize these three realms of leverage due to their interconnectedness and ability to influence and facilitate other innovations (Abson et al., 2017).

To make circular economy become structural, eco-innovations should be implemented in a way that involves interaction between different actors to be successful (de Jesus & Mendonca, 2018). Involving several actors is helpful because it can uncover how sustainability issues can be addressed multi-dimensionally which would be a more effective way of finding solutions that are strong enough to actually make a change (Abson et al., 2017). It is said that the relationship between circular economy and social sustainability is poorly investigated (Geissdoerfer et al, 2016) but ensuring more interests than one actor's is addressed when implementing circular economy innovations increases the possibility of delivering systemic change that includes economic, societal and environmental sustainability simultaneously.

Skene expresses critique towards the possibility for a circulation of material to be a solution to environmental problems as long as biological nutrients are inserted into different places of the Earth's biosphere as they are today when products and material often travel long ways in the global economy (Skene, 2018). Circular economy should be implemented in a way allowing resources and material to circulate locally but the structure of the global economy makes it difficult to implement a local, closed loop system. This means that for circular economy to really deliver sustainable development

it requires a systemic change that alters the global structure of the economic system and allow economies to be more local at scope. Also, Skene says that the different tempos of the Earth's and the economy's ecosystems makes the two incompatible (Skene, 2018). Humanity's consumption rates are too high and a total decrease in consumption is an absolute necessary contribution circular economy has to make to result in eco-centric sustainability.

Realizing the many challenges that circular economy faces as the strategy to deliver sustainable development it is a good idea not to dismiss other strategies (Geissdoerfer et al., 2016). Circular economy is a good strategy along with others, especially because it presents businesses with a strong business case. The systemic innovations that are required will have to include the whole society, and especially regulatory bodies will have to contribute so that a transition of society is not constrained by the lack of proper laws and rules (de Jesus & Mendonça, 2018). It has to be realized that implementing circular economy in a way that deliver systemic change is difficult. Implementations of circular economy can also, regardless of whether or not they are aimed at deep leverage points, be hindered by contextual factors even though they can also be facilitated. It has to be made sure that technology is sufficiently developed and also made accessible, the market structure has to allow for and express a demand for circular economy and the important role of public actors both as legislators but also for their role as facilitators of cooperation between actors and as providers of funding tools has to be acknowledged (de Jesus & Mendonça, 2018). Also, it is of great importance to raise people's awareness about the environment and what alternative choices can be made as a way to make sure the transition towards circular economy is not constrained by a lack of knowledge (de Jesus & Mendonça, 2018).

For circular economy to result in sustainable development that equals an eco-centric human-nature relationship, the above insights inform how circular economy should be implemented. It is necessary to include an understanding of circular economy as a way of reasoning about the human-nature relationship and innovatory measures that contribute to making a systemic change possible should be taken but that does not mean to dismiss other implementations of circular economy. Being part of a system of interacting components, all innovations can come across as contributors of a transition of society towards sustainable development. Different innovations just have different potential to deliver systemic change depending on where in the system they intervene (Abson et al., 2017). For circular economy to reach its highest potential requires systemic change but implementations aimed at shallower leverage points are also influential and important on the path towards sustainable development, especially since those implementations might be the only ones possible in the current capitalistic system.

By adding theoretical viewpoints together and weighing them against each other and the system thinking conceptualization of circular economy, an analytical framework that establish what "The sustainable development way of implementing circular economy" is has now been presented. The framework contributes with an understanding of how circular economy should be implemented to result in sustainable development. In this study it will be used when analyzing the potential of the implementation of ReTuna to result in sustainable development.

## **6. HOW CAN THE IMPLEMENTATION OF RETUNA BE UNDERSTOOD AND EXPLAINED?**

### **6.1. ReTuna as an expression of circular economy in Eskilstuna municipality**

ReTuna is part of a reuse- and recycle park located in Eskilstuna municipality in Sweden. The reuse- and recycle park consists of a recycling station, a facility called Returen, a hazardous waste disposal and of course the reused items mall. The reuse- and recycle park is run by the municipality-owned company Eskilstuna Energi och Miljö (EEM) and the idea behind the reuse- and recycle park is to create possibilities for people to reuse and recycle their waste. Following the Swedish national waste plan, the aim of the facility is to advance in the waste hierarchy which signifies reducing, reusing and recycling waste before moving to incineration or putting waste into landfills (Eskilstuna municipality, 2017; Bergström, 2018; Wiklund 2018).

In the reuse- and recycle park, people can first deposit their environmentally damaging goods in the disposal for hazardous waste. Such products include electronics, wall-paint, pesticides, spray cans, batteries, light bulbs and nail polish among other things (EEM, 2018). After that, goods and products that people no longer want or need but can still be of use for others can be dropped off at Returen instead of being thrown away at the recycling station. The products and goods received at Returen are later on sorted and handed out to the stores in ReTuna Reuse Mall where they are sold in their current state or repaired and “upcycled” before they are sold to the customers of ReTuna (EEM, 2018).

The products and goods received in Returen are taken care of by people working for AMA (Eskilstuna kommuns resursenhet för Aktivitet, Motivation och Arbete) and then distributed to the different stores in the reused items mall. In April 2018, the stores located in ReTuna are 10, soon to be 11, and sell all different kinds of goods and products (Bergström, 2018). The personnel in the stores do a second screening of the products received from Returen and decide what they want to repair, fix up, make better and sell. Everything sold at ReTuna is reused, ecologically or sustainably produced (ReTuna, 2018).

In addition to the stores, ReTuna also house a café and restaurant, Café Returama, a conference facility and an educational program focusing on recycle and reuse design run by Eskilstuna Folkhögskola. The mall is also arranging events, workshops and lectures focusing on sustainability (ReTuna, 2018).

The activities that take place in the reuse- and recycle park, its organizational structure and the thoughts behind it are in alignment with the principles of circular economy, the 3Rs and closing the loop. The reuse- and recycle park is a representation of implemented circular economy and in the following, more details about what ReTuna actually is and what type of implementations of circular economy it represents will be provided. The description of ReTuna is a result of the interviews done in this study, public documents and other public information about ReTuna. The system thinking perspective serves as the framework for how to structure the analysis of what ReTuna is and how it functions as an expression of circular economy in Eskilstuna. First the identified single practices that ReTuna represents will be described, followed by how it

is characterized as an organizational structure and lastly the implementation of ReTuna as a way of reasoning will be described. The contextual factors that have contributed to the implementation and continuous existence of ReTuna will also be described.

### ***Practices***

ReTuna and the connected reuse- and recycle park in Eskilstuna municipality is a set of new and innovative practices that are part of the waste management system. It is a recycling station as well as an innovative solution for how to move higher up in the waste hierarchy by having people turning in their no longer wanted goods to Returen. According to Wiklund, ReTuna is a very “practical and clear expression of circular economy” this way (Wiklund, 2018). It is also an expression for circular economy through the establishment of several stores that has adopted circular business models and an expression of individuals’ choice of engaging with circular economic practices, both their choice of leaving their used goods to Returen and to buy reused products in the shopping mall.

Understanding ReTuna and the reuse- and recycle park in Eskilstuna municipality as a set of practices or single events that represent circular economy also entails looking further into the processes and practices taking place in the different stores that are established in ReTuna. Innovative production measures are taken in the stores that work with repair and up-cycling as well as in the educational program that is directly focused on design processes that aim towards reuse and up-cycling of material (ReTuna, 2018). An indirect outcome of the stores managing production processes using only reused material is, as Wiklund says, that overall production decreases, theoretically at least (Wiklund, 2018). That implies a reduction of material input as well as reduction in resource extraction which is an important part of the 3Rs principle. Wiklund emphasizes the importance of not addressing circular economy solely as a waste issue but to also include questions regarding production design, what materials are being used in the production processes and making sure products are repairable (Wiklund, 2018). Although neither ReTuna nor the stores located in the mall are implicitly partaking in any large production schemes, ReTuna have started to inspire other bigger companies to oversee their production processes. Bergström tells for instance about an idea of a future cooperation with a company that would make use of specific plastic products that were collected in Returen and handed over to the company for them to produce a new plastic product that could be sold at ReTuna (Bergström, 2018). Another example that Bergström mentions is the cooperation between a company and the educational program at ReTuna in which the students were asked to give the company their ideas for what could be done with the large amount of waste the company produces and a third example is companies that want to leave their left over production material to ReTuna (Bergström, 2018).

First and foremost though, ReTuna is an expression for the events of many individuals that choose to leave their products and goods at Returen instead of throwing them away. As Bergström states, the basis of ReTuna is made up by the people who turn in their goods and products to Returen (Bergström, 2018). Individuals’ actions on the consumption side are also an important reflection of circular economy as well as a crucial part of the business case for the stores located at ReTuna. Talking especially about textiles, Bergström says that ReTuna have a “*giant mission*” in trying to get

people to use their textiles longer or finding ways of reusing, repair or prolong the lives of textiles and in a final step consider recycling (Bergström, 2018).

Bergström says at one point that many think of ReTuna as a “*natural arena*” in which many circular economic practices and projects can take place (Bergström, 2018). She also emphasizes that it should not have passed anyone’s attention that ReTuna is something more than just a commercial spot and that the 700 people visiting ReTuna every day should know by now that there is something more to it than just shopping (Bergström, 2018). She exemplifies by mentioning the many attempts done to raise awareness about how to live sustainably for the customers, the educational program and the conference guests (Bergström, 2018).

### ***Organizational structure***

The store managers’ choice of establishing a business that is entirely based on a circular economic business model could be discussed as an event per se but on the other hand it might be the existence of ReTuna representing an organizational structure based on a new way of thinking about the economic system that has inspired to and made the establishments possible. As Bergström says, ReTuna has been a facilitator of “*making dreams come true*” by choosing to give companies a chance to try their ideas in ReTuna despite doubts about the expected success for some businesses (Bergström, 2018). When discussing why ReTuna has been a successful concept, Bergström also expresses faith in the bigger commitment that comes from doing things together rather than opening something up by oneself, as a private actor (Bergström, 2018). In other words, ReTuna can be understood as a symbiotic network and organizational structure that contributes to the adoption of circular economic practices.

Being part of a reuse- and recycle park, ReTuna expresses a form of industrial organization that allows for another type of resource flow as it includes more businesses than one. ReTuna represents a type of symbiosis that is partly industrial but also includes the commercial sector. All the stores located at ReTuna are part of a larger network that includes the waste industry and their commerce is made possible by the re-organization of the waste system that ReTuna facilitates. Bergström describe ReTuna as “*a type of model*” for how to do conduct commerce in a sustainable way but also says that the goal is to reduce waste (Bergström, 2018) making it a structure that rests on the symbiosis between commerce and waste management. In collaboration with each other, the waste sector can reduce their costs (according to Bergström, waste of a value of 20 million SEK have been reduced since ReTuna opened (Bergström, 2018)) and businesses located in ReTuna can create economic value in a way that would not have been possible without receiving material that would otherwise have been thrown away as waste. The organizational structure and collaborative measures that ReTuna consist of make it easier for companies to adopt circular economic principles as ReTuna allows them to be part of a bigger network that increases the benefits and positive outcomes of adopting a circular business model.

Going outside the symbiotic network of the waste sector and the commercial sector, ReTuna also expresses a type of regionalized circular economy. It does so by including individuals as well as the local society in the cycling of goods and material. Bergström explains how ReTuna has become something to “gather and come together around”, partly through the handing in of goods and materials to Returen as well as shopping in

the stores but also refer to a new project which aims to provide all the pedagogical organizations of the municipality with material left in Returen (Bergström, 2018). She says that this way, as good as everyone will have a connection to someone who takes part in those organizations, organizations that could be preschools as well as elderly homes, and that that will hopefully create further incentives for people to continue leaving things at Returen instead of throwing them away (Bergström, 2018). Also, referring to the many companies that have contacted ReTuna wondering what they could do with their material instead of throwing it away, Bergström says that in a way, ReTuna has become a “societal actor” that has managed to start discussions and make people more aware (Bergström, 2018). The practices and activities that ReTuna are and facilitate have leaked out to the rest of the society, inspiring individuals as well as other actors to adopt practices based on circular economic principles. Another example that Bergström mentions that is pointing towards a regionalization of circular economy in Eskilstuna is a transport company that, for payment, has started to offer home delivery as well as transportation of things from people’s home to Returen (Bergström, 2018). It shows again how the cycling of goods that ReTuna facilitates has come to involve as well as be beneficial for actors outside of the industrial symbiosis too.

Actually, it is in the future of plans for ReTuna to start collaborating even more with the rest of the local society as well as other actors in the same sector. According to Bergström the ambition is to build a climate destination working with the principles of ecotourism. To become a concept of eating, shopping, living and doing, Bergström says it demands for a certain infrastructure as well as other establishments and therefore they are now trying to create collaborations with other actors (Bergström, 2018). Again, the principles adopted by ReTuna are starting to leak out to the rest of the society and it is supported by the fact that ReTuna while looking for actors to collaborate with have certain demands; “until today we have not found a living solution that is sustainable from the prerequisites that we would like” (Bergström, 2018).

### ***Way of reasoning***

ReTuna, although it is run by its own board today (Bergström, 2018), has its roots in politics. It was a political incentive to create a reused items mall that resulted in what is ReTuna today (Wiklund, 2018) and it is the waste plan that forms the basis and creates the guidelines for ReTuna (Bergström, 2018; Wiklund, 2018). This entails that the purpose of ReTuna is received from the waste plan which includes a national effort to rethink the value of waste and how resources can be reduced, reused or recycled. The effort signifies a societal change or at least constitutes a goal for how society should change. As Bergström says, everyone who is subordinate the waste plan as well as EU’s waste hierarchy are supposed to find ways to decrease waste and start reusing material and that includes all Swedish municipalities as well as all member countries of EU (Bergström, 2018).

When asked to describe ReTuna, Bergström says that it is the “*future of commerce*” (Bergström, 2018). Describing how ReTuna will be the way to conduct commerce in the future she talks about a change that everyone has to take part in. She acknowledges that there might be other ways of moving towards a more sustainable way of producing, shopping and consuming than the model used at ReTuna but emphasizes that ReTuna is one model for how to facilitate the change that leads towards more sustainability (Bergström, 2018). At another point Bergström describes the visionary work of Retuna

and says that in public, their slogan is “*save the Earth*”. She says that the public vision has to be well grounded in citizens’ minds as well as outside of the municipality (Bergström, 2018). This is an expression of how ReTuna represents a new way of thinking about the proper ways of creating value in an economic system without harming nature. It is a type of circular economy that expresses a new form of economic system that decouples growth from resource extraction.

When describing how ReTuna is aiming towards becoming a climate destination she explains they aspire to create something bigger at ReTuna (Bergström, 2018). By trying to arrange activities such as bird watching or picnic tours they aim to get people to rethink about shopping as a pleasure and start to think about other things when looking for something fun to do. The type of activities that are proposed signals a way of connecting and unifying human with nature, suggesting an eco-centric human-nature relationship in which humans see themselves as part of the larger system. Bergström says they have to get people to shop only when they need it (Bergström, 2018) and in a way that is something that entails a change of purpose in the systemic structure of shopping. Stating that shopping and consuming is an established need in society though; Bergström explains how ReTuna is aspiring to offer a possibility for people to shop without leaving a negative mark on the environment (Bergström, 2018). Although the visionary aim is to establish a systematic change, this expresses an understanding and acceptance towards what changes are possible to make real on this scale. Wiklund expresses a similar view when discussing why the concept of circular economy has become successful. He says that it is beneficial to work with circular economy since it can be adapted in the current economic system without any big changes; it is just a smarter way of doing the same thing (Wiklund, 2018). Acknowledging that the whole system is built around consumerism, Wiklund expresses that it would be hard to tell companies and politicians to consume less and use less energy since that would affect job opportunities and tax income but that using circular economy as a method can be a way of achieving those goals without making bigger adjustments (Wiklund, 2018).

Wiklund expresses belief in the educational role that ReTuna has by saying that people who visit ReTuna are likely to start become more aware of the environment and other climate issues after visiting (Wiklund, 2018). Bergström also says that they have worked hard to make individuals and companies more aware (Bergström, 2018) which contribute with a purpose for ReTuna to be a system changer. Bergström wishes that ReTuna and the stores located there will become “mainstream” and the concept that all people, citizens and customers wants, to always look at the reused things before turning to a producer of new goods (Bergström, 2018). By contributing to higher awareness of the environment and a new way of looking at the human-nature relationship, ReTuna might become what Bergström wishes for. It has been challenging though, says Bergström, to reach out to people and really establish ReTuna as a new concept. She thinks that the establishment of more “ReTunas” on other places would help make the ReTuna model the obvious way to consume, putting light on the increased benefits of working on the whole system (Bergström, 2018).

## **6.2. Contextual factors contributing to the implementation of ReTuna**

To further understand the implementation of circular economy by the way of ReTuna the contextual factors that have contributed to the implementation will be described in

this section. The aim is to understand what factors have affected the outcome in the specific case of ReTuna.

### ***Political influence***

The implementation of ReTuna was the result of a political initiative to build a reuse- and recycle park. The political involvement was an important ignitor which made ReTuna possible, especially due to the financial support the municipality gave to ReTuna in the initial phase (Wiklund, 2018).

### ***Directives from Eskilstuna municipality's waste plan***

Being part of the municipally run company Eskilstuna Energi och Miljö, ReTuna is still affected by municipal politics since the board of political representatives makes sure the company follows the decisions and policies adopted in the municipality. According to Bergström all decisions are made by themselves though, meaning they pretty much run themselves and are not really dependent on the municipality's support. They do get their directives from the municipal's waste plan though, which is a politically adopted policy (Bergström, 2018). The content of Eskilstuna municipality's waste plan will be analyzed in the forthcoming of the study, especially focusing on the plan's way of promoting circular economy by the way of ReTuna. Thereafter, it is also of interest to understand what it is that has made Eskilstuna municipality decide to focus on an increased cycling of resources. It is a fact that despite the focus on circular economy in the Swedish national waste plan as well as in EU directives, circular economy is generally not a priority the way it has become one in Eskilstuna municipality. Therefore, the contextual factors that have contributed to the existence of ReTuna as well as the motivations behind the implementation will be highlighted.

According to Swedish environmental law, all municipalities in Sweden ought to have a cleanliness agenda with local rules and a waste plan. In the beginning of Eskilstuna municipality's waste plan it is stated that the plan serves as a document for how to increase the cycling of resources in the municipal waste system (Eskilstuna municipality, 2017). According to the municipal waste plan, the identified areas of improvement are based on national environmental goals, Sweden's national waste plan, current legislation and discussions around waste planning (Eskilstuna municipality, 2017). The Swedish national waste plan aims to make waste management more resource effective and present solutions that are supposed to “*decrease the amount of waste and unsafety connected to it, make better use of the resources in waste, stop the spread of toxic substances and generally improve the management of waste*” (Naturvårdsverket, 2012:10). The plan is influenced by the waste hierarchy, an EU-directive which is also embedded in Miljöbalken, Swedish environmental law. According to the waste hierarchy waste should first of all be prevented, second prepared for reuse, third recycled, fourth recovered as energy through incineration and lastly disposed of at landfills. The directive describes what the priorities in waste management shall be and in the national waste plan it is stated that politicians have a big responsibility to create a society in which waste can be prevented (Naturvårdsverket, 2012). Also, Eskilstuna municipality's membership in SEKOM (Sveriges ekokommuner, Sweden's environmental municipalities) affects the direction of the waste plan. It is stated in the municipal waste plan that SEKOM wants to develop towards a closed loop society which entails that Eskilstuna municipality as a member should implement a similar line of thinking in political decisions, the waste plan included (Eskilstuna municipality,

2017). The combination of these inputs has resulted in a waste plan which presents a strategy which aims to treat waste higher up in the waste hierarchy by developing a waste management system in which ReTuna is an important part. It is stated in the waste plan that *“ReTuna is a cornerstone in the development of new business models within circular economy, for increased resource reduction and reuse”* (Eskilstuna municipality, 2017:10). The strategy aims towards the following vision:

*“In Eskilstuna, in the year of 2025, we prevent the emergence of waste and thereby decrease the output of waste. Good product quality contributes to a sustainable consumption. Used products that people want to give away are reused, recycled and taken care of in a long lasting way without harming nature. Material use is recognized for a careful usage of natural resources and energy. The closed loop system has effectively been detoxed by taking care of and destroying dangerous substances”* (Eskilstuna municipality, 2017:11).

To reach the vision, goals have been outlined in the following four areas; (1) reduced output of waste and an increase in reuse, (2) reduced environmental damage, (3) increase in recycling and (4) customer orientation (Eskilstuna municipality, 2017). In the waste plan it is identified what the municipality can do to create the best preconditions to reach the goals outlined in the plan. Part of that is to facilitate and make it easier for people and organizations to sort and deposit their waste in an environmentally friendly way (Eskilstuna municipality, 2017) and ReTuna is one example of such behavior. ReTuna is given an especially important role in the fulfillment of the first goal area “reduced output of waste and an increase in reuse”. The strategic goal in this area is to make sure people and organizations are aware of waste minimizing alternatives and that they contribute to a reduction of waste and an increase in reuse. Part of this goal is to develop ReTuna and make sure ReTuna is economically feasible (Eskilstuna municipality, 2017). Also, ReTuna is emphasized in the waste plan for its potential to become a knowledge center for circular economy where new business models can be developed (Eskilstuna municipality, 2017).

It is stated in Eskilstuna municipality’s waste plan that to reach the long term goals outlined in the plan production and consumption patterns have to change (Eskilstuna municipality, 2017) and taking a step further in the right direction an action plan for sustainable consumption based on circular economic principles is being elaborated in collaboration with 4M (Fyre mälärstädér i samarbete, a collaboration between Västerås, Enköping, Strängnäs and Eskilstuna) (Eskilstuna municipality, 2017; Wiklund, 2018). Such an action plan would probably even further incentivize the development of ReTuna.

### ***A demand for circular economy***

ReTuna is not only a result of policies adopted with the purpose to manage waste in resource effective ways. Without the directives, ReTuna would not exist in its current form but the story of how and why Retuna was implemented also reflects a demand for circular economy. The first idea behind what later became ReTuna was the idea of a citizen in Eskilstuna showing interest for up cycle design and how waste is treated in design (Wiklund, 2018). This implies that the demand for a place where reuse and recycling was adopted in design was the starting point of the implementation of ReTuna and later the demand for circular economy had an impact on politics and inspired a

political incentive to take form. Today too, the demand for circular economy is shown through the many people that visit the mall and ReTuren where materials and products are left for reuse. People's engagement, interest and support for ReTuna are part of making it a successful implementation and without it there would be no business case for the stores located at ReTuna (Bergström, 2018). Through the way ReTuna contributes to an increase in awareness and knowledge people are encouraged to think critically about current consumption patterns and can become more interested in alternative ways of consuming, such as buying reused products sold at ReTuna. As Bergström says, consumption is an influential part of people's life in today's society (Bergström, 2018) and that is also part of the explanation for why ReTuna exist, to tackle the problems connected to high consumption rates. Consumption patterns demands for excessive resource extraction and the large flow of materials result in big amounts of waste that have to be managed in effective ways.

Wiklund informs that circular economy is also emphasized in Affärsplan Eskilstuna (Eskilstuna business plan) (Wiklund, 2018). Affärsplan Eskilstuna describes how the business sector should develop the next ten years in a way that contributes to the creation of jobs and economic development. Two of the many activities planned to reach the goals of the business plan aim towards emphasizing the potential of adopting circular economic principles for companies as well as for Eskilstuna in general (Affärsplan Eskilstuna, 2017). This makes visible the belief in the potential of circular economy to be beneficial for business as well as the economy and the rest of society.

### ***The motivations behind the implementation***

The membership in SEKOM is a reflection of the municipality's environmental profile and on the Eskilstuna municipality website circular economy is described as a part of the municipality's environmental and climate work (Eskilstuna municipality, 2017b). When asking Bergström and Wiklund why ReTuna exists, they both say it is because of a political initiative with the intention to move waste higher up in the waste hierarchy (Bergström, 2018; Wiklund, 2018). It is stated in the municipal waste plan though that when pursuing the vision outlined in the waste plan it is also important to make sure waste management does not exceed reasonable costs (Eskilstuna municipality, 2017). Bergström says waste valued 20 million SEK have been saved since ReTuna was established (Bergström, 2018) which of course is economically beneficial for the municipality. In a report written before ReTuna was built, the expected benefits of creating a reuse- and recycle park based on circular economic principles were outlined mostly in terms of economic benefits (Pledger & Fälth, 2014). It was expected that Eskilstuna would gain competitiveness, increase resistance towards future cost increases on the natural resources market and also become one of the leaders in the market for competence needed to work towards the guidelines of EU's waste hierarchy (Pledger & Fälth, 2014). The motivations behind the implementation of ReTuna might very well be economic gains and cost savings, or, a combination of both economic and environmental gains. Regardless of the motivations, the implementation of ReTuna has resulted in a combination of environmental and economic as well as social benefits and that might be an important explanation for the success of ReTuna. Bergström expresses a similar viewpoint by referring to the collaboration of different actors and interests when trying to explain the success of ReTuna (Bergström, 2018).

## **7. HOW DOES THE IMPLEMENTATION OF RETUNA REFLECT THE SUSTAINABLE DEVELOPMENT WAY OF IMPLEMENTING CIRCULAR ECONOMY?**

In this section the analytical framework presented in this study will be applied when analyzing the potential of ReTuna to result in sustainable development. “The sustainable development way of implementing circular economy” suggests how circular economy should be implemented to result in sustainable development and here the degree to which ReTuna reflects such an implementation will be analyzed.

From the case study analysis it is made visible that the implementation of circular economy by the way of ReTuna consists of a wide range of innovations. Being part of the waste management system it represents practices that make it possible to move waste higher up in the waste hierarchy by providing a solution for people how to reuse and recycle their products and materials instead of throwing them away as waste to incineration or landfills. It also represents the practice of businesses choosing to create value using business models that fit into the circular economy. The existence of ReTuna also provides its customers with the opportunity to consume reused products. The idea is to adopt the 3Rs principle or in other words to make reality of the EU’s waste hierarchy. The leverage points of these interventions to the system are shallow and do not result in any systemic changes. People are provided with alternatives of how to consume and how to make use of their waste instead of throwing it away but it does not change the system’s intent or design. The production and consumption system is left to be continuously growth-oriented without any noticeable decrease in consumption rates.

But ReTuna is more than just an expression of a set of practices. The establishment in itself is a facilitator of circular economy as it allows businesses and consumer to adopt circular economic practices. The cooperation it enables between the municipal waste sector and private businesses is a corner stone in making the adoption of circular economic practices possible. Being incentivized by the municipality, it shows how the involvement of a governmental institution has been an important driver that has facilitated the implementation of circular economy, especially since the municipality also supported ReTuna financially in the start of things. The symbiotic network that has risen between the waste management sector and the commercial sector that ReTuna represents allows circular economy to grow a little bit bigger in society. When practices are adopted within the scope of ReTuna, they immediately get a bigger range thanks to the fact that ReTuna has become a known arena that people search themselves to and therefore Retuna creates the potential for single events to become patterns. It suggests a systemic redesign of how the local municipality makes use of their waste and how citizens together make it possible for companies to adopt new business models. In a way, ReTuna has become an institution in itself, or as Bergström puts it, a societal actor (Bergström, 2018) and it gives ReTuna the ability to facilitate change. It does not though, as Bergström expresses too, possess the ability to be a system changer in terms of the system’s intent. Bergström says that it is a known fact that people have to stop to consume for fun and instead only consume what is absolutely necessary but since the demand is already there, ReTuna wants to offer the possibility to at least consume in a better way (Bergström, 2018).

Although this realization is made, ReTuna do make important efforts that could contribute to a change in the values and norms of the society. About the purpose of why

ReTuna exists, Bergström says that ReTuna should situate an example for how to carry forward an omställning of the future of commerce but also that the vision is to “save the Earth” (Bergström, 2018). To the public, ReTuna wants to show the importance of valuing the resources from nature and that economic growth has to be disconnected from resource depletion. Abson et al. express the value of re-connecting people with nature as one good leverage realm for facilitating change that can result in a transition of society towards sustainability. In its urge to become a climate destination, Bergström says they are trying to provide people with the opportunity to partake in other activities than shopping, activities that allows people to connect with nature (Bergström, 2018). When people re-connect with nature, their perception of their role as humans in the natural environment can change as they realize how much they rely on nature to function (Abson et al., 2017) and by providing outdoor activities in the natural environment ReTuna can contribute to a change in people’s attitude towards nature. When people get another perception of nature they are more likely to engage with and be interested in environmental issues and as long as there are institutional bodies (like ReTuna) there to provide them with the opportunity to do so they might adopt more sustainable lifestyles (Abson et al., 2017). In other words, ReTuna contributes to an alteration of the intent of the system by affecting people’s values and norms and if the change comes across, ReTuna situates an example of a re-design of the way of consuming. Likewise, by educating and informing people about circular economy and sustainability, ReTuna influences people to think differently about nature and the environment which in turn allows change to be undertaken more easily. Consumers’ environmental awareness is an important facilitator of circular economy since that is part of creating the demand and business case for circular economy (de Jesus & Mendonça, 2018). For a transition towards circular economy to be made possible, the structural barrier of path-dependencies have to be taken away and raising awareness about as well as offering other alternatives are ways of doing that. Bergström expresses it is still a far way to go though before ReTuna has been established as the mainstream way of consuming, which is what they aim for ReTuna to become (Bergström, 2018). Despite efforts made from ReTuna to change the production and consumption system’s intent and design it is still characterized by linear economic norms and values. Being a small part of the globalized economic system, this is not a surprise. The implementation of circular economy by the way of ReTuna is only a fish in the sea and due to the global character of the economy it is difficult to change the entire economic system by working only on a local level. As Bergström expresses, it would probably help if there were more “ReTunas” out there and this way of consuming was considered the obvious way to consume (Bergström, 2018). On the other hand, ReTuna has gained a lot of attention for being a frontrunner in the area and it is possible that the reputational gains it has made because of this is part of the reason the establishment exists. At least de Jesus & Mendonça state that reputational gains are a driver for the implementation of circular economy for businesses (de Jesus & Mendonça, 2018) and in the pre-study that the municipality did before building ReTuna the advantage of being a frontrunner in the area was emphasized too (Pledger & Fälth, 2014).

Another thing that points towards ReTuna as an implementation that has the potential to deliver a transition towards a sustainable society is the involvement of several actors in the implementation. As has already been mentioned it facilitates collaboration between the established companies at ReTuna and the municipal waste sector but it also includes

interests of other actors in society. First, it involves the municipal work agency AMA. Their involvement has contributed to the creation of many jobs for people who have a hard time entering the job market. Second, ReTuna houses an educational program focusing on up-cycle design (Eskilstuna Folkhögskola) which in turn has facilitated cooperation with many other interested companies that want to receive inputs about how they can make use of their material in better ways than to dispose of it as waste. Third and maybe most important, the municipality has been involved and made the implementation of ReTuna become possible by providing financial means etc. Also, it is in the future of plans to involve even more actors by trying to develop ReTuna to become a climate destination and additionally, the pedagogical sector of the municipality will soon be involved by providing them with unsold material received at ReTuna (Bergström, 2018). The involvement of all these actors makes the outcome of ReTuna bigger and more important. Several actors have an interest for ReTuna to succeed and the support of the establishment increases. It shows how circular economy has become regionalized and has leaked out and become beneficial for the society as a whole. By involving all these actors of which many are social actors, ReTuna itself has created a social and cultural support for circular economy in the society, which is one of the factors that facilitates the implementation of circular economy (de Jesus & Mendonça, 2018). The involvement of many actors and their different interests also contributes to a multi-dimensional approach to the problems that ReTuna aims to address. It allows ReTuna to be a solution for many things at the same time making its implementation strong enough to really contribute to a change (Abson et al., 2017).

Once again it has to be emphasized that the role of the municipality as a facilitator of ReTuna has been a crucial driver of the implementation. The political incentive, formed by national as well as supranational directives as seen in the municipal waste plan (Eskilstuna municipality, 2017) reflects a way of governing that signifies a rethinking of the value of waste and how resources can be reduced, reused and recycled. It reflects new goals and priorities in politics, another driver of circular economy (de Jesus & Mendonça, 2018). Politics shape the design of the economic system by constituting goals and regulations reflecting one of the deeper leverage points. As a result, practices are influenced and as can be seen in the case of ReTuna, it can also be part of helping to facilitate a new mind set in people (Abson et al., 2017). The interaction between different system levels should not be forgotten about, all implementations regardless of leverage point, can end up influencing the whole system. In the contextual analysis of ReTuna it is further shown that other areas within politics are also emphasizing the value of circular economic principles. The business plan is inspired by circular economy and there is a project running that addresses how consumption patterns can be made more sustainable (Affärsplan Eskilstuna, 2017; Eskilstuna municipality, 2017; Wiklund, 2018). Moreover, an interest in and demand for circular economy was found existing even before ReTuna was implemented which was an important contributor of its existence. Still, the demand for circular economy is shown by people who partake in the activities of reducing, reusing and recycling and that is what keeps the organization flowing (Bergström, 2018). Without people consuming, leaving their things to be reused at Returen and then buying the up-cycled products offered in the mall, ReTuna would not exist. By its way of not only offering these activities but also trying to educate and make people more aware about nature and the environment as well as trying to connect people with nature, ReTuna manages to create a continuing demand for itself.

ReTuna reflects an implementation of circular economy that allows for companies to pursue business in alternative ways. It helps to create an arena and a demand for the products and services circular economic companies produce. ReTuna also consist of other activities that are not circular economic per se but that reflect the way of reasoning behind circular economy. Facilitating a combination of bird-watching, education and social entrepreneurship with alternative ways of consuming, ReTuna consists of a mix of strategies that together capsule an implementation of circular economy that can contribute to create values and norms that shapes people's perception of the human-nature relationship in new ways. Being a small part of the large global production and consumption system, any change in consumption rates or in the system's intent to continuously yield economic growth is unlikely to be the result of ReTuna but its contributions should not be foreseen. Remembering the system thinking perspective's emphasis on delays (Kim, 1999) it can also be difficult to know when the results from intervening in a system will be noticeable. As a frontrunner in the field, ReTuna gains reputation and eventually, others might take up on the ideas and implement similar organizational structures that can facilitate the adoption of circular economic practices as well as new ways of reasoning. Systems' character of interconnectedness makes all interventions important, just more or less influential.

## **8. DISCUSSION AND CONCLUDING REMARKS**

The analytical framework that is developed in this study describes how circular economy should be implemented to result in sustainable development. From a system thinking perspective, circular economy should be implemented in a way that reflects an understanding of circular economy as a way of reasoning about the economic system and the human-nature relationship. This will contribute to facilitate the systemic changes that are necessary for eco-centric sustainable development to take form. This does not entail that other implementations that reflect another understanding of circular economy are a waste of time; from a system thinking perspective all interventions to a system changes the function of a system but to varying degrees. The interconnectedness of the parts of a system also implies that one implementation of circular economy can influence and facilitate other innovations directed to the system.

It has become visible from this study that circular economy can be implemented in numerous ways and the implementations reflect different definitions and understanding of what circular economy is. By making visible how differently circular economy is implemented depending on how the concept is understood, the results of this study raise awareness about the importance of synchronizing implementations with the purpose one has for implementing circular economy. The understanding of what circular economy is will have an impact on what implementations are made which in turn have an impact on what results can be expected. It goes both ways, knowing what can be expected from different types of implementations helps to make sure circular economy is implemented in the "right way", right depending on what the aim and motivation behind implementing circular economy are.

As have been shown in the analysis of how ReTuna reflects "The sustainable development way of implementing circular economy", the systemic changes that are needed for a sustainable transition of society to be facilitated are not found in the implementation of ReTuna, yet at least. The intent of the production and consumption

system is left characterized by the linear economic model which indicates a natural resource depletion of measures too high to be considered sustainable. Defining sustainable development as development within the boundaries of the Earth, ReTuna fails to deliver enough change to facilitate the necessary transition of society. By its expression of circular economy as a way of reasoning, ReTuna takes on the difficult but honorable task of trying to bring about systemic change but system changes are difficult to make happen. The implementation of ReTuna should not be foreseen as a failure because of this, although not yet resulting in a transition of society it reflects an implementation that could be a step on the right way. Also, positive contributions have been made to the society, environment and the economy even though they might not be “sustainable enough”.

In the analytical framework put forward in this study, sustainability is interpreted from an eco-centric world-view. Viewing sustainability like this demand for a restructuring of the norms and values of society but with another view of sustainability, it would become a bit easier to succeed in delivering a sustainable outcome when implementing circular economy. If to a higher degree accepting the norms and values given by the capitalistic system society exists within today and at the same time accepting an anthropocentric look on the world, the implementation of ReTuna and the contributions it has made to society are suddenly far more prominent. With an eco-centric understanding of what is sustainable, as in this study, circular economy has to be understood and implemented as a way of reasoning. But if there is no interest in pursuing a sustainable development of society that rests on an eco-centric worldview, implementing circular economy as understood as a way of reasoning will not be necessary. As it has been showed in this study, the way of defining and understanding circular economy will have an impact on how it is implemented. To make sure an implementation of circular economy results in sustainability, the working definition of the concept has to be synchronized with what is perceived to be sustainable.

The value of this study is first and foremost for those that are concerned with how society can develop sustainably within the boundaries of the biosphere, turning to circular economy as the solution. Such an interpretation of sustainable development that is used in this study is unfortunately not seen too often though (Imran et al., 2014) and although it was not within the aim of this study, it would be interesting to study what the outcome of an implementation of circular economy by the way of ReTuna actually can be. Likewise, how would the potential of the implementation of circular economy by the way of ReTuna be described if sustainable development was differently interpreted? Staying with the eco-centric perspective of what sustainable development is, another idea of a future research project would be to further address how the visible outcome of ReTuna constitutes a path on the way towards the necessary systemic transition of society.

The study also offers insights in how circular economy has been implemented by the way of ReTuna. Although it is not the explicit focus of the study, the results can be used as a learning example for how circular economy can be implemented. Especially the way ReTuna has in itself shown to create and establish some of the important drivers for circular economy as well as how contextual barriers have been removed and worked around can make valuable insights for those who wish to implement something similar to ReTuna. The positive contributions that ReTuna have resulted in should not be

foreseen and if the results desired reflect the ones seen in the case of ReTuna, much learning can be done from studying the implementation of ReTuna.

This study suggests “The sustainable development way of implementing circular economy”, carried forward with system thinking and an eco-centric perspective on sustainable development. As previously addressed, the desired outcome has to be synchronized with way of implementation but, what is the ambition? What is the desire or even, what are the possibilities of ever implementing circular economy the way suggested in this study? Further research should relate the results from this study with research on what are the possibilities and ambitions to implement circular economy this way. That could result in another sustainable development way of implementing circular economy that is more realistically adjusted to present contexts.

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