

Implementation of Circular Economy in various departments within a company

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Abstract: This paper aims at examining the challenges a company faces when implementing circular economy within their company. Circular economy is viewed as a possible solution to combat environmental degradation caused by the current economic model. In order to apply circular economy as a macro level concept it needs to be examined at company level first as a prerequisite. It is important to ensure its feasibility on company level so that it can be upscaled to macro level. During the transition to circular economy at company level challenges emerge from market restrictions and governmental policies. For the examination of these factors semi-structured interviews were held. Company members were interviewed to obtain their perception of the challenges faced when implementing circular economy into their companies. The results show that various challenges are perceived and that the companies have specific ideas on how to combat them. Challenges perceived were insufficient infrastructure, governmental regulations and communication with customers. Interestingly, a gap between theory and reality concerning the most influential actors for change was identified by the interviewees. The information in the paper is useful for policy makers and entrepreneurs wanting to implement circular economy into their businesses.

INTRODUCTION

We live in a throwaway society where products have a short life span, and their replacement is frequently undemanding and inexpensive in contrast to repairing them (Millar, McLaughlin, Börger, 2019). Subsequently, a large number of resources, often finite ones, is required (Braungart, McDonough, 2014). A further issue is the quantity of waste generated by disposing of still usable items (Braungart, McDonough, 2014). Therefore, these factors have led to environmental degradation causing damage to the planet so that we are in danger of leaving the safe operating space for humans to thrive (Steffen et al., 2015). Due to this, in recent years, the awareness of environmental degradation and climate change has increased (Millar et al., 2019). As a consequence, companies face an increasing demand for sustainable products and services (Millar et al., 2019). These demands stem from public opinion and governments requiring an increase of environmentally friendly practices (Umweltbundesamt, 2020, Sehnem, Vazquez-Brust, Pereira, Campos, 2019). Nevertheless, it is still highly disputed which strategy is the most suitable and successful in combating the negative side-effects of a growing economy (Millar et al., 2019). Many strategies merely consider the production process instead of a product's complete life cycle (Braungart, McDonough, 2014). This narrow focus leads to an incomplete picture of the problem (Braungart, McDonough, 2014). Most approaches attempt to improve exclusively one particular part of the process neglecting the complete life cycle of the product (Braungart, McDonough, 2014). Frequently, it is attempted to treat the symptoms e.g., pollution, but changes of the whole system are not considered (Braungart, McDonough, 2014). So, most improvement strategies focus on an improvement in production and usage, whereas the end-of-life of the product is not included (Sumter, de Koning, Bakker, Balkenende, 2020). As a consequence, the current economy is focused on a cradle to grave approach, meaning the production cycle ends with the products disposed of in a landfill or being incinerated (Braungart, McDonough, 2014).

Beyond that, a comprehensive approach is circular economy, which aims at keeping resources as long as possible in the production cycle (Braungart, McDonough, 2014). This approach is not new, but it has received more attention from policy makers, governments, and institutions such as the European Union (Galvao, de Nadae, Clemente, Chinen, Monteiro de Carvalho, 2018, Sumter et al., 2020). Contrary to the conventional production approach circular economy focuses on the entire life cycle of products and designs them accordingly (Sehnem et al. 2019, Geissdoerfer, Savaget, Bocken, Hulting, 2017). This means that products are constructed in such a manner that their materials can be retrieved and reused after the product is not in use anymore (Sehnem et al. 2019, Geissdoerfer et al., 2017). Therefore, circular economy challenges the current production processes and accordingly a shift towards circular economy is a complex process where numerous detailed processes need to be examined (Braungart, McDonough, 2014). In order to apply circular economy as a macro level concept it needs to be examined at company level first as a prerequisite (Galvao et al., 2018, Franco, 2107). It is important to ensure its feasibility on company level so that it can be upscaled to macro level (Galvao et al., 2018, Franco, 2107). Turning to the circular economy approach in its entirety, including all departments at company level, is a huge task, with a variety of challenges emerging (Braungart, McDonough, 2014).

One of the challenges is the lack of specific literature in this area (Korhonen, Honkasalo, Seppälä, 2017a). In literature no clear definition of the term circular economy can be found (Korhonen et al., 2017a). This can cause misunderstandings and confusion when the term circular economy is discussed (Negrei, Istudor, 2018). Further, the existing literature is focused on theory, whereas little research has been done to understand the challenges businesses face when transitioning their business to meet the requirements of circular economy (Trigkas, Karagouni, Mpyrou, Papadopoulos, 2020). As a consequence, there is an evident discontinuity between papers focused on the theory and various definitions of circular economy and the actual

practices developed by companies and policy makers (Korhonen et al., 2017a). These two sides need to be combined to make circular economy suitable for the implementation at company level (Korhonen et al., 2017a). Also, there is a distinct research gap in literature that examines the barriers and challenges perceived by the entrepreneurs (Stewart, Niero, 2018). To bridge this gap, it is important to determine what steps need to be taken by policy makers, entrepreneurs and consumers involved to reduce challenges and make the desired change towards circular economy feasible for entrepreneurs (Stewart, Niero, 2018).

Although the interest in circular economy to facilitate change towards sustainability is rising, there are not many companies that have implemented it into their business (Korhonen et al., 2017a). Also, there are few experts currently available for transitioning a business to meet the requirement of circular economy resulting in a strong demand for these specialists (Patwa, Seetharaman, Arora, Agrawal, Mandalia, 2021). Subsequently, companies seek to keep experts tied to their own business to create a market advantage (Patwa et al., 2021). Sharing experts is essential for implementing circular economy in an increasing number of companies (Franco, 2017). However, cooperation is not easily achieved and leads to constraints in case of possible partnerships (Franco, 2017).

Additionally, the communication within a company can be challenging (Stewart, Niero, 2018). Departments within a company have varying interests that can be conflicting (Franco, 2017). In general, most changes are implemented within the packaging of products and the product itself, less considered is the interior of offices, buildings, or resale locations (Stewart, Niero, 2018).

All the above-mentioned issues, the unclear definition, the challenges created by the market such as the shortage of experts, and by policy makers lead to the research question of this paper “What are the challenges perceived by entrepreneurs when implementing Circular Economy

within their companies?”. This paper aims to explore the various challenges of implementing circular economy in a company as a whole. The aim is to discover what individual challenges exist and how they are approached.

This research is of interest for businesses planning on transitioning towards circular economy, policy makers and governments as it discusses the challenges companies face when implementing circular economy at company level. It is useful for governments and other policy makers to adjust their regulations to combat these challenges and further the growth of circular economy in companies.

This paper is structured as follows. The introduction section is followed by the theory section. Here, the circular economy approach is explained in detail. Additionally, criticism and the potential downside of the approach are discussed. Further, the focus is directed to the challenges a company faces when transitioning to circular economy which are created by the market and governmental policies. Following the theory section are the methods applied to conduct this study. Thereafter, the results are presented. This is followed by the discussion of the results. The last part begins with a conclusion of the findings. Also discussed are the limitations of this research. Lastly, an outlook for further research is given.

THEORY

This section is divided as follows, first the concept of circular economy is explained as well as the difficulties concerning a universal definition of the term. Furthermore, criticism of the concept and possible pitfalls are discussed. A second section explains barriers and challenges that are faced by businesses when implementing it. Barriers are divided into market barriers and those created by governmental policies.

Circular economy

The concept of circular economy is not universally defined, neither by researchers nor by literature (Sehnem et al., 2019). The various definitions make it difficult to choose the best suited for the individual business (Negrei, Istudor, 2018). In literature the terms and concepts are paired differently, and terms are used interchangeably, this leads to a confusion of meanings and creates misunderstandings when the term circular economy is discussed (Negrei, Istudor, 2018). Yet, the lack of a precise definition has led to the existence of various concepts of circular economy (Sehnem et al., 2019). Circular economy, and the various interpretations of the concept, have been developed to counteract the linear business and production processes of take, make, and waste and the resulting environmental degradation (Korhonen, Nuur, Feldmann, Birkie, 2017b). The most mentioned concepts in literature which have emerged from circular economy are cradle-to-cradle, closed loop systems, industrial ecology, reverse logistics and biomimicry (Sehnem et al. 2019, Korhonen et al., 2017b). Although, all these concepts have different definitions, they all have some similarities they share, namely that there is the common goal to reduce the extraction of raw virgin materials, and the avoidance of waste both resulting in loss of valuable materials (Sehnem et al. 2019, Geissdoerfer et al., 2017). In general, there are more similarities, one is that there is a hierarchy of desirability of what to do with waste or more precisely how to avoid it going to landfills and being incinerated (Korhonen et al., 2017b). The common ground in this is that recycling is seen as the least desirable outcome and reuse and remanufacturing are better options (Korhonen et al., 2017b). However, there are different opinions about how to design such products, depending on the concept of circular economy that is used as a guideline (Millar et al., 2019). The main argument is between designing a product which has an exceedingly long lifespan or to design it in such a way that it can be remanufactured easily (Sehnem et al. 2019, Millar et al., 2019).

Another topic that is important to consider when dealing with circular economy is the focus on the different cycles (Sehnem et al. 2019). There are two cycles identified, one is the biological cycle and the other one is the technological cycle (Braungart, McDonough, 2014). Both cycles describe a closed system, each has its own area of application (Sehnem et al. 2019). In the biological cycle all materials must be biodegradable and the break-down products safe for the environment. The break-down products become nutrients for new plants and therefore help to grow new materials so that the cycle can start again (Braungart, McDonough, 2014). Products that are designed for this cycle are mostly meant for consumption such as clothes (Braungart, McDonough, 2014). In literature there is more focus to be found on the technical cycle rather than the biological one (Sehnem et al. 2019). In the technological cycle the products are designed to be disassembled after the disposal, the individual parts can be refurbished, recycled, or reused to create a new product (Braungart, McDonough, 2014). So, the former parts become technical nutrients for a new product, this cycle is for non-consumable items such as washing machines (Braungart, McDonough, 2014). A concept that includes both cycles in its explanation is cradle-to-cradle (Millar et al., 2019). The cradle-to-cradle concept differentiates between the technological and a biological cycle and states the importance of keeping these two cycles separate, otherwise achieving true circularity would not be possible (Braungart, McDonough, 2014).

Circular economy is viewed as a possible way to achieve a more sustainable production and therefore contribute to the United Nations Sustainable Development Goals (Millar et al., 2019). Circular economy is often viewed as being a suitable tool to achieve sustainability in production and design (Sumter et al., 2020). However, Millar et al. (2019) argue that there is a difference between circular economy and sustainable development and that it is possible for circular economy concepts to help sustainable development but that there are issues which need to be addressed first. There is no agreement if circular economy is a tool to achieve sustainable

development or if those two are different concepts in and of themselves (Geissdoerfer et al., 2017). It is argued that circular economy is not suitable to create sustainable development because it is mainly focused on the environmental aspect and lacks the other two dimensions of economic and social aspects of the so-called triple bottom line, especially because it has no measurement tools for these dimensions (Millar et al., 2019). However, the cradle-to-cradle concept addresses many of the issues mentioned by Millar et al. (2019). There, it is argued that it is currently not possible to separate certain materials and that the environmental degradation and pollution is therefore merely slowed down. The cradle-to-cradle concept by Braungart and McDonough (2014) argues against this with the idea of designing products in a manner that the materials used can be fully separated and used again, and in the ideal case the designed product is beneficial for the environment.

An argument that is used often to show the limitation of circular economy is the second law of thermodynamics, entropy (Korhonen et al., 2017a). The line of argumentation is that a system cannot be truly circular because of the energy required to reuse or recycle the materials and the used energy creates other by-products and energy itself cannot be circular (Korhonen et al., 2017a). Another argument concerns the biological cycle. The concern is that even if products are biodegradable, they depend on raw materials, with overconsumption it still has a detrimental effect on the natural environment (Millar et al., 2019). So, circular economy alone is not sufficient enough to create sustainable development (Millar et al. 2019). Additionally, it is mentioned that there is the possibility of a rebound effect (Korhonen et al., 2017a, Millar et al., 2019). This occurs when a new technology is scaled up and the price is declining, the product becomes affordable (Korhonen et al., 2017a, Millar et al., 2019). Therefore, sales increase and the positive effects that are present in the small scale are negated (Korhonen et al., 2017a, Millar et al., 2019).

The concept of circular economy is viewed by organisations and governments as a promising tool to create sustainability (Millar et al., 2019, Sehnem et al., 2019, Galvao et al., 2018). However, there are also limits to the concept as mentioned above, especially the limits to growth and the rebound effect (Korhonen et al., 2017a, Millar et al., 2019). Therefore, it is important to include more stakeholders into overcoming the challenges, and governmental actors need to work together with the entrepreneurs to create a working environment and framework for circular economy (Whalen, Whalen, 2020). It is important to further work on the concept of circular economy to solve the above-mentioned issues and make it more suitable for sustainable development (Korhonen et al., 2017a, Millar et al., 2019).

Challenges for Implementation of Circular Economy

The challenges that hinder entrepreneurs to implement circular economy into their businesses can be divided into two main categories. One set of barriers is caused by market regulations and other businesses (Galvao et al., 2018). The other set of barriers is caused by policies and governmental regulations (Korhonen et al., 2017a).

The challenges of implementing circular economy on a company level are diverse and can even affect various departments (Franco, 2017). Depending on the industry area a company is located in and their position in the value chain, their level of influence varies considerably (Franco, 2017). The level of influence is important to determine the options a company has to convince other companies in the value chain to make their products suitable for circular economy (Franco, 2017). It can be a challenge for companies to design their products in such a way that they are suitable for circular economy (Franco, 2017). Especially when they need materials from other companies because those materials need to be compatible with the principles of circular economy (Franco, 2017). The challenges arising are that companies need to design their products with a limited pool of materials and likewise a smaller selection of suppliers (Franco, 2017, Braungart, McDonough, 2014). Due to this production costs can increase, which in turn

leads to a higher end price of the product (Franco, 2017). Because of the higher price good marketing is needed to attract and convince customers to buy the product, this can be a challenge as circular economy is not a widely known concept among customers (Franco, 2017).

Additionally, companies trying to implement circular economy products on the mainstream market face barriers that need to be addressed (Galvao et al., 2018). One such barrier is the *lock in* phenomenon, which is the refusal to replace an established system (Korhonen et al., 2017a). This is also referred to as *survival of the first* contrary to *survival of the fittest* (Korhonen et al., 2017a). Established companies either block or are unwilling to adapt their strategies even though the emerging technologies are more efficient and sustainable (Korhonen et al., 2017a). Circular economy is not an established concept, therefore companies implementing circular economy are disadvantaged when advertising their products to customers (Korhonen et al., 2017a). As a consequence, companies might not become economically viable because they are overlooked by the customers (Franco, 2017). A different barrier is the scalability of the businesses. Companies still depend on resources, even if these are considered waste (Korhonen et al., 2017a). In this regard they have a strong competition for these resources, they have to compete with the regular recycling facilities (Franco, 2017, Korhonen et al., 2017a). Therefore, access to materials can be challenging as the choice of materials is limited already (Franco, 2017). Furthermore, the infrastructure for these waste streams is not extensive enough yet to make changes towards circular systems feasible (Korhonen et al., 2017a). Currently there are no structures in place that can separate regular waste from waste that can be used as a raw material (Korhonen et al., 2017a). Furthermore, there is little information for companies on the point in time when products are returned so that they can serve as technological nutrients in the cycle (Braungart, McDonough, 2014). Therefore, it is a challenge to plan the production with the uncertainty of the availability of the right materials (Franco, 2017, Braungart, McDonough, 2014).

Within the current economic structure, circular economy works on a small scale, where material streams can be controlled but on a global scale the waste streams cannot be controlled and there are few regulations that are valid on a global scale (Korhonen et al., 2017a). Consequently, in order to implement circular economy on a global scale changes to the regulations of waste streams need to be made on a policy level (Korhonen et al., 2017a, Whalen, Whalen, 2020). These changes need to be implemented by governments and other political institution such as the EU (Whalen, Whalen, 2020). There are barriers in place on a regional or state level that are due to regulations and laws (Korhonen et al., 2017a). These laws prevent circular activities and material flows, in Germany e.g., it is prohibited to dispose of clothes in the compost bin even if it is biodegradable (Franco, 2017). Furthermore, in most environmental administration statistics circular waste streams are not included, therefore they are not considered in legislations (Korhonen et al., 2017a). This omission in the regulations is an obstacle for companies implementing circular economy, especially if permits are required to handle waste products (Korhonen et al., 2017a). As a consequence, these regulations are time-consuming and create a disadvantage for companies implementing circular economy, as they have to invest more time into obtaining their resources and complying to the rules (Korhonen et al., 2017a, Franco, 2017).

METHODS

In order to conduct this research a qualitative, interview-based approach to gather the relevant data was chosen. The advantages of this approach were that it is possible to get an in-depth analysis of the topic (Brymann, Bell, 2011). For this study interviews were conducted to gather the relevant data. The interviews were conducted in the form of semi-structured interviews. This approach allowed for an in-depth discussion about the topic, with prepared questions to guide the interview (Jacob, Heinz, Décieux, Eirmbter, 2011). However, this approach allowed

some flexibility for asking additional questions. Also, it allowed the interviewee to answer the questions in their own words, which allowed for a higher accuracy of the results (Jacob et al., 2011).

Data collection

For the data collection purposeful sampling was chosen as this approach allows to select a case according to predetermined criteria to receive specialised information about the researched topic (Palinkas, Horwitz, Green, Wisdom, Duan, Hoagwood, 2015). The criteria a case had to fulfil to be considered for this research were as follows. The case was chosen on the basis that the company had at least made one change towards implementing circular economy into their business. This was important because the company had to have experience with transitioning towards circular economy and therefore had encountered challenges. Furthermore, it was important that they were planning to convert more elements of their business towards circular economy, as this showed that they were convinced of the concept of circular economy, regardless of the challenges. Additionally, sustainability should be seen as a core goal of the company. These requirements were chosen to ensure that the interview partners had experienced the transition and were able to explain what they perceived as the greatest challenges.

The potential companies were approached via email. In these emails the project and the research aim were explained. After a suitable company was selected each interviewee was approached through email and sent a letter of consent (Appendix A). In this letter the project and the research aim were explained and what the data was used for. In this letter they were asked for their consent to participate in the interviews. It was stated that they could withdraw their consent at any time before the end of the project. Additionally, they were made aware that they had the option to have their names anonymized. This letter was signed before the interviews by the interviewee and interviewer. The interviews were conducted online to comply to the health

guidelines and regulations regarding the Covid-19 pandemic. In order to conduct the interviews online Microsoft Teams was used.

For this research, the companies Lebensbaum who produce and sell coffee, tea and spices, and SEA ME who uses reusable glass bottles for hand soap were chosen as interview partners. The interviews were timed to approximately 30 - 40 minutes in length and were conducted in German. The interviews were held with members of various departments in order to gain an understanding for the perceived barriers within a company as a whole. In total 4 interviews were conducted. The interviews addressed the CEO, marketing and product development and design departments. They were chosen according to the focus in literature (Franco, 2017). Three interviewees were from Lebensbaum and one from SEA ME. The interviews with Lebensbaum were conducted with the CEO, the product manager for tea and the head of corporate communications. The interview with SEA ME was held with their head of marketing & sales.

The interview questions were structured into blocks, with a specific topic for each block (Appendix B). The first block consisted of general questions concerning the interviewee's background. Example questions for the first block: *What is your position in the company? How long have you worked for the company?* This block aimed at building rapport and putting the interviewee at ease (Jacob et al., 2011). The next block was about their understanding of sustainability and circular economy: *In your opinion what is the greatest advantage of circular economy?* The third block covered questions concerning challenges perceived with regard to implementing circular economy: *What was the greatest challenge you encountered when implementing circular economy into the company?* The fourth block contained questions about what the interviewees thought needed to change to facilitate the implementation of circular economy into their businesses: *In your opinion what changes are necessary to make the implementation of circular economy into the company easier?*

Data analysis

After the interviews had been conducted, they were transcribed (https://docs.google.com/document/d/1mxvF9Zm6yptz7oQbUumGGGGc7Z6N9NrMcJQjaBh_0I/edit?usp=sharing). The transcripts were not completely translated into English, instead only relevant passages that were used as direct quotes were translated. The transcripts were sent to the interviewee for inspection and confirmation that the information was accurate and could be used in the research. Additionally, they had the possibility to add information to their answers. However, none of the participants made any additions or changes to the transcripts. The transcripts were then analysed using the coding scheme. An initial set of codes was developed before the first interviews took place. The overarching themes that were used were circular economy, challenges which encompass words such as barriers, regulations, laws, and improvements. From these themes a first set of codes was developed. After the first analysis of the transcripts additional codes were added. The additional codes were derived from the overarching topic of change. This strategy allowed it to concentrate on specific themes whilst analysing but also allowed for additions later when new insights were gained (Brymann, Bell, 2011).

The final coding scheme consisted of 3 themes, which were then divided into second order themes and then further into codes. The final number of codes was 12. The three overarching themes were: definition of circular economy/sustainability, challenges perceived, and responsibility for change. The first theme, the definition section, was divided into sustainability in general and into circular economy as the second order themes. Additionally, circular economy was divided into cradle-to-cradle and other definitions of circular economy. The challenges theme was divided into internal and external challenges of the companies, these were subdivided into the codes. The codes for internal challenges were communication, conflicting interests, and other challenges perceived. For the external challenges, the division is as follows:

politics & regulations, consumers, and other businesses. The change theme was divided into theory, reality, and suggestions for change. The division between theory and reality of change was added because the participants made a distinction between these two when being asked about what group is responsible for, and most influential in, driving the change towards circular economy.

RESULTS

This section is structured as follows: the findings from the analysis of the interviews are separately discussed under the established themes. The challenges theme was divided into their second order themes of internal and external challenges to allow for a clear structure. The analysis of the interviews produced the following results for each section starting with the interviewees' definition of circular economy and sustainability. This is followed by the challenges perceived theme, internal and external, and finally the results for the change theme are presented.

Definition of circular economy and sustainability

In the interviews the participants were asked to present their understanding or definition of circular economy. Here two of the interviewees stated using the cradle-to-cradle approach as their preferred way of defining circular economy. This approach was preferred because it focused on recovering materials and integrating them back into the loop without downgrading the quality of the material. The most important aspect for them was that chosen materials remain in the loop and are not transformed into a different product and therefore downgraded, and afterwards discarded. They emphasised that with this approach the materials remain permanently in one of the loops with continuing high quality. The other two interviewees, both from Lebensbaum, did not refer to the term cradle-to-cradle in their answers or any specific framework. Instead, they explained their personal understanding of the concept. These descriptions included the reuse, reduce, and recycle definition of circular economy. The greatest

advantages that were perceived by all interviewees were a lower consumption of resources and waste avoidance.

“...Material can be used not only once but over and over again...reuse, reduce und recycle...” (Product manager for tea Lebensbaum, 2021)

Additionally, all participants were asked to describe the company’s stance on sustainability in general. The participants from Lebensbaum all stated that sustainability is a core element of their company and that it was founded with the goal to be beneficial for the environment. It was also stated by the CEO of the company that for the company sustainability must include the three pillars of sustainability: environmental, economic, and social. It is considered an important precondition to find a balance between these three to have a functioning, sustainable business.

“You always have to think in terms of the 3 areas, so we also want to think economically, of course, so we also have to earn money, otherwise we can't invest (...) but we also have to think ecologically and socially at the same time, and all 3 are not contradictory at all - they work very well together...” (CEO Lebensbaum, 2021)

Likewise, the company SEA ME was founded with sustainability in mind and to create an alternative to existing practices. The head of marketing & sales compared SEA ME’s understanding of sustainability in terms of the environment to the finance industry, stating that the existing capital should work to generate a bonus and that investments should only be taken from that and not from the capital itself in order not to erode and diminish it over time. Overall, the understanding of circular economy is quite similar across all interviewees and the two companies as both were founded with sustainability as the core value.

Challenges perceived - internal

The next set of codes examined the challenges perceived by entrepreneurs when implementing circular economy into their businesses. In order to gain an insight into the internal challenges

the interviewees were asked about internal communication about circular economy, if it occurred and if there were problems regarding communication. The result was that there is an active communication across the departments, confirmed by all interviewees. Furthermore, the importance of communication was emphasised, especially across the departments, as the whole company must take part in implementing change within a company. It was also stated that it is paramount that the employees know the company's stance on sustainability and therefore work together to achieve this goal.

“...that circular economy, sustainable thinking so really sustainable thinking... is something you can't put in one department...” (Head marketing & sales SEA ME, 2021)

The following code was about conflicting interests on a company level. This topic was answered differently by each participant. They all focused on different issues when talking about conflicting goals and ideas within and across different departments. However, they all agreed on that there is always some kind of conflict or friction regarding the goals of different departments. Furthermore, all answered that conflicting goals are inevitable within companies and are due to the fact that every department focuses on its own area of responsibility and wants to improve the performance of their department. As a general approach to this issue, the importance of communication and finding a balance between the varying interests was stated. In order to find a balance between the different interests the company Lebensbaum attempts to include all three pillars of sustainability from the start. This means that ideas are developed with all three areas in mind and once these ideas are discussed, a certain degree of balance is already guaranteed.

“In a company you always have competing goals, it's always a field of tension... economic, ecological, social and something always pulls, so we try to think about all 3 pillars, which I mentioned briefly before, right from the start” (CEO Lebensbaum, 2021)

Another point that was mentioned by the product manager for tea at the company Lebensbaum was that conflicts might even occur within one department concerning sustainability. The product manager explained that there are differing views on sustainability and how to pursue it best. A conflict can arise when deciding on sustainable materials. The viewpoint of SEA ME on this topic is quite similar and it is stated that sometimes a compromise is necessary in the short term in order to be effective in the long run. An example mentioned during the interview was that of the dilemma of having an idea which is not technically feasible. This was the case for SEA ME where one important component of their product was not available the form initially intended, leading to the discussion whether to launch the product or wait until the perfect product could be manufactured. Such issues lead to discussions and often require a compromise.

“...So do we wait with our idea until we have everything perfect and start, or do we start running, collect everything again and thus challenge the status quo and that is then such a decision and we say: no we start running, we start running and start to establish the system, do everything as well as we can and work against the background, to, in the long term, in the medium term ideally, increasingly close the loops...” (Head marketing & sales SEA ME,2021)

Generally identified internal challenges by Lebensbaum were that the process of changing and implementing circular economy takes a long period of time, in certain circumstances, two years from its planning until the product is being sold. Also, it is a challenge to convince the shareholders that an expensive investment for a marginally better result is necessary and worth the cost in the long run.

Challenges perceived - external

The results for the external challenges are as follows: concerning politics and governmental regulations there were several challenges perceived, although the type of challenge observed differed among the interviewees. The product manager from Lebensbaum regarded the differing regulations in the European countries as a challenge. Concerning Germany, their main market, this meant that a potentially biodegradable packaging material could not be properly disposed of because the regulations did not categorise it as a material suitable for circular economy. Furthermore, existing regulations across the European Union are not universally applicable any longer, as France decided not to use the green dot label any longer. This results in the need to change the packaging according to each country's regulations. In accordance with this occurs the next challenge: too many different labels and certificates for sustainability exist. This is partially due to the fact that there is no EU wide agreement on standards and strategies to follow when pursuing sustainability.

A further point mentioned by SEA Me was that it is a challenge to establish circular economy in a system that is organized on a linear and single use model. This prevalent mode of thinking can be a challenge in many aspects from dealing with suppliers and producers to finding retail partners. Furthermore, another challenge SEA ME faces, caused by current political regulations, is infrastructure. Currently the infrastructure is not designed for circular economy and there are gaps in the regulations that prevent such companies from using existing infrastructure. In the case of SEA ME this means that the infrastructure for cleaning and reusing glass bottles exists, but only for beverages and not for their soap bottles. The current regulations prohibit the use of those facilities for anything other than beverage bottles.

“...There is no clear regulation because there is not yet a cosmetic solution like ours. There are reusable canisters, but there are laws that stipulate that they must not be

mixed, that food cleaning, i.e., beverages, and cosmetics cleaning must be separated from each other.” (Head marketing & sales SEA ME, 2021)

Other external challenges can be caused by consumers. The findings for this category are as follows, the participants from the company Lebensbaum stated that it can be a challenge to convince customers that their packaging is sustainable. They attribute this to the problem that there are many varying opinions on what materials are deemed most sustainable, currently paper is seen as sustainable from the consumer’s point of view. However, paper is not suitable to package their products as it cannot deliver sufficient food protection. Food and quality protection are the most important aspects for the company. These outside demands can also cause internal challenges during the decision-making process. An example mentioned by the product manager was the introduction of individually packaged tea bags instead of loose tea. At the company this always leads to a discussion about the supposedly most ecological sustainable solution, apart from that it is important to listen to the consumer’s preferences because otherwise they will not buy the product and might turn to a conventionally manufactured product instead.

A further external source of challenges are other businesses. Challenges from other businesses can either be created by large, conventional companies wanting to maintain their leading positions or it can also be caused by sustainable companies that follow a different approach. Still the other sustainability-oriented companies were not seen as serious challenges by the interviewees. The CEO and the head of corporate communications from Lebensbaum did not perceive other businesses as causing challenges for circular economy. However, the product manager mentioned that other businesses can cause confusion in the customer as they all focus on different materials and classify them as particularly sustainable.

Additionally, it can be challenging to find a suitable business partner that can deliver materials suitable for circular economy.

“when you ask and then you get the response: Yes, well, we haven't thought about that yet” (Product manager for tea Lebensbaum, 2021)

The response from the head of marketing & sales from SEA ME was that there are other businesses that naturally want to keep their businesses profitable and therefore promote different materials or solutions for sustainability, here oil and gas industry were mentioned specifically.

Responsibility for change

In order to learn what must be done to improve the situation to facilitate implementing circular economy into a business, the interviewees were asked who needs to be responsible for making these changes and who is the most influential driver. The question was answered in a similar way by all interviewees. None of them determine one single group of actors that should be making these changes. In order to create change the individual groups have to work together.

When determining the most influential driver, the interviewees all made a distinction between who they think is most influential in theory and who they believe is the most influential in reality. However, the opinions on this differed among the interviewees. The interviewees from Lebensbaum stated that in theory politics should have the most influence in changing the situation. Additionally, the consumer is viewed as influential as they can push change with their buying decisions. Concerning reality, the interviewees see various actors as more influential. Although the answers differ, they all mention businesses and entrepreneurs as highly influential in reality because they implement the changes needed. Furthermore, they acknowledge that political regulations are necessary, but are not as influential as the businesses themselves or the consumers. Here again, it is difficult to determine clearly which group is the most influential

one. The participant from SEA ME answered that a personality is needed to act like a role model.

“...we need new personalities, new minds that put the idea of the circular economy in the foreground and where other people can look and say what the person is saying...”
(Head marketing & sales SEA ME, 2021)

When being asked about their ideas on how to improve the perceived challenges, the interviewees answered as follows: in general, a simplification is needed in the governmental regulations and a subsequent standardization across Europe is necessary. Another suggestion of a participant from Lebensbaum is that governments could set incentives for implementing circular economy into their businesses. A suggestion from SEA ME is that the infrastructure needs to be improved and enlarged and that this works best if one company starts and therefore paves the way for following businesses.

DISCUSSION

The discussion section contains the following parts. It starts with the conclusion, where the implications of the results and how they integrate into the existing literature are discussed. Furthermore, the limitations of this study are presented. This is followed by a section about ideas for future research on this topic.

Conclusion

The insights gained from the interviews show similarities to the challenges and barriers described in literature. However, they provide new and deeper insights into those challenges. Furthermore, in some aspects the results differ from the experiences described in literature.

Starting with the challenge of defining circular economy, it can be stated that there is no universally accepted definition of what circular economy encompasses (Negrei, Istudor, 2018), this was also observable in the interviews. Twice circular economy was equated with cradle-

to-cradle, with specifically mentioning Michael Braungart, as founder of the concept, in their understanding. The other two interviewees did not mention a specific concept but used a mixture of aspects associated with circular economy in general, this is in accordance with the observation of Sehnem et al. (2019) that there are similarities among all the definitions and that the terms are used interchangeably. However, there seems to be a general consent about the benefits and advantages of circular economy among the interviewees. The differences in definition about circular economy within the company were not perceived as a challenge. Another barrier mentioned by Franco (2017) is that cooperation with different companies is difficult to achieve because the number of existing experts is too low, this observation differs from the observations made in this paper. It is mentioned that it can be difficult to approach companies with their ideas and their special requests but the reason for this is that little exploring has been done in that direction of manufacturing. It presents a barrier more in the sense that more research is required because it was stated by the interviewees that the companies they approached were open to and interested in developing new solutions.

A challenge that was identified by the interviewees concerns the customer's view on the products, but it differs from Franco's (2017) description of customers as a challenge. It is different in so far that most consumers do not need to be convinced that organic or sustainable products are of high quality as Franco (2017) states, it is more that the customer has a certain view on what they consider for example sustainable packaging. The challenge is still to convince the customers and fight against misinformation.

In literature there is the discussion that there is no universal strategy on how to design products for circular economy and that there is a conflict between making a product with a long-life span versus a product that is uncomplicated to remanufacture (Sehnem et al., 2019, Millar et al., 2019). However, this is not necessarily viewed as a problem as the interviewees stated that every change towards circular economy, away from conventional production, is positive.

Furthermore, it needs to be acknowledged that different solutions are suitable for different branches of industry. It cannot be generally determined that one solution is suitable for all types of business as the interviews showed. The chosen companies have varying approaches, SEA ME has decided to use glass bottles, a long-lasting product (Franco, 2017), and Lebensbaum has chosen packaging that is suitable for the ecological cycle (Braungart, McDonough, 2014). Lebensbaum considered using glass bottles for their tea but decided against it because of the excess weight the bottles cause and therefore they would produce more CO₂ emissions during transport. This shows that individual solutions for specific industries are necessary.

Another challenge that was discovered during the interviews was that governmental regulations are making the implementation of circular economy within businesses difficult. Noteworthy are here the challenges occurring due to the lack of suitable infrastructure as described in literature (Korhonen et al., 2017a), as well as by the interviewees. As described in the result section, SEA ME developed cosmetic products where the bottles can be returned, cleaned, and refilled, for this the existing infrastructure for refilling beverage bottles could be used, but regulations prohibit this. This is a suitable example of how inadequate governmental regulations can hinder the progress of circular economy. It was stated that the regulations are not actively put in place to prevent the progress of circular economy, but that the regulations did not consider circular economy when they were developed. Practices are new, therefore, no regulations concerning their use exist so far. A suggestion for improvement by the CEO of Lebensbaum was that there should be a timeframe for regulations after which they are re-evaluated and adjusted. Additionally, in the category of challenges created by governmental regulation falls the issue of potentially biodegradable materials that cannot be disposed of correctly because governmental regulations do not allow it (Franco, 2017). This was also observed by the interviewees from Lebensbaum, remarkably so, this observation was made only for the German system.

The difference in regulations across European countries proved to be another challenge perceived by businesses. The different regulations impede the business to expand into other countries as it is difficult and time-consuming to adapt the product in such a way that it fulfils all required standards. This aspect was also mentioned by Whalen and Whalen (2020) that, in order to make circular economy feasible, standards need to be generalised across countries, for example EU wide. However, despite the fact that all interviewees identified challenges from governmental regulations, they did not view politicians as the most influential drivers for circular economy. They viewed the businesses themselves as the most powerful driver for change in reality. Due to their practical approach, they can initiate change more easily. This is a vivid example of the identified gap between theoretical frameworks and the reality of businesses (Korhonen et al., 2017a, Trigkas et al., 2020). Additionally, the participant from SEA ME stated that they have created something new that had not been attempted in that form before paving the way for other companies following this approach in the future.

Overall, this research provides an insight into the challenges faced by companies when implementing circular economy. The results show that the existing literature describes some of the challenges encountered by companies, but they are not detailed enough. The findings imply that for the success of circular economy changes in governmental policies are necessary, especially in the infrastructure. A promising recommendation that could reduce barriers for companies implementing circular economy was that regulations should be evaluated on a regular basis to ensure that they do not unintentionally hinder progress. To conclude this paper, it can be said that implementing circular economy into businesses is possible on the small scale as the examples show, and for its success changes on a macro level need to be made. Especially regarding the standardisation of requirements on a global or at least EU wide scale. The chosen companies show that it is possible and that hopefully their success paves the way for more companies to implement circular economy.

Limitations

The limitations of this research lie in the small sample size as only 2 companies were involved in the interviews. Additionally, the number of interviews per company was very limited and therefore represents only a limited picture of the whole company. A further limiting factor is that the interviewed companies are in the same geographical and legislative region in Germany. This means that the gathered information and perceived challenges cannot be generalised across other countries, but as Whalen and Whalen (2020) stated it is important to have EU wide universal standards and regulations. The companies that were reviewed are industry specific and the focus of this study was mainly on companies that implement circular economy into their packaging, Lebensbaum produces food and SEA Me cosmetic products and the focus is on circular packaging. Therefore, it cannot be used as a generalisation for every type of industry. The companies selected for this study were all founded with sustainability in mind and in the case of SEA ME additionally with circular economy in mind. Therefore, little can be said about the challenges a company faces that previously used conventional methods of production.

Future Research

This paper helps to provide an insight into the challenges companies face when implementing circular economy into their business. Due to the small sample size and other limitations, further research is needed to gain a better and more thorough understanding of the topic. For future research it would be necessary to obtain a larger sample size and therefore to interview more companies. In the future, companies that operate in various other countries should also be interviewed as well as companies that operate in a different field of industry.

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Appendix A

Letter of consent (English)

Date:

Name of company:

SUBJECT: Approval to use information from this organisation for research purposes

Dear...,

PURPOSE OF STUDY

You are being asked to take part in a research study. Before you decide to participate it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need further information.

The goal of this research is to have an in-depth understanding of the perceived challenges companies face when implementing circular economy. This study is conducted for the thesis of the master's programme Sustainable Entrepreneurship at the University of Groningen.

STUDY PROCEDURE

The research will be conducted online due to Covid-19 and will take an average of thirty minutes. During the interviews, the audio will be recorded so the researchers can focus on the conversation, and the information is accurate. It will then be transcribed and analysed. The transcript will be sent to you for confirmation, and you are free to correct or review the transcript which will only be accessed by the researcher and their lecturers. After the study is completed the findings can be shared with you, upon request.

You may decline to answer any or all questions and you may terminate your involvement at any time before the submission of the assignment if you choose.

CONFIDENTIALITY

Your responses to this interview can be anonymized upon request. Every effort will be made by the researcher to preserve your confidentiality including the following:

- Assigning code names/numbers for participants that wish to stay anonymous

- All audio files are deleted after the transcription of the interview

Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents.

CONTACT INFORMATION

If you have any questions at any time about this study, you may contact the researcher through: s.v.mittelstaedt@student.rug.nl

VOLUNTARY PARTICIPATION:

The participation in this study is voluntary. If you do decide to participate, then please sign below on this form.

Withdrawing from this study will have no negative effects. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and I understood the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date 21.04.2021

Investigator's signature S. Mittelstaedt Date 21.04.2021

Letter of consent (German)

Einverständniserklärung

Datum:

Name der Firma:

THEMA: Zustimmung zur Verwendung von Informationen dieser Organisation zu Forschungszwecken

Sehr geehrter Herr/Frau,

ZWECK DER STUDIE

Sie werden gebeten, an einer Forschungsstudie teilzunehmen. Bevor Sie sich zur Teilnahme entschließen, ist es wichtig, dass Sie verstehen, warum die Studie durchgeführt wird und was sie beinhaltet. Bitte lesen Sie die folgenden Informationen sorgfältig durch. Bitte fragen Sie den Forscher, wenn Ihnen etwas unklar ist oder wenn Sie weitere Informationen benötigen.

Das Ziel dieser Studie ist es, ein tieferes Verständnis für die wahrgenommenen Herausforderungen zu erlangen, denen sich Unternehmen bei der Umsetzung der

Kreislaufwirtschaft gegenübersehen. Diese Studie wird für die Abschlussarbeit des Masterstudiengangs Sustainable Entrepreneurship an der Universität Groningen durchgeführt.

ABLAUF DER STUDIE

Die Studie wird aufgrund von Covid-19 online durchgeführt und dauert durchschnittlich dreißig Minuten. Während der Interviews wird der Ton aufgezeichnet, damit sich die Forscher auf das Gespräch konzentrieren können und die Informationen korrekt sind. Anschließend wird es transkribiert und analysiert. Das Transkript wird Ihnen zur Bestätigung zugesandt, und es steht Ihnen frei, das Transkript zu korrigieren oder zu überprüfen, auf das nur der Forscher und seine Dozenten Zugriff haben. Nach Abschluss der Studie können die Ergebnisse auf Wunsch mit Ihnen geteilt werden.

Sie können die Beantwortung einzelner oder aller Fragen ablehnen und Sie können Ihre Teilnahme jederzeit vor der Abgabe der Arbeit beenden, wenn Sie dies wünschen.

VERTRAULICHKEIT

Ihre Antworten auf dieses Interview können auf Wunsch anonymisiert werden. Der Forscher wird alle Anstrengungen unternehmen, um Ihre Vertraulichkeit zu wahren, einschließlich der folgenden Maßnahmen:

- Zuweisung von Codenamen/Nummern für Teilnehmer, die anonym bleiben möchten
- Alle Audiodateien werden nach der Transkription des Interviews gelöscht

Die Daten der Teilnehmer werden vertraulich behandelt.

KONTAKTINFORMATIONEN

Wenn Sie zu irgendeinem Zeitpunkt Fragen zu dieser Studie haben, können Sie sich an den Forscher wenden unter: s.v.mittelstaedt@student.rug.nl

FREIWILLIGE TEILNAHME:

Die Teilnahme an dieser Studie ist freiwillig. Wenn Sie sich für die Teilnahme entscheiden, dann unterschreiben Sie bitte unten auf diesem Formular.

Ein Rücktritt von dieser Studie hat keine negativen Auswirkungen. Wenn Sie aus der Studie aussteigen, bevor die Datenerfassung abgeschlossen ist, werden Ihre Daten an Sie zurückgegeben oder vernichtet.

ZUSTIMMUNG

Ich habe die bereitgestellten Informationen gelesen und verstanden und hatte die Möglichkeit, Fragen zu stellen. Ich verstehe, dass meine Teilnahme freiwillig ist und dass ich jederzeit ohne Angabe von Gründen und ohne Kosten zurücktreten kann. Ich verstehe, dass mir eine Kopie dieser Einverständniserklärung ausgehändigt wird. Ich erkläre mich freiwillig bereit, an dieser Studie teilzunehmen.

Unterschrift des Teilnehmers _____ Datum 11.05.2021

Appendix B

Interview guide (English)

Introduction to the interview:

- Do you agree to me recording the interview?
- Have you received the letter of consent? Do you have any questions concerning the letter?

Outlining and explaining the purpose and aim of the study.

First block of questions:

- What is your position in this company?
- How long have you worked for this company?
- What is your main area of responsibility?

Second block:

- What is your concept of and attitude towards circular economy?
- In your opinion what is the greatest advantage of circular economy?
- Could you outline the companies view on sustainability?
- In your position, are you involved in transitioning the company towards circular economy?
 - If Yes-> Could you give details about the process?
 - IF No -> Could you name the department responsible for the transition?

Third block

- Have you encountered challenges during the implementation?
 - Could you please describe them?

According to you:

- What caused these challenges?
- How could they be solved/improved?
- Which one did you perceive as the biggest challenge?
- Which one affected the company as a whole the most?

Fourth block

According to you:

- What changes need to be made to improve the situation inside/outside of the company?
 - What group needs to make these changes?

- Who is the most influential driver?
- What was the most rewarding moment in the process of implementing circular economy in your company?

This was the last question, thank you for your time.

- Would you like to add anything to this interview?

Thank you again for your participation, I will send you the transcript once I will have finished it.

Interview guide (German)

Leitfaden für das Interview

Einleitung zum Interview:

- Sind Sie damit einverstanden, dass ich das Interview aufzeichne?
- Haben Sie die Einverständniserklärung erhalten? Haben Sie Fragen zum Schreiben?

Skizzieren und Erklären von Zweck und Ziel der Studie.

Erster Fragenblock:

- Was ist Ihre Position in diesem Unternehmen?
- Wie lange arbeiten Sie schon in diesem Unternehmen?
- Was ist Ihr Hauptverantwortungsbereich?

Zweiter Block:

- Was ist Ihr Konzept von und Ihre Einstellung zu Kreislaufwirtschaft?
- Was ist Ihrer Meinung nach, der größte Vorteil der Kreislaufwirtschaft?
- Können Sie den Standpunkt des Unternehmens zur Nachhaltigkeit skizzieren?
- War es eine bewusste Entscheidung des Unternehmens, Kreislaufwirtschaft einzuführen?
- Gibt es eine aktive abteilungsübergreifende Kommunikation bezüglich CE?
- Gibt es konkurrierende Ziele in Bezug auf Nachhaltigkeit. Wenn ja, wie wird damit umgegangen?
- Sind Sie in Ihrer Position an der Umstellung des Unternehmens auf die Kreislaufwirtschaft beteiligt?
 - Wenn Ja-> Könnten Sie Details über den Prozess nennen?
 - Wenn Nein -> Könnten Sie die Abteilung nennen, die für die Umstellung verantwortlich ist?

Dritter Block

- Sind Sie bei der Umsetzung auf Herausforderungen gestoßen?
 - Könnten Sie diese bitte beschreiben?
- Sind diese Herausforderungen spezifisch für Ihren Verantwortungsbereich?
 - Für die Marketingabteilung: Worauf konzentrieren Sie sich bei der Vermarktung Ihres Produktes.

Ihrer Meinung nach:

- Was hat diese Herausforderungen verursacht?
- Wie könnten sie besser gelöst/verbessert werden?
- Welche haben Sie als die größte Herausforderung wahrgenommen?
- Welche hat das Unternehmen als Ganzes am meisten betroffen?

Vierter Block

Was meinen Sie?

- Welche Änderungen müssen vorgenommen werden, um die Situation innerhalb/außerhalb des Unternehmens zu verbessern?
 - Welche Gruppe muss diese Veränderungen vornehmen?
 - Wer ist der einflussreichste Treiber?
- Was war der lohnendste Moment im Prozess der Einführung der Kreislaufwirtschaft in Ihrem Unternehmen?

Dies war die letzte Frage, wir danken Ihnen für Ihre Zeit.

- Möchten Sie diesem Interview noch etwas hinzufügen?

Nochmals vielen Dank für Ihre Teilnahme, ich werde Ihnen das Transkript zusenden, sobald ich es fertiggestellt habe.