



UMEÅ SCHOOL OF BUSINESS,  
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# MATERIALS NETWORK IN UMEÅ AND VAASA REGION

**The implementation of a circular  
economy**

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## Summary

This report is written as a part of a D-level course at Umeå School of Business, Economics and Statistics (USBE) for Circular Regions. The report aims to provide strategic suggestions for Circular Regions, to ensure mass adoption of a secondary-materials marketplace - The Materials Network - in Umeå and Vaasa regions. The report analyses the possibilities for a circular economy by dividing stakeholders in the region in clusters. The clusters present in this region are Policy Makers, Innovation, Waste, Distribution and Production. Based on the analysis of the clusters, the report identifies various tactics that Circular Regions could adopt and use to assess and improve the functionality of the Materials Network. The tactics are: Idea; Driving forces and commitment; Activities; Critical mass; and Organization.

After analysing the clusters and identifying tactics, strategic suggestions were formed. To ensure the mass adoption of the marketplace, Circular Regions needs to communicate the financial benefits that joining the Materials Network will present to the stakeholders, by identifying and gathering information regarding policies and financial forecasts. The policies refer to taxation and environmental requirements that may be a source of lower costs. The financial forecasts refer to information regarding cost savings and alternative revenue sources that are relevant for the specific actor that is approached. Secondly, Circular Regions should plan and implement activities, such as networking events and seminars, to acquire new members and increase the commitment of the current members of the network. Lastly, Circular Regions should include Vaasa in the marketplace from the beginning. In order to do that, Circular Regions needs to establish relationships with relevant actors in Vaasa, such as the University of Vaasa, in order to gain access to networks in the region.

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# **1. Introduction**

This work has been written as a part of a D-level course at Umeå School of Business, Economics and Statistics (USBE) for Circular Regions.

## **1.1 Case**

Circular Regions is an Oslo-based company, providing innovative solutions to enhance and encourage region-based circular economies. Circular Regions aims to connect actors and companies located in an area and establish ways for those companies and actors to participate in circular economies (Appendix 1). The company aims to provide new products and services for SMEs, and to create regional systems where one organization's waste becomes another organization's resource, generating new business models, tools and models, and products and jobs.

Circular Regions is intending to launch Materials Network, a marketplace for secondary products, waste streams and by-products. The Materials Network has been on a test-period in Oslo with environs by Circular Regions and they are intending to launch it in Umeå and Vaasa -regions, aiming to achieve critical mass and cross-sector adoption across all stakeholder levels; public, private and third sector. The company is not yet operating in this area and according to the OECD (The Organisation for Economic Co-operation and Development), the regions present an opportunity for the development of circular economies due to previous initiatives and spirits present in Umeå and Vaasa.

As one important stepstone to realize this opportunity, Circular Regions have given the authors the task to analyse the different stakeholders in the regions that are incorporated in the OECD-participant list. The analysis will begin with establishing clusters for the actors in the region. By distributing the actors in Umeå into several clusters, the authors can analyse and give examples regarding the companies based on their role in the circular economy. Moreover, the analysis will include identification of limitations and weaknesses that could slow down mass adoption of circular economies, tactical suggestions to enhance the market adoption of the Materials Network, and assessment of opportunities and strengths that are present or may evolve from the network created by Circular Regions. The analysis will focus both on the clusters as well as on Circular Regions and present critical points to focus on for the actors in the clusters and suggestions for Circular Regions that Circular Regions can utilize to develop a stable network for development of a circular economy in Umeå and Vaasa regions.

This report includes an introduction of the main concepts relevant for the report and presentation of our framework that will work as a basis of argumentation for analysis. The analysis includes SWOT-analysis and presents characteristics and other important factors in the network. In addition, the report also includes critical factors related to Vaasa and the integration of that region to the Materials Network in Umeå. The final product of this report will therefore be a set of recommendations for Circular Regions to enhance the mass adoption and expand the network, considering the various stakeholders presented in the region. The purpose of this report is to be used as a guide to enhance the market adoption of the marketplace and to highlight obstacles that may slow down the development of circular economies in the Umeå and Vaasa. Lastly, this report aims to provide a framework that is imitable also in other regions.

## **1.2 The Circular Business Model Canvas**

Changing a company's business model to a circular one is challenging. The Circular Business Model Canvas (CBMC, see Appendix 2) is a conceptual framework that practitioners can use to facilitate the transition process from their current linear business models to more circular business models (Lewandowski, 2016, p. 2). The task involves the construction of a framework to support Circular Regions in their implementation of a circular economy (Appendix 1) within the Umeå and Vaasa Region and relevant actors. Since this implementation potentially requires some changes in the actors' current business models, the CBMC is considered to be a suitable framework to apply in this case.

Therefore, in the following section, we will categorize the stakeholders in clusters, which will then be connected to the CBMC. This to identify what beneficial characteristics the actors within the clusters have, from a circular economy perspective. Due to the limited amount of time and lack of complete information regarding the companies in Umeå, the analysis will only include the most relevant blocks within the CBMC for each cluster. With relevant blocks referring to the Take-Back System and Adoption factors, depicted below. By focusing on the most relevant factors for each cluster, the authors are able to identify which potential changes the actors within the clusters will need to implement, in order to transition their current business model to a more circular one.

However, the CBMC is a generic framework and thereby more focused on how to theoretically transition a linear business model to a more circular one, in comparison to giving practical instructions on how to realize the transition process (Lewandowski, 2016, p. 22). This entails that the identified changes that the actors within each cluster need to implement, are general suggestions. If the transition process is to be realized in practice, further details regarding each actor within each cluster need to be addressed. This to conclude which specific changes each actor needs to implement within their respective business model, to transition their business model into a more circular one. Despite the generic aspect of the CBMC, we consider that it is a useful and suitable framework to apply to our specific case. This since it will contribute to a more comprehensible illustration of how to innovate and change the involved actor's current business models into circular ones, in order to enhance the possibility of a successful implementation of a circular economy in the Umeå and Vaasa Region.

When applying the CBMC on the different clusters, the authors used information about the actors in the region and what they are currently doing to make the right assessment for the cluster as a whole when implementing a circular economy. In this way, the authors identified improvements and changes that each cluster could pursue, while simultaneously not demolishing the practice each cluster is currently carrying out. Our goal is not to change the fundamental core of each cluster's meaning to the economy, but to make sure that they could proceed with their essential parts at the same time as they are working within the circular economy. This aims to provide solutions and suggestions with the aim of adding value for the stakeholders in the Umeå region.

### **1.3.1. Take-Back System and adoption factors**

There are two prominent components that differentiate the CMBC from the traditional business model canvas - the take-back system and the adoption factors. Take-back systems refer to the return, reuse and collection of used products and materials and involve the implementation of such logistics in the business model. Adoption factors involve initiatives

both internally- and externally of the organizations, to reduce possible rejection towards the transition of the business model into a circular one. Internal adoption includes organizational capabilities to shift towards the circular economy business model, such as team motivation, organizational culture and knowledge. Therefore, change management is needed, to enhance human resources and team building that facilitate the transition into a circular business. External adoption involves the implementation of adequate technology to support the material tracking and recycling that circular businesses require. Further external adoption factors are political, economic and sociocultural. The latter involves the management of customer habits, to assist and facilitate the customers in possible changes of their previous habit pattern in the transition to the new ones, that the circular business model requires (Lewandowski, 2016, pp. 19-20). Therefore, we argue that all clusters and their respective actors within the Umeå and Vaasa Region, need to implement these two components into their current business models, to transit the actors into a more circular one.

## **2. Clusters**

This chapter will identify clusters for the circular economy and the main characteristics of each of the clusters. Furthermore, this chapter will include SWOT-analysis of the business models within the clusters, and investigate strengths, weaknesses, opportunities and threats that the collective business models might present to the adoption of circular economies and the Materials Network. The analysis will be based on how well the characteristics of the clusters' current business models correspond to the circular business model canvas adopted from Lewandowski (2016, p. 21). A summary of the findings of the SWOT-analysis of each cluster can be seen in Appendix 4.

The SWOT-analysis is conducted by using information of the respective businesses and their operations. This information is retrieved from their official webpages. Further, our personal reasonings are included and supported with conducted studies when possible. Lastly, this information and reasonings are assessed in relation to the CBMC. This to evaluate which strengths, weaknesses, opportunities and threats each cluster in general possess in relation to the CBMC and thereby contribute with relevant information for us to conclude which strategic options we suggest that Circular Regions should adopt.

### **2.1. Clusters**

As the task revolves around the establishment of a regional economic initiative, it is important to understand how these regional initiatives can be built and implemented. This part will introduce clusters and critical aspects of implementation. Further, this part will present how the different actors in the Umeå and Vaasa-regions will be distributed among the clusters, ultimately creating the circular economy.

Firstly, the CE presented in Appendix 1 consists of clusters of companies and actors in Umeå and Vaasa regions. These two building blocks - the clusters and the regional constraint - indicate the significance of exploring what is called *cluster development* and *cluster initiatives*. The term "clusters" is widely understood based on the definition by Porter (2000, p. 15) as "geographic concentrations of interconnected companies". These concentrations of interconnected companies enhance the value for each other and are often mediated by specific organizations called cluster initiatives (Klofsten et. al., 2015, p. 65). These cluster initiatives are responsible for the development and support of these networks of clusters and the companies within, for example by raising awareness and creating different platforms for

interaction between the companies and external parties (Klofsten et. al., 2015, pp. 65-66). As can be derived from this definition, Circular Regions is establishing a cluster initiative for the region (the Materials Network), connecting companies, governmental bodies and other stakeholders in order to create circular economies, in the form of the marketplace.

As the concepts of cluster development and cluster initiatives are defined, identifying critical success factors is necessary for the successful implementation of clusters. Adopting the model of Klofsten et al. (2015, p. 67), a cluster initiative should have; (i) an idea, (ii) driving forces and commitment, (iii) activities, (iv) critical mass, and (v) organization. The *idea* refers to the needs that are satisfied with the cluster, the actors in the group, and which resources should be available for the actors. *Driving forces and commitment* refers to the ability of the initiative to network and motivate the actors in the cluster, in order to increase commitment. As for the *activities*, the initiative should make it advantageous for the actors to join the clusters by complementing other activities. *Critical mass* refers to the scale and the number of members the cluster has. Lastly, *organization* means that the initiative needs to be able to provide access to the needed resources in the cluster. These critical success factors will be examined more thoroughly later.

Linking this back to circular economies, we have identified five clusters within the circular economies. These clusters include most of the actors in the OECD-participant list, which are companies and stakeholders in different phases of the circular economies. The clusters are (a) Policy Makers, (b) Innovation, (c) Waste, (d) Distribution, and (e) Production and Manufacturing (Appendix 3). These clusters together construct the network operating in the circular economy, managed by the cluster initiative. The identified clusters manage to cover all aspects in a circular economy, from educational institutions to service providers and manufacturers and it was adopted from the illustration of Stahel (2016, p. 436).

## **2.2. Policy Makers**

Businesses are required to follow certain policies, which originate from laws and regulations that are created by the government. Policy makers are as an example governmental organizations that have the power to implement policies. This results in the policies affecting the businesses and their decisions regarding the plan the specific business carries out. The identified and evaluated policy makers within this cluster, can be found in Appendix 5.

### **2.2.1. SWOT-analysis of the policy makers cluster**

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● External adoption factor → Economic factors, through the authority of taxations etc.</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● Complex- and time-consuming deliberations could hinder the implementation of CBM and CEs</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● Increased public interest of environmental sustainability and social responsibilities → Facilitates the implementation of changes that supports CEs</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>● External adoption factor → Potential lack of political- and sociocultural support</li> </ul>

### **2.2.2. Strengths with policy makers**

Policy makers have the authority to adjust aspects that affect all businesses, such as taxations. Thereby, the policy maker cluster possesses the authority to adjust one of the external adoption factors - economic - to reduce the rejection of circular business models. If policy makers would like to enhance the adoption of a circular business model and the implementation of circular economies, they could use such aspects to influence businesses in the Umeå and Vaasa Region, to adopt a more circular business model. Through such courses of action, the policy makers obtain a strong position to enhance mass adoption to the intended Marketplace in the region and beyond. Further, as stated by Wiesmeth (2020, p. 228) the main challenges when constructing a circular economy are to use appropriate policy tools to integrate the stakeholders to achieve incentives compatible for the regions and the stakeholders. However, since the Umeå Municipality is already collaborating with Circular Regions, we assume that Umeå Municipality is well informed of which policy tools that are appropriate to use regarding the implementation of the Material Network.

### **2.2.3. Weaknesses with policy makers**

Complex- and time-consuming deliberations could be required for policy makers to establish necessary aspects and make vital decisions that affect the businesses that are interested to adopt more circular business models and join a circular economy. This could entail delays that could erode the patience of the interested businesses, possibly resulting in them changing their mind and deciding to not transit to a circular business and not joining a circular economy.

### **2.2.4. Opportunities with policy makers**

Increased public interest of environmental sustainability and social responsibilities could constitute an opportunity for the policy makers. This, since the increased public interest and public support regarding these areas, could both facilitate and support the policy makers' establishment of initiatives and changes that support the implementation of circular economies. Moreover, the ongoing pandemic of Covid-19 has also shined a light on another opportunity for the policy makers. The pandemic outbreak challenged almost every element of the society into changing their operations quickly to fit the regulations, which afterwards has shown that businesses today have the capacity to make radical changes. This is an opportunity in the sense that policy makers have incentives to encourage and make changes in the economy for the region, and the implementation of those changes can be adapted rather quickly.

### **2.2.5. Threats with policy makers**

Two external adoption factors that are required to implement circular business models, are the political- and sociocultural support. Therefore, we assume that the ongoing pandemic of Covid-19 could possibly constitute an external adoption factor that could be a threat to the policy makers cluster. Both the public and the policy makers themselves, could be under the opinion that the focus should be on the management of the pandemic and its consequences. Thereby, this could constitute an obstacle for the policy makers and the support given to prioritize to realize an implementation of a circular economy within the Umeå and Vaasa Region. Further, the fact that the region involves the participation of two different countries, increases the risk of possible obstacles between policy makers during the current presence of Covid-19. Different countries have different policies and are managing the pandemic in various manners. This entails further threat to the policy makers cluster to reach consensus regarding necessary aspects that an implementation of a Marketplace in this region requires.



## **2.3. Innovation**

The actors within the innovation cluster have the opportunity to exploit innovation and research by helping new start-ups create business models and establishing themselves on the market, as well as giving the resources needed in order to make the necessary research in a specific field of knowledge. The innovation cluster has a different role in the circular economy than the other clusters. The actors are needed in order to help the CE to work in practice, meaning that they have the task of developing new resources or ways of operation in order to complete the circle (see Appendix 3). Participants in the innovation cluster can be found in Appendix 5.

It is important to understand that there are differences in the diverse clusters. As one can see in our model for the CE and our clusters (Appendix 3), the innovation cluster is seen as the cluster who assists as an input to the circularity, meaning that the role of the actors in this cluster is to help and assist the established and new businesses into adapting to the CE. This will also include a difference in the inclusion of the CBMC to the SWOT-analysis in this chapter. Since these actors will not focus on implementing their own adoption or take-back systems, but develop them for the other clusters, the use of the CBMC will focus more on what the innovation cluster can do for the other actors in the CE. In the following sub-chapters, the actors within the innovation cluster will be analysed by their role in the CE, to develop and innovate systems and strategies for the circular economy to be the working economy in the region.

### **2.3.1. SWOT-analysis of the innovation cluster**

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● External adoption factors (for the other clusters) → Developing adoption strategies for business model changes</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● Limitations and regulations → Changes in the consumers behaviours</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● Take-back systems and adoption factors → Innovations and strategic development to change the linear economy into a CE</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>● Policy makers → Threatening the implementation of the new economy for the businesses</li> </ul>

### **2.3.2. Strengths with innovation**

The innovation cluster's strengths when it comes to the adaptation to CE are many. Since they already have the resources and capabilities available to search the field deeper and become "experts", they are then able to use their knowledge when helping new ventures with their business model. This allows the innovation actor to be an actor in the circular economy, as well as to develop strategies and solutions to established businesses. They have the capabilities and resources needed to develop take-back systems for the different actors as well as adaptation systems in order to fall in line with the circular economy. Further, the innovation cluster consists of the actors that have the experience in developing new courses

of action and also finds the right innovation to help the other clusters to develop economic efficiency.

### **2.3.3. Weaknesses with innovation**

When developing the needed innovation systems, as mentioned as the strengths of the innovation cluster, they have to bear in mind that they have little to no power to change the customers behaviours. The innovation cluster then has the weakness of not being able to influence customer awareness when it comes to the circular economy, as well as not being able to change the fundamental parts of customer involvement. The innovation cluster does not possess the power to change the role of the customer in the economy and therefore becomes limited in the process of closing material cycles.

### **2.3.4. Opportunities with innovation**

Being in the innovation cluster of the circular economy means that the actors have the opportunity to develop the necessary tools and courses of action in order to make the linear economy into a circular economy. The adaptation systems for the other actors in the circular economy come from the innovation cluster and the development of new systems, helping each actor and cluster come together in a circular economy. The cluster has the capability and opportunity to make sure that the region becomes a circular economy, not just in theory but in practice. As the policy makers can shape all actors inside the region in theory, the innovation cluster can create the solution needed in order for the region to reach circularity.

### **2.3.5. Threats with innovation**

The innovations created by this cluster might not always work in practice because of the different limitations and regulations from policy makers that the actors need to incorporate and adapt to. As far as the authors know, it may interfere with the wanted implementation of actions towards a circular economy. The innovation cluster does not possess the power to make the limitations or regulations, but it is their role to make sure that they are followed when implementing the different systems. Furthermore, the possibility that the different clusters and actors within the region could be resistant to change is high, meaning that the implementation of solutions could receive friction from the other clusters.

## **2.4. Waste**

This chapter depicts the waste management actors. The actors in this cluster are waste management companies, such as Vakin AB, of which some are partly owned by the municipalities. Also, we highlight another distinction between them regarding their size. The waste management companies are large and used to deal on regional scales, but they also can specialize in different aspects of waste management, from managing landfills to developing recycling techniques. The Waste-cluster's role in the CE is to handle and collect waste and to find a way to recycle- or reuse materials, in order to close the material cycles. A list of actors within this cluster can be found in Appendix 5.

### 2.4.1. SWOT-analysis of the waste cluster

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● Take-back system → In the centre of circular economy</li> <li>● Some belongs to the municipality → Administrative support</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● Impossibility to recycle everything</li> <li>● Too specialized or small</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● External adoption factors → Increase of ecological initiatives at government scale</li> <li>● Bigger network → More opportunities for business</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>● Competitiveness → Costly recycling process</li> <li>● Sensitive subject</li> <li>● “Not in my backyard”-philosophy</li> </ul>

### 2.4.2 Strengths with waste

Because the waste cluster’s goal is to collect and recycle waste, their biggest strength is to be in the centre of the CE. They work for the reuse of waste products, directly from the customers or sell it to companies for new production. The current business models of this cluster are based on the take-back systems making their current operations already more in line with the CBMC. Another strength of this cluster is the range of recycling techniques and specificities which allow them to answer for a majority of recycling opportunities. A wide range of techniques already exist to recycle different types of products thanks to the number of actors involved in the waste recycling. This provides alternative solutions of waste management for individuals and stakeholders on nearly every range of products. This base of recycling techniques, big companies and SMEs are a strength for future initiatives in Umeå and Vaasa region, highlighting the potential of new revenue sources surfacing for the Waste-cluster. Lastly, the support of the state and the municipalities for these types of companies allows for more efficient implementation. Since some of the companies in this cluster is owned by municipalities (Dava, Vakin), the companies are to some extent involved in the administrative side in these ecological issues. This brings support and network opportunities for this cluster that can improve their operations.

### 2.4.3 Weaknesses with waste

Even if there is a lot of progress in waste management and recycling, there are still some products which companies are not able to recycle. This can appear as a weakness for the cluster as long as there is not a solution to treat these materials. Although there is an existing and growing recycling awareness, companies are still looking for efficiency and competitiveness. Not being able to provide a general solution for them can appear as a weakness. Dava (D.A.C., 2020) offers an alternative by storing non-recyclable products such as hazardous waste, which will be encapsulated and buried. Finally, the specialization of some companies can be a weakness for finding customers. Since the Waste-cluster’s role is to supply recycled materials to other clusters, they have to be able to meet the demand of

materials to some extent. By expanding their possibilities of recycling different types of materials, they could be able to acquire customers on a wider scale. However, this could require investments on a larger scale.

#### **2.4.4 Opportunities with waste management**

Most important opportunity for the waste management cluster is the external adoption factors. The actors in this cluster already present solutions for the economy to switch into a more circular way. Waste management companies can make assets and benefits from the global awareness of ecological issues and the human impact. As a result, there are more and more actors that favour ecological practices and are more willing to participate. This is also visible by the political awareness that appeared in Sweden in 2019. The Swedish Government has to take in consideration the ecological impact for each decision it will make (Novithec, 2020). This raises an opportunity for the Waste-cluster in the Umeå region, since it favours their area of profession.

Another opportunity for this cluster is the fact that this cluster is not overwhelmed by actors. Since the market potential for waste management is huge, there is still a lot of space for new actors to enter or/and develop themselves. As an example, an actor could develop themselves by increasing their capacity of waste management, finding new techniques of recycling that would be more efficient, or by recycling new types of products.

#### **2.4.5 Threats with waste management**

The largest threat for Waste-cluster is the large investments required. R&D and infrastructure is costly, possibly presenting obstacles for innovation and development in this cluster. Since investments require capital, the price that waste management companies demand for their services could increase. This highlights the importance of alternative revenue sources through supplying materials to the circular economy. Another challenge for this cluster is to convince the other clusters to choose ecological and recycled materials, even if it might be more expensive. Lastly, the Waste-cluster is threatened by the possibility of encountering resistance from local inhabitants regarding the establishment of recycling plants or storage fields near their residences. Called the “Not in my backyard”-theory (NIMBY) (Saunders, 2013, pp. 7-9), it highlights the possibility of rejection from people who do not want heavy industry or hazardous materials near their residences, because of the risks they present.

### **2.5. Distribution**

The distribution cluster within the Umeå region consists of actors that mediate services and products to businesses and end consumers. A list and description of the actors within the distribution cluster can be found in Appendix 5. This list of actors constitutes the base of evaluation and analysis in the following section.

### 2.4.1 SWOT-analysis of the distribution cluster

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● Adoption of the take-back system → Through direct interaction with customers</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● External adoption factors → Management of customer habits</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● New revenue streams → By extending product life cycle</li> <li>● Increased public interest in environmental sustainability and social responsibility</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>● External adoption factors → Political and economic issues</li> </ul>

### 2.5.2 Strengths with distribution

The biggest strength for the Distribution-cluster lies in the adoption of the take-back systems. One assumption made is that actors within the distribution cluster, often have some form of direct interaction with the consumers. Therefore, we consider that they obtain a relatively strong position in the circular economy regarding their possibility to influence users to return used products and materials to recycle and reuse those. Such logistics constitutes the take-back system, one of the two prominent factors that differs a linear business model and a more circular one. Thereby, we argue that the Distribution-cluster relatively easily can adopt such logistics in their business model and by doing so facilitate the implementation of- and contribute to a continuous circular economy. Such systems can for example be PaaS-solutions, or offering recycling for used products to consumers.

### 2.5.3 Weaknesses with distribution

As mentioned, is the incorporation of external adoption factors one of the prominent factors that differs a CBM and a linear one. One external adoption factor is the management of customer habits and to assist and facilitate the customers in possible changes in their previous habit patterns, in the transition to the new ones that the CBM requires. The actors within the Distribution-cluster are the ones with direct interaction with customers. Therefore, they obtain a great responsibility regarding the implementation and management of such external adoption factors. This is required to realize a transition into a circular business model. We perceive that this responsibility could be both a strength and a weakness when it comes to the implementation of a circular economy in a region - if the distribution actors manage it well it is a strength, and if they do the contrary, it is a weakness. Nevertheless, we argue that this factor needs to be highlighted and prioritized, since we perceive it to be a vital aspect to optimize a successful implementation of a circular economy and a Market Network in the Umeå and Vaasa Region.

### 2.5.4 Opportunities with distribution

#### Extending product life cycle to open new revenue streams

As an example, by offering repair services, performance upgrades of products, reselling used or leftover products or services, distributors can extend the product life cycle. Through such courses of action, distributors can significantly reduce waste and simultaneously open new revenue streams in untapped markets.

### **Increased public interest in environmental sustainability and social responsibility**

Businesses within the distribution cluster often have a direct- or indirect contact with consumers. Therefore, if they would adopt a business model in line with the circular economy and act accordingly, it would present in a clear, palpable manner to the consumers that the companies have a social purpose and give back to local and global communities as a part of their role in the economy. Since people today are more concerned with both environmental sustainability and social responsibility, we argue that this change of business model would result in attracting both skilled employees and increased recognition in media and the industry, which entails numerous advantages and opportunities.

### **2.5.5 Threats with distribution**

#### **Political and economic issues**

External adoption factors, such as political and economic issues, constitute threats to the realization of a transit to circular business models and the implementation of a circular economy. As an example, the current worldwide situation due to Covid-19, puts a lot of pressure on the government and political institutions and their management and prioritizing of resources and errands. Therefore, we assume that this external factor might compose a threat towards the implementation of a Market Network in the Umeå and Vaasa Region. This since the institutions managing vital aspects that make such implementation possible, might be prioritizing other areas due to the pandemic. Further, the distribution cluster within Umeå and Vaasa Region includes businesses of various sizes- and economic conditions. This entails that a transit process to a circular business model and the implementation of a circular economy, might be rejected due to economic restrictions because of the ongoing pandemic. Thereby, we consider that political and economic issues are external adoption factors that might constitute an obstacle and threat towards the distribution cluster and its implementation of a business model in line with a circular economy.

## **2.6. Production**

The production cluster consists of companies that produce and manufacture products and raw materials (Appendix 5). In terms of circular economies, the production cluster has two important factors; the input of materials and the output of a product. The input of raw- and recycled materials is crucial for the existence of a circular economy and using recycled raw materials ensures that material cycles are closed. The output of products places the manufactured goods back into the circulation, creating value for the customers, suppliers and the circular economy.

The production cluster is also placed in a crucial position regarding possible issues and opportunities that may affect the business models of the companies within this cluster. These factors include for example scaling, price competition and supply of raw materials. These will be discussed in the coming sub-chapters.

### 2.6.1. SWOT-analysis of the production cluster

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● Increased resource productivity → Increases profitability</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● Energy consumption</li> <li>● Shocks to supply</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● Industry recipes (learning from others)</li> <li>● Under-utilized resources</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>● Dependency on other clusters → Critical mass</li> </ul>

### 2.6.2 Strengths with Production

The fundamental idea of circular economies is to produce more with less. This implies smarter and efficient use of materials, resulting in cost savings. By implementing circular business model adjustments, companies in this cluster can reach healthier finances, as well as invest in new areas where investments before might have been considered as of secondary importance.

Regarding the implementation of circular business model adjustments in manufacturing companies, Gusmerotti et. al., (2019, p. 323) found that one of the most important factors increasing the probability of a company implementing circular economy actions is economic efficiency. This highlights the importance of communicating the economic and financial factors to the businesses, and the gains connected to those. Gusmerotti et. al., (2019, p. 323) suggests that actions such as reducing the amount of scrap, and improving the efficient use of energy, water and raw materials, increase resource productivity and consequently firm profitability. Besides saving costs, the companies might even gain competitive advantage through reputational factors, in the forms of customer loyalty.

A rather significant factor affecting the production cluster in Umeå Region is the concentrated waste management sector with only a few companies. While this might present issues in terms of competition and prices, the supply chain remains simpler. This makes the acquisition of recycled materials more simple and possibly cheaper.

### 2.6.3 Weaknesses with Production

One of the main weaknesses with the production cluster is energy, and especially consumption (and production) of it. As long as non-renewable energy is produced by burning scrap and other waste, the circulatory system is leaking out materials. This highlights the importance of efficiency in terms of energy and the usage of electricity from renewable sources.

Another weakness with the production cluster is possible shocks to the circulatory system (Esposito et. al., 2018, p. 9). The cluster and the materials network should be able to answer the question: “How can this network be managed in a way that the supply and demand of the recycled and repurposed materials and products is secured and stable enough”. The supply and demand patterns need to be matched with the help of digital solutions, warehouses and diversification, creating preferable conditions.

In addition, cultural change in the cluster is needed. The effect that culture has on strategy should not be underestimated and the employees, shareholders and stakeholders need to be convinced of the long-term gains that transition towards circular economies could present. According to Whittington et. al., (2020, p. 168), managerial actions that might help in terms of culture is to begin with the implementation of current strategy: lowering costs, improving accepted ways of working (routines) and tighter control. Whittington et. al., (2020, p. 168) then suggests that in case further actions are needed, the company should reconstruct or develop a completely new strategy, and as a last resort, move towards changes in the culture. However, one should be cautious when pursuing large changes in the area of organizational culture. Drastic changes can be met by resistance, resulting in legitimacy issues for the new strategy.

#### **2.6.4 Opportunities and Threats with Production**

Besides strengths and weaknesses, companies in this cluster are presented by numerous opportunities. Firstly, the companies should learn from each other. By studying and analysing implementation of sustainability, ways of delivering a product or a service, and innovation activities, companies can find new ways of adopting circular economies to their strategies. As an example, product-as-a-service is an already existing business model innovation present in Umeå. Umeå Energi AB provides solar panels as a service with a monthly fee and a possibility to buy the panels, improving the market adoption by lowering one-time costs and increasing convenience for customers.

Besides product-as-a-service, companies should analyse their own under-utilized resources, such as office spaces and equipment. By taking advantage of these under-utilized resources, companies improve circularity in two ways: the need to create new products decreases and the efficiency of the already-created products increases. As an example, Bostaden AB and Akademiska Hus could utilize and repurpose unused spaces rather than building new ones. The largest advantage in this is that the need for additional resources for this switch is minimal and only depends on the will and innovativeness of these companies.

Lastly, Lacy & Rutqvist (2015; cited in Esposito et. al., 2018, p. 10) propose five business model adjustments for production and manufacturing companies: (1) circular supply chain, (2) recovery and recycling, (3) building products to last, (4) sharing platforms, and (5) PaaS. All of these business model adjustments focus on the efficient use of existing materials and resources in order to present new and additional value, and many of these are already present in Umeå. Umeå Energi AB and Två Punkt Ett are already providing products as a service and Fritidsbanken (although placed in Distribution) is sharing sports equipment. By offering additional services such as refurbishing, trade-in and buy-back systems or adding new features, companies can increase the lifetime of a product as well as gain new revenue sources in the process. Innovating supply chains in order to provide substitute products that are produced more efficiently and ecologically allows companies to decrease the usage of raw materials such as water.

However, an important aspect to note is that the success and failure of the switch to circularity for the production cluster is dependent on the other clusters. Recycled raw materials need to be supplied and new products need to have a demand, new ways of production and usage of raw materials need to be innovated. Lastly, the policy makers need to take initiative to support and encourage others to move towards circular economies in order to create a region-wide culture and eventually possibilities of scaling. Without the support and volume required to create functional economies, the success of the circular



economy and the production cluster is endangered. This highlights the importance of reaching critical mass.

### **3. Tactics for Circular Regions**

As mentioned in chapter 1.3, Circular Regions should be able to assess the dynamics in the clusters and based on that, evaluate possible tactics to implement into their operations. The critical success factors presented in that chapter were as following: (i) an idea, (ii) driving forces and commitment, (iii) activities, (iv) critical mass, and (v) organization (Klofsten et. al., 2015, p. 67). This chapter will present how those critical success factors reflect to Circular Regions as well as present courses of actions that Circular Regions could follow to enhance market adoption.

#### **3.1. Idea**

The Idea refers to the well-defined concept that specifies what needs are being satisfied, who it is targeted for, and which resources are critical for the members (Klofsten et. al., 2015, p. 68). By defining those factors, not only will the marketing of the Materials Network be more efficient, but also the product development of the marketplace. The need satisfied is the need for circularity and sustainable solutions in the region, in order to minimize waste and enhance the usage of secondary goods. The target group will be the five different clusters identified previously, however it is important to note that each of the clusters has their own specific ways they will be contributing to the circular economies, highlighting the importance of understanding the differences of those clusters. Waste-cluster's main contribution is in the collection and distribution of raw materials, while policy makers contribute by directing the individual actors towards specific directions. Therefore, it is important to approach the clusters from their own specific ways and communicate the benefits of joining the materials network present for their specific cluster. This will form a way for the network members to understand why the idea is viable, creating a solid ground for the cooperation between the clusters in the future.

#### **3.2. Driving forces and commitment**

Secondly, Circular Regions should have the capability to increase the commitment of the members for the network. Committed members are necessary in order to spread enthusiasm and energy, which will increase the activity of the network and promote change (Klofsten et. al., 2015, p. 68). Since the idea behind the marketplace is to connect relevant actors together, Circular Regions should continuously monitor and take advantage of the opportunities that arise and use those opportunities in order to create additional value for the members, increasing commitment. Such opportunities are for instance the identification of knowledge present in the network and possibility to meet the specific expectations and needs of the cluster members. Circular Regions can then take advantage of those opportunities by working closely with the members and users of the materials network to continuously develop the service with the help of feedback and comments. Therefore, we suggest that in the development phase of the marketplace, Circular Regions should already take input from the customers from all of the clusters.

### **3.3. Activities**

The activities refer to the factors that make joining the network advantageous for the users. Such activities include various forms of training and education programmes for entrepreneurs, and activities that promote networking (Klofsten et. al., 2015, p. 68). Circular Regions could host seminars and guest lectures with cooperation of the innovation cluster, as well as organize networking events to gather members of the different clusters. By educating the community, Circular Regions can spread awareness and knowledge regarding the existence of the network, but also considering circular economies and the importance of reducing waste. Networking events provide the possibility for the different actors to share ideas, connect to each other and increase the commitment to the network. However, Klofsten et. al., (2015, p. 69) highlights that it can be difficult to persuade companies into participating in such activities. Factors such as lack of time and economic resources might decrease the attendance rate, and thus reaching firms across the whole spectrum might be difficult. Klofsten et. al., (2015, p. 69) suggest that the attractiveness of these activities can be improved by targeting companies in terms of maturity and using the help of established actors that are known to be successful in the region. Such actors can be large companies and well-known institutions, and they can improve the participation rate of the activities. Therefore, we believe that Circular Regions should plan a set of events, seminars and workshops in order to enhance the mass adoption of the marketplace. To improve the attendance rate, Circular Regions should plan the events in cooperation with well-established and successful members. Such members could for example be eXpression Umeå and Volvo Trucks Umeå.

### **3.4. Critical mass**

As highlighted throughout the report, having enough members is crucial for the success of this network. Reflecting this to circular economies, all of the clusters should be represented in the marketplace. This would ensure that the leaks in the material cycles are minimized, as well as provide the means for the clusters to create and absorb value for- and from each other. Lack of diversity will limit the opportunities for exchange in the networks (Klofsten et. al., 2015, p. 69). Besides the number of active companies in the network, different types of actors should be present. Universities, businesses and policy makers are all an important part to move towards functional circular economies adopted by masses.

### **3.5. Organization**

Lastly, Circular Regions should define how they will coordinate all the activities related to the operations of the network as well as the critical success factors. Coordination can be executed in various forms, such as developing communication systems and initiatives, designing different activities suited for the needs of the members, and by establishing connections with actors outside of the network, such as financiers and other stakeholders (Klofsten et. al., 2015, p. 69). Additionally, different roles within the network should be clearly defined, in order to avoid situations where Circular Regions undergo activities that should be assumed by the companies in the networks. An advantageous aspect regarding the materials network is the independence of it from the actors in the region. As an independent actor and a service provider, Circular Region has the ability to target resources to the needs of the functionality of the network, instead of only depending on the efforts of the members.

#### **4. Challenges regarding Vaasa and how to include them**

The goal to include the Vaasa region in the materials network presents both opportunities but also obstacles. This chapter will present the critical points as well as relevant actors participating in Vaasa, and recommended actions that may help in connecting the Umeå and Vaasa regions. First and foremost, we believe that the same cluster model can be used in Vaasa, due to the similarity of the two regions. Vaasa and Umeå are similar in regards to size, industries, and institutions. Since Vaasa will be included in the marketplace, Circular Regions should use the same criteria in identification of companies in order to provide the best solution for each company in the marketplace.

The main opportunity with successfully connecting the Vaasa region to the network in Umeå would be possibilities to scale. Scaling would mean increased number of actors and stakeholders included in the network, which would open multiple doors for the success of the materials network. Firstly, scaling would decrease fluctuations in supply and demand. By including more actors that are both interested in buying materials as well as selling them, the supply and demand patterns would flatten. By having stable demand and supply, businesses would be ensured that their needs and expectations would be met more regularly.

Secondly, scaling would close the material loops more efficiently. By having a larger number of possible customers, selling and distributing left-over materials and secondary products would work more smoothly. This would enhance the functionality of the circular economy as well as work towards the goal of reducing waste and extending product life cycles.

Thirdly, the Vaasa region presents opportunities in the form of existing networks. By taking advantage of the existing networks in Vaasa, the materials network and Circular Regions could gain valuable knowledge from those actors. By creating relationships with the relevant actors could help the materials network to gain access to the Finnish market and gain connections to companies and actors present in the region. Connecting to the right networks and actors in the Vaasa region is crucial for the success of expansion. The most relevant actors that Circular Regions should connect with is University of Vaasa, the City of Vaasa, Vasek (a business development company owned by Vaasa-region), Bio and Circular Finland (Business Finland's Circular Economy -program for businesses) and Renergi (Vaasa's own Circular Economy initiative). These actors could help to gain access to the right companies in the region as well as guide in the process of connecting Vaasa and Umeå.

As it comes to the obstacles, the foremost issue present is the logistics. Umeå and Vaasa are connected by a ferry with 16 departures every week. The logistics and shipping would both result in higher costs, but also in increased CO<sub>2</sub>-emissions and the use of fuel. Since the only other option for this would be to transport goods by land increasing both time and distance, neither one of the options would improve the sustainability of this initiative. This could result in larger negative effects than using completely new materials and therefore requires further calculations. However, as a positive sidenote, Umeå and Vaasa municipalities have ordered a new ferry starting operations between the two cities in 2021, which will partly be powered by electricity and has readiness to be used with biogas.

## **5. Strategic suggestion and action plan**

The strategic options that Circular Regions should pursue are based on the clusters identified in this report. The strategic options will leverage the strengths and opportunities presented for each cluster, while aiming to develop the weaknesses and minimize the threats. Firstly, as mentioned earlier, the adoption of circular economies for businesses depends on the knowledge of economic and financial benefits that circular economies present to the businesses. Thus, Circular Regions should begin by establishing how the local policies promote sustainability, use of renewable energy, and even implementation of circular economies. We believe that Circular Regions are positioned beneficially for this, due to the cooperation with Umeå Municipality and the already established relationships in the region. That information will present Circular Regions with two opportunities; understanding the Policy Makers-cluster and arguments for joining the Materials Network. By understanding the Policy Makers, Circular Regions can achieve a comprehension of the environment and context that the clusters in Umeå- and Vaasa Regions are operating in. Circular Regions will also be able to refer to the exact policies that are relevant for joining the Materials Network, such as tax benefits and possible sustainability requirements. Secondly, Circular Regions should present financial data and forecast how using the Materials Network will benefit the stakeholders in the regions. By presenting how circular economies can benefit the companies without increasing costs drastically, Circular Regions can increase the adoption rate of the Materials Network. This requires market analysis regarding current standards and operations (e.g. price of raw materials) and estimations of the price of raw materials acquired through the marketplace in relation to the current prices of new materials. To realize this, alternative models for each cluster is needed, due to the varying business models and the different nature of the added value that the network brings to the companies. Information relevant for the Waste-cluster revolves around alternative sources of income and possibilities for scaling due to the central role in the circular economy, while Production-cluster should be presented data regarding supply and price of raw materials. All clusters will also benefit from the advantages of using circular economies and sustainability in their external communications, by improving the stakeholders' image and reputation. This will fulfil the concept of the Idea presented in part 3.1.

After identifying the policies and financial factors that promote joining the Materials Network, Circular Regions needs to acquire members. For this stage, the clusters will work as a guideline of establishing what each member's role is in the network, as well as provide opportunities of connecting members that match in terms of types of raw materials possessed/needed, and volume and frequency of those raw materials. Parallel to this, Circular Regions needs to promote themselves and increase the commitment to the Materials Network by creating relationships with the stakeholders. By hosting activities presented in part 3.3., Circular Regions can increase the adoption of the network by educating and spreading awareness to stakeholders in the regions. A strategic weakness for the Materials Network is the need for the critical mass, as presented in 3.4., as the number of members facilitates the functionality of the Materials Network. Therefore, we believe that the activities work as a way of increasing commitment as well as acquiring new members to the network.

In terms of Vaasa, Circular Regions should assume that Vaasa will be a part of the Materials Network from the beginning. Circular Regions should begin by contacting the relevant stakeholders in Vaasa and leverage the relationships and knowledge that those stakeholders possess. At the current moment, Circular Regions' relationships in Umeå are more developed. By establishing similar relationships in Vaasa with governmental actors, the

university, and other organizations, Circular Regions not only gains knowledge regarding the current state of circularity in Vaasa, but also establish a channel to reach the companies. Examples of such stakeholders were presented in chapter 4. After establishing a relationship with the stakeholders, Circular Regions needs to contact the relevant companies in Vaasa and acquire customers as they would in Umeå. Including Vaasa to the Materials Network presents opportunities, as the additional members will help to tackle the issue of critical mass. In addition, extending the geographical reach to another country presents the Materials Network with new material cycles that can be used.

In conclusion, the strategic implications of this report focus on the mass adoption of the Materials Network and highlights the importance of preparation in terms of communication to the stakeholders. Circular Regions should collect material regarding the political environment and benefits for companies, and based on that material, communicate those benefits to the stakeholders. This process should start even before the development of the marketplace (website) is ready, due to the valuable input that the potential future members have for the development of the service.

## **6. Limitations and challenges**

Having established requirements for a functional circular economy (Appendix 1) and the clusters within the regions, it is evident that challenges are present. First and foremost, one has to note that competition - and the lack of it - is just as much a threat for the success of this cluster as for any other business initiative. However, as established by Porter (2000, p. 19), competition in this context both encourages innovation but also makes the market more dynamic. By joining forces with suppliers, competitors and other institutions, the clusters could possibly affect efficiency and stagnate the rate of innovation by reducing competition. This is a critical aspect for the Policy Makers to consider due to the role of presenting incentives for companies to join the CE. Too large incentives may cause negative side-effects. On the opposing hand, competition might also slow down the market adoption of CE. The pursuit of competitive advantages in the form of cost leadership could remain as an obstacle in motivating why companies should join CE and adjust their business models from traditional ones to more contemporary models. It is therefore, in our judgement, critical for Circular Regions to acknowledge the phenomenon of the cooperation paradox, meaning that they need to find a balance between competition and cooperation in order for the CE to work in practice. As mentioned earlier, this report will suggest activities and actions that companies can use to leverage CE and gain competitive advantage through sustainability and alternative revenue streams and cost structures. However, communicating why and how these alternative models can create similar or better profit margins in addition to the sustainability aspects is important.

Besides competition, globalisation could present a threat for location-based clusters. Globalisation has diminished the importance of location (Porter, 2000, p. 15), implying that location based and regional systems might need to provide additional value for the users. By providing additional value, a regional system could be able to gain competitive advantage over the global suppliers. However, the challenge remains in possibilities of scaling and the balance of demand and supply. If the circular economy cannot provide necessary raw materials to the extent that the local actors expect, the global (or large) players remain as a threat for the network and closing the material loops. This is also why the authors consider the inclusion of Vaasa as important, due to the network extending over different markets, introducing more users and therefore more stable demand and supply patterns. By reaching

critical mass in the early stages, the Materials Network can position itself more beneficially in regard to their global competitors.

The available information of each specific actor is limited to the official information presented on their own webpages. This affects our identification and division of each actor to each cluster. In turn it affects the analysis and suggestions of each cluster and the respective proposed strengths, weaknesses, opportunities and threats. This entails that our recommendations and suggestions are general and thereby not applicable to all specific parties. Further, the inclusion of Vaasa in the region of the prospected Material Network, do entail longer transportations and thereby potentially greater environmental impact. This is something to be invoked but not further discussed or evaluated from our party, due to time restrictions and limited opportunities to influence the logistics. Nevertheless, it is a factor that limits the arguments made since it is an aspect that potentially contributes to decrease the degree of sustainability of the intended Materials Network. As presented in various parts of the report, assumptions have been made. These assumptions are not aspects that can be supported by theory and thereby we reserve the degree of the correctness of the assumptions made.

## **7. Conclusion**

Circular Regions assigned us with a task of identifying ways of ensuring mass adoption of the Materials Network in Umeå and Vaasa Regions. The report began by identifying the Circular Business Model Canvas and clusters. The clusters were further analysed with the use of SWOT, where each cluster was assessed based on their strengths and weaknesses in relation to circular economies. The five clusters identified are Policy Makers, Innovation, Waste, Production and Distribution, and each cluster represents an important part in the functionality of a circular economy. Policy Makers are responsible for regional initiatives (such as the Materials Network) and policies and investments that encourage circularity and sustainability. Innovation cluster consists of institutions such as the university, that participate in innovation and the development of solutions that enhance sustainability. The waste cluster is responsible for collection and distribution of recycled materials, which is a crucial part in trying to close the material cycles and make an economy truly circular. The production cluster in turn buys in those materials and produces goods and products, adding value to the materials and extending the life cycle of the products, with alternative solutions. Lastly, the distribution cluster is the cluster selling and retailing the produced goods directly to customers.

The strategic suggestions presented to Circular Regions emphasize the importance of communication for a successful mass adoption of the marketplace. As explained, studies suggest that companies should be presented with financial motivations in joining initiatives. The motivations can include tax benefits, possibility to meet sustainability requirements with less effort, or pure cost savings. This is why we believe that Circular Regions should conduct market analysis and financial estimations for each of the clusters, focusing on the factors that are most relevant for each cluster. By presenting relevant data for the clusters, not only can the process of marketing the Materials Network be improved, but also the commitment to the circular economy increased.

The amount of the members in the network should reach a minimum level in order for the marketplace to be functional. That is called critical mass. By including Vaasa in the Materials Network, we believe that the critical mass can be reached faster and exceeded by a larger

number. However, as motivated in chapter 4, the relationships Circular Regions have established in Umeå are more advanced than those in Vaasa. Therefore, we suggest that Circular Regions should establish contact with the Policy Makers and institutions in Vaasa, that have both knowledge of the market but also existing networks and relationships with companies in the municipality.

Lastly, Circular Regions should plan and host activities that attract new potential members as well as increase the commitment and educate current members. These activities are a good way of establishing physical contact with the companies and other stakeholders, receiving direct feedback regarding the Materials Network, and bringing the clusters together creating new material streams.

With these actions, we believe that Circular Regions can improve the mass adoption of the Materials Network and reach critical mass quicker. The biggest advantage Circular Regions have in the process is the access to the Policy Maker cluster in Umeå, as well as the established contact with Umeå University. In addition, the model of clusters can be imitated in other regions, raising the opportunity of creating hubs of regional Materials Networks that are interconnected. This way, Circular Regions can increase their reach to new regions and markets, closing the material cycles and making the economy circular.

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## **9. Appendix**

### **Appendix 1. Circular economies**

Circular Economy (CE) is an economic system, in which resource input, waste and emissions are minimized by closing and narrowing material and energy loops (e.g. product life cycles) (Geissdoerfer et. al., 2017, p. 759). Geissdoerfer et. al., (2017, p. 759) explain that this can be achieved by design solutions, as well as through recycling and remanufacturing. CE has already gained traction among different actors (Geissdoerfer et. al., 2017, p. 759) at micro-, meso- and macro-levels, in the form of political action plans (European Union, 2020), sustainability initiatives for corporations (Groupe Renault, 2020) and regional programmes such as the Flanders Materials Programme (EEAC, 2020).

A large and growing body of literature has investigated CE, from its linkages to sustainability (Geissdoerfer et. al., 2017, p. 757) to different methods of implementation (Wiesmeth, 2020, p. 227). The importance of Circular Economies for the environment is widely accepted in all of the articles. Besides environmental impact, circular economies have an economic effect - such as the need for growing workforce (Stahel, 2016, p. 435) and increase in household incomes (Sillanpää & Ncibi, 2019, p. 211). However, while the environmental and macro-economic impacts might be convincing to policy makers, circular economies have to make business sense to attract users - SMEs.

For the long-term sustainability of circular economies on micro-level, the incentives to join such initiatives for small- and medium-sized businesses need to be convincing. According to a study conducted by the Confederation of Finnish Industries (EK), the driving force for companies to participate in circular economies is partnership (EK, 2016, p. 4) and reasons to join circular economies include decreasing risks; revealing new opportunities; value-addition to products and brands; and diversification (EK, 2016, p. 5). Sillanpää & Ncibi (2019, pp. 217-219) further identify several ways of achieving those goals: waste management and recycling, digital technologies, and innovative business models for an example. Similarly, Stahel (2016, p. 436) highlights the importance of waste management and recycling, and illustrates circular economies with a model of three “closing” mechanisms: *reuse, repair and remanufacture; take-back of goods; and recycling*. The proposed mechanisms not only present a way to keep material and resources in circulation rather than ending up in waste, but also reveals opportunities in terms of innovation, jobs and specialist knowledge. Turning used products back into raw materials efficiently requires innovation and specialist knowledge, while managing the processes, logistics and transfer of goods create new areas for jobs.

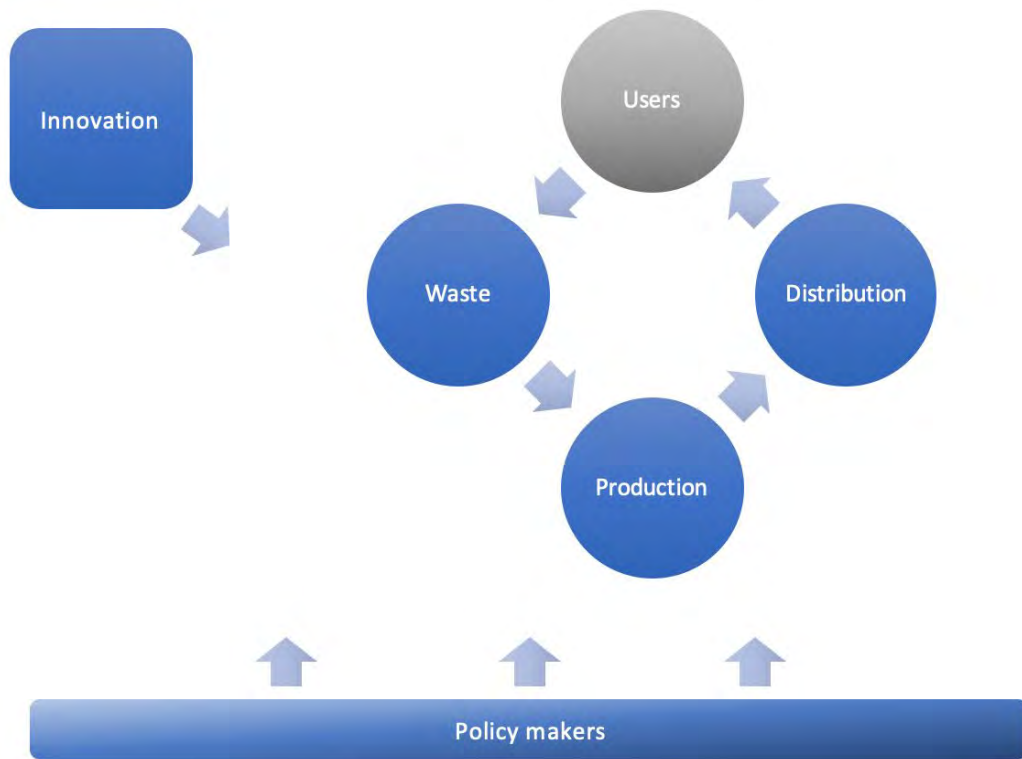
Lastly, Stahel presents some critical tipping points for the success of circular economies. According to Stahel (2016, p. 436), the objective of circular economy is to maximize a product’s value at each point in a product's life. This further highlights the importance of specialist knowledge and new jobs, due to the notion of adding value rather than minimizing costs. Stahel (2016, p. 437) further points to the importance of innovation and research on all areas such as social, technological and economic and to communications and information, in order to raise awareness. Stahel (2016, p. 437) concludes his article by arguing that the last tipping point is policymakers. Policies promoting activities that encourage participation in circular economies further motivates businesses to implement new business models and individuals to consume more consciously produced goods. These actions by the policymakers then further boost circular economies both on micro-, meso- and macro-levels. Having discussed how to understand circular economies and what are the critical aspects one should

keep in mind, the next section of this paper addresses ways of regionally implementing such systems.

## **Appendix 2. The Circular Business Model Canvas**

<p><b>Partners</b></p> <ul style="list-style-type: none"> <li>• Cooperative networks</li> <li>• Types of collaboration</li> </ul>	<p><b>Activities</b></p> <ul style="list-style-type: none"> <li>• Optimising performance</li> <li>• Product Design</li> <li>• Lobbying</li> <li>• Remanufacturing, recycling</li> <li>• Technology exchange</li> </ul> <p><b>Key Resources</b></p> <ul style="list-style-type: none"> <li>• Better-performing materials</li> <li>• Regeneration and restoring of natural capital</li> <li>• Virtualization of materials</li> <li>• Retrieved Resources (products, components, materials)</li> </ul>	<p><b>Value Proposition</b></p> <ul style="list-style-type: none"> <li>• PSS</li> <li>• Circular Product</li> <li>• Virtual service</li> <li>• Incentives for customers in Take-Back System</li> </ul>	<p><b>Customer Relations</b></p> <ul style="list-style-type: none"> <li>• Produce on order</li> <li>• Customer vote (design)</li> <li>• Social-marketing strategies and relationships with community partners in Recycling 2.0</li> </ul> <p><b>Channels</b></p> <ul style="list-style-type: none"> <li>• Virtualization</li> </ul> <p><b>Take-Back System</b></p> <ul style="list-style-type: none"> <li>• Take-back management</li> <li>• Channels</li> <li>• Customer relations</li> </ul>	<p><b>Customer Segments</b></p> <ul style="list-style-type: none"> <li>• Customer types</li> </ul>
<p><b>Cost Structure</b></p> <ul style="list-style-type: none"> <li>• Evaluation criteria</li> <li>• Value of incentives for customers</li> <li>• Guidelines to account the costs of material flow</li> </ul>		<p><b>Revenue Streams</b></p> <ul style="list-style-type: none"> <li>• Input-based</li> <li>• Availability-based</li> <li>• Usage-based</li> <li>• Performance-based</li> <li>• Value of retrieved resources</li> </ul>		
<p><b>Adoption Factors</b></p> <ul style="list-style-type: none"> <li>• Organizational capabilities</li> <li>• PEST factors</li> </ul>				

**Appendix 3. Cluster model**



## Appendix 4. SWOT-analysis of clusters

	Policy makers	Innovation	Waste	Distribution	Production & Manufacturing
Strengths	<ul style="list-style-type: none"> <li>- Economic factors</li> <li>- Authority of taxation and policies</li> </ul>	<ul style="list-style-type: none"> <li>- Resources and capabilities available</li> <li>- Develop take-back and adoption systems</li> <li>- Source of innovative solutions</li> </ul>	<ul style="list-style-type: none"> <li>- In the center of circular economy</li> <li>- Based on the take-back system</li> <li>- Some belongs to the municipality → Administrative support</li> </ul>	<ul style="list-style-type: none"> <li>Adoption of the take-back system → Through direct interaction with customers</li> <li>- Product As A Service</li> </ul>	<ul style="list-style-type: none"> <li>- Smarter and efficient use of materials, resulting in cost savings</li> <li>→ Possibility to invest in new areas which previously have been of secondary importance</li> <li>- Competitive advantage through reputational factors (Sustainability)</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>Increased public interest of environmental sustainability and social responsibilities</li> <li>→ Facilitates the implementation of changes that supports CEs</li> </ul>	<ul style="list-style-type: none"> <li>- Opportunity to develop linear economy to circular</li> </ul>	<ul style="list-style-type: none"> <li>Increase of ecological initiatives/will → At government scale Bigger network</li> <li>→ More opportunities for business</li> <li>- Alternative revenue streams → Large incentives</li> </ul>	<ul style="list-style-type: none"> <li>New revenue streams → By extending product life cycle</li> <li>Increased public interest in environmental sustainability and social responsibility</li> </ul>	<ul style="list-style-type: none"> <li>- Imitability of solutions (Possibility to imitate others in this cluster)</li> <li>- More efficient use of under-utilized resources</li> <li>- Possibility for alternative revenue sources through additional services</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Complex- and time-consuming deliberations could hinder the implementation of CBM and CEs</li> </ul>	<ul style="list-style-type: none"> <li>- Little to no power to change the customers behaviours.</li> </ul>	<ul style="list-style-type: none"> <li>- Impossibility to recycle everything</li> <li>- Too specialized or small</li> <li>- Investments and machinery can be costly</li> <li>- Logistics</li> </ul>	<ul style="list-style-type: none"> <li>External adoption factors → Management of customer habits</li> </ul>	<ul style="list-style-type: none"> <li>- Energy consumption (requirement of renewable energy)</li> <li>- Shocks to the circulatory system → Relies on steady supply</li> <li>- Cultural change</li> </ul>
Threats	<ul style="list-style-type: none"> <li>Potential lack of political- and sociocultural support</li> </ul>	<ul style="list-style-type: none"> <li>- Resistancy to change in other clusters is high</li> </ul>	<ul style="list-style-type: none"> <li>Competitiveness → Costly recycling process</li> <li>Sensitive subject</li> <li>"Not in my backyard"-philosophy</li> </ul>	<ul style="list-style-type: none"> <li>External adoption factors → Political and economic issues</li> </ul>	<ul style="list-style-type: none"> <li>- Dependent on other clusters (Supply &amp; Demand)</li> <li>- Need for a stable supply of raw materials</li> </ul>

## Appendix 5. List of participants in clusters

Participants in policy maker cluster	Key activities
Public Transport Authority	Transport
Umeå municipality	Administration
Region Västerbotten	Administration

Participants in innovation cluster	Key activities
Umeå University	University
USBE	University
Umea Institute Design	University
Research and Development Institute	Research
Coompanion	Advisoring, teaching
eXpression	Incubator, design
Uminova	Incubator, entrepreneurship
Umeå Biotech Incubator	Incubator, medical science

<b>Participants in waste cluster</b>	<b>Key activities</b>
Vakin	Drinking water, recycling, waste collection
Dåva DAC	Recycling waste, storing waste
Stena Recycling AB	Recycling, advising

<b>Participants in distribution cluster</b>	<b>Key activities</b>
Blå Huset	Hotels, coffee shops, restaurants
UmeEcoRide	Electric-driven transportation
Reko-ring	Connecting consumers with local food producers
Fritidsbanken	Renting sports- and outdoor equipment free of charge
Upab	Parking lots, surveillance
Circular Regions	Connecting stakeholders to Material Networks

<b>Participants in production cluster</b>	<b>Key activities</b>
Umeå Energi AB	Energy production
Bostaden	Housing
Volvo Trucks Umeå	Production of trucks
Två Punkt Ett	PaaS (production of sustainable lights)
Tarkett AB	Production of flooring
Polarbröd	Bakery
Norrmejerier	Dairy products
Harvest Umeå AB	Sustainable food production
Komatsu Forest AB	Heavy machinery