



Barriers and solutions towards a circular economy in
Walloon SEs and SMEs

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Abstract

Title: Barriers and solutions towards a circular economy in Walloon Small Enterprises (SEs) and Small to Medium-sized Enterprises (SMEs)

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The circular economy is a new economic model based on natural ecosystems. Its objective is to promote closed-loop cycles to replace the current linear economy. The aim of this dissertation will be to analyse how far Walloon companies are concerned with the circular economy. We will examine the barriers to a successful transition and determine the most effective solutions and levers to be implemented. Following a thematic analysis approach, we did a qualitative study by conducting semi-structured interviews with different actors on the field and within companies taking and not taking part in the circular economy. The main barriers for companies not acting in a circular way are the technical and cognitive barrier. For companies in the circular economy, many face a financial brake as well. Different levers are detailed as part of a solution towards a successful implementation in Wallonia, like the necessity of regulatory changes or the importance of partnerships inside industries and geographical areas. Finally, our discussion confronts theory with practice and the author's contribution is clearly mentioned.

Keywords: Circular Economy – SMEs – Wallonia – Implementation – Barriers – Levers

Sumário

Título: A economia circular nas Pequenas Empresas (PE) e Pequenas e Médias Empresas (PME) da Valónia.

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A economia circular é um novo modelo económico baseado em ecossistemas naturais. O seu objectivo consiste em promover ciclos de ciclo fechado para substituir a actual economia linear. O objectivo desta dissertação será analisar até que ponto as empresas da Valónia estão preocupadas com a economia circular. Iremos analisar os obstáculos a uma transição bem sucedida e determinar as soluções e alavancas mais eficazes a implementar. Seguindo uma abordagem de análise temática, fizemos um estudo qualitativo através da realização de entrevistas semi-estruturadas com diferentes actores no terreno e no seio das empresas que participam e não participam na economia circular. Os principais obstáculos para as empresas que não actuam de forma circular são a barreira técnica e cognitiva. Para as empresas da economia circular, muitas enfrentam também um travão financeiro. Diferentes alavancas são detalhadas como parte de uma solução para uma implementação bem sucedida na Valónia, como a necessidade de alterações regulamentares ou a importância das parcerias dentro das indústrias e áreas geográficas. Finalmente, a nossa discussão confronta a teoria com a prática e a contribuição do autor é claramente mencionada.

Palavras-chave: Economia circular - PME - Valónia - Implementação - Obstáculos – Alavancas

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List of Abbreviations

CE = Circular Economy

GHGs = Greenhouse Gases

EPI = European Performance Index

EU = European Union

SEs and SMEs = Small Enterprises and Small to Medium-sized Enterprises

IS = Industrial symbiosis

PLC = Product Life Cycle

RL = Reverse Logistics

HLEG = High-Level Expert Group

ECBIC = European Community Business and Innovation Centres

1 Introduction

"Think globally, act locally" - Patrick Geddes

The United Nations reported in 2019 that our current economic model is not capable of providing effective and sustainable responses to the social, environmental and health impact it generates (Global Commitment Progress Report, 2019). The linear "take – make – dispose" system, on which our economy is based since the industrial revolution, has therefore reached its limits (Moreno et al., 2014). Moreover, experts forecast there will be 9 billion humans on the planet by 2050 with a significant increase in the number of middle-class consumers (Ellen MacArthur Foundation, 2015).

This linear model is leading to an increase in the consumption of natural resources, as well as the emission of greenhouse gases (GHGs) emissions responsible for climate change (Ellen MacArthur Foundation, 2015). Last year, on July 29th "*humanity had already consumed all the renewable natural resources the Earth could produce in a full year*" (Global Footprint Network, 2019).

To be able to meet the current and future needs of society, the **circular economy** (CE) is an alternative towards a more sustainable use of our natural resources. The CE maximizes the value of resources and materials by reintegrating them into the production cycles (Korhonen et al., 2019). It invites reflection on our consumption modes while bringing a lot of different actors together to work towards a more sustainable ecosystem (Lacy & Rutqvist, 2016).

Wallonia became the first Belgium region to collaborate with the Ellen MacArthur Foundation on the circular economy (Ellen MacArthur Foundation, 2015). However, there is a lack of coordination between public and private authorities as on their ability to establish innovative and effective solutions at the local level (Rapport au Parlement Wallon, 2019). The Environmental Performance Index (EPI), which assesses the environmental performance of states, ranked Belgium second to last in its European ranking (Hsu et al., 2016).

The focus will be on **Small Enterprises (SE) and Small to Medium-sized Enterprises (SMEs)** because they play a key role in this transition. SMEs represent over 99% of the European enterprises (European Commission, 2018) and created more than 85% of new jobs in the EU between 2013 and 2018 (European Commission, 2018). This type of enterprises is

crucial to support and is an area of great potential. Research suggests that circular implementations result in positive returns in terms of material cost savings (Rizos et al., 2015), in opening up new markets (Hillary & Burr, 2011), and in a turnover increase (Longo et al., 2005). Unfortunately, the circular economy is often better applied in larger corporations because of greater financial resources and larger scales (Russo & Perrini, 2010; Lepoutre & Heene, 2006).

The research question this dissertation will thrive to answer is:

“How to accelerate the transition to a circular economy in Small Enterprises (SEs) and Small to Medium-sized Enterprises (SMEs)?”

There are many different lines of research around the circular economy. The focus can be on the analysis of a particular loop such as reverse logistics or ecodesign (Karlsson et al., 2006; Pereira et al., 2020), researchers may also choose to study the strategies of actors such as private sector practices, local actors or the role of public authorities (Dennis, 2011; Ellen MacArthur Foundation, 2015). Many studies and frameworks have been published for the industrial, manufacturing or energy sector (Blomsma, 2019; Cavaleiro de Ferreira, 2019; Chen, 2019), but when it comes to SEs and SMEs, only certain geographical areas, such as Italy and Malaysia (Mura et al., 2019; Wooi et al., 2010) or specific fields, like the assessment of a conceptual framework concerning green management (Kazancoglu et al., 2018), have been studied.

This study addresses the SEs and SMEs of Wallonia. Primary data will be gathered by conducting semi-structured interviews in Walloon companies taking and not taking part in the CE. The goal will be to understand insiders' perception of this economic model, collect information about specific projects and get professional insights about sustainability in Wallonia. Further, we will rely on secondary data such as governmental reports and official European documents to have a comprehensive overview of the CE situation.

A qualitative approach seems more appropriate because, like Kovacic et al. (2019) suggest, developing metrics to quantify circularity is hard. In fact, no single accepted framework exists to enable organizations to assess and report their circularity. This lack of framework represents one of the greatest needs in the circular economy (Pomponi & Moncaster, 2017).

2 Literature Review

The literature review is divided in two sections. First, we will present the circular economy as one of the solutions for a more sustainable economy and detail the aspects that characterize it through the 7 main axes which it is based upon (Kovacic et al., 2019; Hillary & Burr, 2011; Korhonen et al., 2019). Once the concepts have been described and established, we will define SEs and SMEs. The selection of these categories of enterprises will be justified and the barriers, challenges and solutions towards the implementation of a circular economy will be discussed. Finally, we will set out the geographical context of the study and draft the situation in Wallonia.

2.1 The Circular Economy

2.1.1 Definition

The term appeared for the first time in 1989 in the book *Economics of Natural Resources and The Environment* by D. Pearce and R. Turner. As they point out with humour, the inventor of the concept of the CE is none other than nature itself. The CE is therefore not a theory invented by a scientist or an economist as a result of experimental research, but instead a result of new currents of thought inspired by the natural cycles of nature (Pearce & Turner, 1989).

The Ellen McArthur Foundation, which has been active since 2010 and a key player in this landscape, defines the CE as follows: "*A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models*" (Ellen MacArthur Foundation, 2015).

ADEME, the French Environment and Energy Management Agency, proposes this definition: "*The circular economy can be defined as an economic system of exchange and production which, at all stages of the life cycle of products (goods and services), aims to increase the efficiency of resource use and reduce environmental impact while developing the well-being of individuals. It's about doing more and better with less*" (ADEME, 2018).

Both of these definitions highlight the need to **increase resource efficiency**, **minimize environmental impact** through **better management of resources** and **extend the life cycles** of manufactured products. To the purpose of this study, we will follow the definition of the Ellen MacArthur Foundation based on three core principles illustrated in the diagram below.

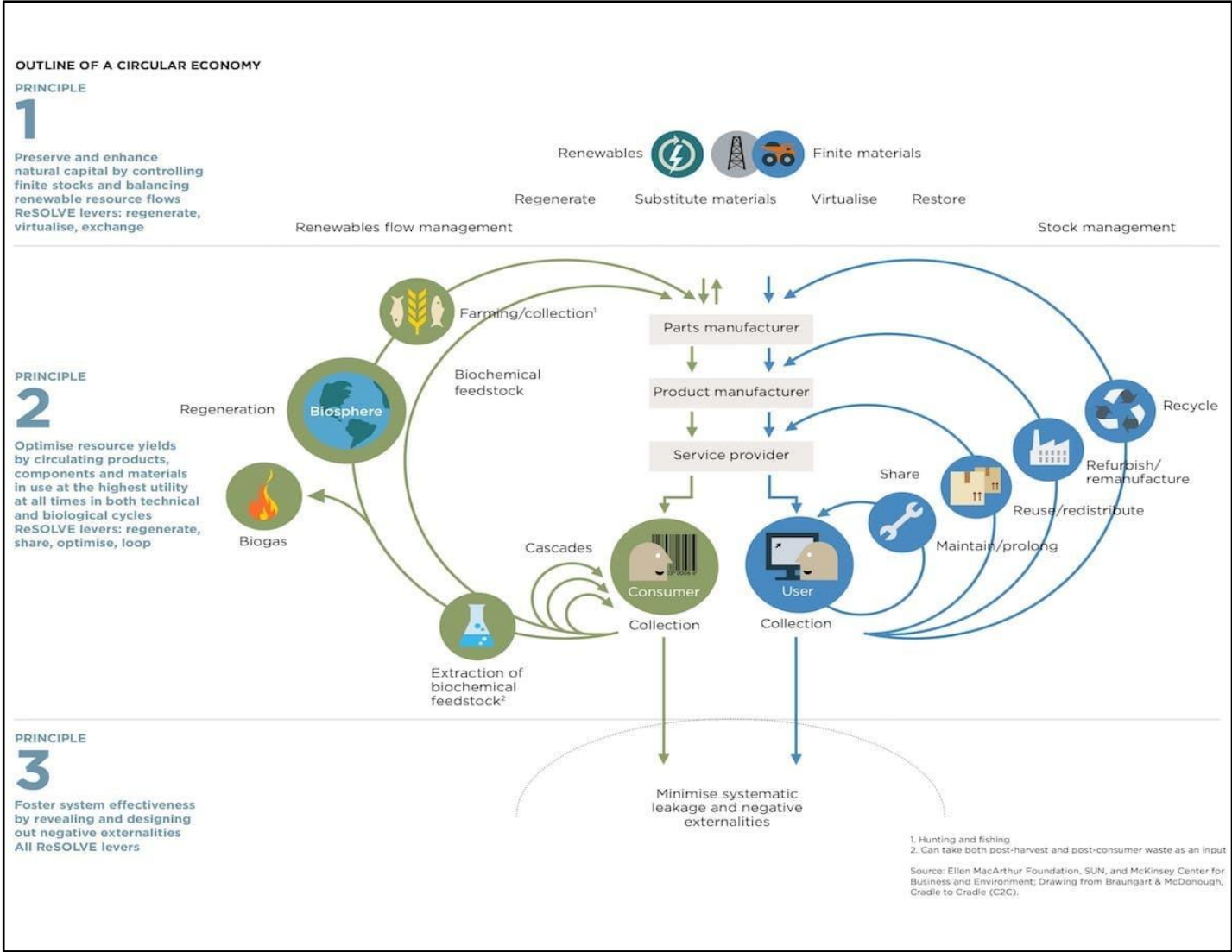


Figure 1: Outline of a circular economy (Ellen MacArthur Foundation, 2015)

Principle 1: Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows.

Principle 2: Optimize resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles.

Principle 3: Foster system effectiveness by revealing and designing out negative externalities.

In a nutshell, the CE supports a **sustainable transition** with the **involvement and mobilisation of all stakeholders**: society, public authorities, associations, companies, local authorities, etc. (Carroll, 1999). These principles on which the concept of CE is based, lead to 7 main axes to promote its implementation in practice (Ellen MacArthur Foundation, 2015; Korhonen et al., 2019).

2.1.2 Core Principles

2.1.2.1 Ecodesign

Ecodesign is a product design method that takes into account the **whole life cycle** in order to reduce negative externalities linked to the product as much as possible (Karlsson et al., 2006). The process refocuses on the service an object provides and how to continue to provide that service with a smaller ecological footprint (Pereira et al., 2020). This approach tends to reduce as much as possible the **natural resources** for its production, allows a longer lifespan, facilitates repairs and tends towards a policy of zero waste (Karlsson et al., 2006; Paulson & Sundin, 2015).

The economic benefits of ecodesign are mainly due to the reduction of raw materials (Karlsson et al., 2006). There are many competitive advantages: entering into a process of innovation for the company makes it possible to remain competitive and to convey a **positive image** to consumers (Pereira et al., 2020). In addition, being innovative often allows you to be one step ahead of the **competition** concerning standards and regulations (Kok et al., 2013; Haas et al., 2015).

The method is often related to the economy of functionality allowing a reduction in the demand for resources, but also a reduction in the frequency of new raw material inputs due to the lengthening of product life cycles (Korhonen et al., 2019). Nevertheless, this approach remains complicated to implement at 100% because the production of a product requires the participation of other actors (subcontractors, suppliers, etc.) who are often geographically distant (Prendeville, 2014). Indeed, the authors Aupperle and Carroll (1985) explain that the territorial but also organisational distance between actors implies less cooperation and therefore sharing less information and developing less trust.

2.1.2.2 Sustainable sourcing

Sustainable sourcing is the search for producers who use natural resource extraction methods (Haas et al., 2015). They usually are more efficient by minimizing waste, environmental impact and human conditions (Ghadimi et al., 2019). Wherever possible, sustainable sourcing advocates the use of **recycled materials** rather than raw materials. The idea can be applied for an individual, where we will speak of "**responsible consumption**" instead of "sustainable sourcing" (e.g. buying organic vegetables produced by a local farmer) (Haas et al., 2015)

2.1.2.3 Industrial symbiosis

Industrial symbiosis can be explained by its best-known example: the Kalundborg Industrial Park in Denmark. Kalundborg is the first example of separate industries grouping together to gain competitive advantage through **material exchange, energy exchange and information exchange**. The term, industrial symbiosis (IS) was defined by a Kalundborg station manager as "*a cooperation between different sectors whereby the presence of each increases the viability of the others, and whereby society's requirements for resource saving and environmental protection are considered*" (Ehrenfeld & Gertler, 1997, p.34).

As defined by Neves et al. (2020, p.4): "*Industrial and territorial ecology, also known as industrial symbiosis, is an inter-company organisation mode through exchanges of flows or pooling of need*", meaning synergies can be divided into synergies from pooling and substitution synergies.

The first one includes the management of incoming and outgoing flows in a collective way (e.g. joint waste management and joint orders in order to spread logistics costs and benefit from economies of scale). The second group consists of recovering waste from some companies for use as raw material by others (Haas et al., 2015).

Although these practices offer many advantages to the business networks that implement them, there are still many **obstacles** to putting them into practice (Neves et al., 2020). Indeed, companies working in different sectors often have their own schedules and it is difficult to understand the production process of others to know at which stage there would be an interesting flow for another company. These symbiosis approaches can also be developed internally (Korhonen et al., 2019).

2.1.2.4 The economy of functionality

The economy of functionality is a new approach, allowing the consumer to perceive the useful contribution of the good rather than its purely material aspect (Hossain, 2020). Take the car sharing industry as an example. A customer will buy a mobility **service** rather than a car; thus, the factors of production are essentially aimed at offering a function to the consumer (Anderson et al., 2014).

The company or manufacturer thus remains the owner of the good and retains control over the raw materials (Anderson et al., 2014), allowing it to make savings in the supply of primary resources, for example. The manufacturer, being at the same time a service provider, will maximize its revenues by creating a sustainable product. The aim is to provide the customer with a product that can withstand time and abrasion, because the longer the customer holds and uses the original product, the higher the supplier's performance will be (Hossain, 2020; Anderson et al., 2014; Bastein et al., 2013).

This new notion of economy presents itself as an inevitable alternative to the problems of **overconsumption** and **overproduction** (Hossain, 2020; Korhonen et al., 2019; Hansen & Klewitz, 2012).

2.1.2.5 Extension of product life cycle (PLC)

This concept is integrated in the principle of ecodesign and economy of functionality. A first part of this concept is based on the actions of consumers and producers which are (Haas et al., 2015): (1) **maintenance** (2) **reuse** and a third aspect resulting from producers' own actions (3) **remanufacturing**.

(1) Maintenance. Encompasses access to the purchase of spare parts, which for instance, is now subject to a law in Belgium. This regulation wants to push producers to announce if there are spare parts for sale. However, this measure is not yet well implemented due to a lack of room for manoeuvre in the event of non-application (Rapport au Parlement Wallon, 2019). Some producers in search of a better brand image are already offering spare parts at reasonable prices. Moreover, with new technologies such as the 3D printer, it is easier to access requests for scarcer parts (Korhonen et al., 2019). Consumers too are beginning to organize themselves to extend the life of their products through forums, tutorials, do-it-yourself and repair shops (Kaczmarek & Przemysław, 2013).

(2) Reuse. The internet has facilitated business models for second-hand markets (Bastein et al., 2013). Reuse means less energy, labour and resources are consumed compared to manufacturing a new product with new raw materials. It is important to note that reuse is the principle that is currently the most undervalued (Ghisellini et al, 2016).

(3) Remanufacturing. This involves extracting the sub-components of a product when it reaches the end of its life to re-inject them into the manufacturing process (Haas et al., 2015) This action is made possible by reverse supply chain management.

2.1.2.6 Reverse logistics

Reverse supply chain management or **reverse logistics** (RL) is defined as "*the effective implementation of the series of activities involved in collecting a product from any stage to either dispose it or recover value*" (Karamchandani, 2017, p.4).

Unlike the traditional supply chain or now called forward supply chain, reverse logistics focuses on the end-of-life of products on the market by paying attention to the ecological aspect in its process. Initially, the reverse supply chain was created for ecological reasons in order to reduce the waste of raw materials and to meet consumer demand (Karamchandani, 2017).

The goal is to integrate these two supply chains to achieve a **closed-loop supply chain** (Govindan & Soleimani, 2016). The purpose of the closed-loop supply chain is twofold. First, it aims to add value to the process to cover consumer demand, and second, to recover end-of-life products from the customer and determine the best way to reprocess them (Govindan & Soleimani, 2016). We talk about added value for the customer, when for example a product is defective or does not satisfy the customer, he can return it. This allows the company to improve its image by taking responsibility (Karamchandani, 2017).

2.1.2.7 Recycling and Waste management

The final component of the CE loop is the **management of waste** that could not be avoided by other methods (Korhonen et al., 2019). The aim is to recover materials and waste products from one product and reintroduce them into the manufacture of another product (Haas et al., 2015). This stage will take place more at the end of the product's life cycle in order to optimize the resources used. Recycling can be technological (e.g. plastic recycling) or natural (e.g. composting) (Iqbal & Quiasrawi, 2012). The circular economy is too often associated with the

recycling system, yet it represents the **last solution** for a product reaching the end of its life cycle (Korhonen et al., 2019).

According to Ross and Evans (2003), there are two types of recycling: closed-loops and open-loops. The first uses the waste to produce an identical product without functional loss of the material (e.g. the recycling of a PET bottle into a PET bottle). The second type uses the waste to produce a substitute for new material (e.g. the recycling of a PET bottle into polar fiber).

2.2 SEs and SMEs

In this second section of the literature review, we will address the managerial scope of this dissertation, i.e. SEs and SMEs. We will define these types of firms, depict the main opportunities and challenges to a successful transition and eventually draft the situation in Wallonia.

2.2.1 Definition

For the purpose of this dissertation, an institutional definition for small enterprises (SEs) and small and medium-sized enterprises (SMEs) will be used. We chose the definition that the European Commission published in 2003 ([EU recommendation 2003/361](#)) : "*Enterprises with fewer than 250 employees and an annual turnover not exceeding EUR 50 million or an annual balance sheet total not exceeding EUR 43 million.*"

| Category of the company | Employees | and | Annual turnover | or | Annual balance sheet total |
|-------------------------|-----------|-----|-----------------|----|----------------------------|
| Medium-sized | < 250 | and | ≤ € 50 million | or | ≤ € 43 million |
| Small | < 50 | and | ≤ € 10 million | or | ≤ € 10 million |
| Micro | < 10 | and | ≤ € 2 million | or | ≤ € 2 million |

Figure 2: Definition of Micro, SEs and SMEs (European Commission, 2003)

2.2.2 Opportunities of the CE

The shift of a linear economy towards a circular model pushes our society to respond to many challenges but is also an opportunity at different levels (Rizos et al., 2015; Hillary & Burr, 2011; Longo et al., 2005).

2.2.2.1 Economic

The CE invites companies to stand out in an increasingly competitive market where **reducing costs** is becoming a fundamental issue for their survival and economic development (Blomsma, 2019). Despite the fact that they can rely on considerable technological progress, highly volatile resource prices (Rizos et al., 2015), high labour costs (Trianni & Cango, 2012) and uncertain economic markets remain challenges that companies must constantly face and adapt to (Ghadimi et al., 2019).

By supporting a linear model, companies expose themselves to many dangers. Indeed, in view of the overexploitation of natural resources, a "*risk of disruption of supply*" (Ellen MacArthur Foundation, 2015) is to be expected. As a result, companies have every advantage in engaging in more circular approaches in order to ensure their own autonomy (Blomsma, 2019) and thus ensure their sustainability and competitiveness on the market.

By 2030, 3 to 5 billion consumers will have reached middle-class living standards (Global Commitment Progress Report, 2019; Ellen MacArthur Foundation, 2015), implying an improved quality of life but also increased pressure on natural resources and, consequently, on the prices of these resources (Ghisellini et al, 2016). The challenge for companies is therefore to demonstrate their capacity for innovation and to succeed in collaborating with each other within the same or heterogeneous sectors (Neves et al., 2020; Korhonen et al, 2019; Haas et al., 2015).

The CE, through its seven pillars, makes it possible to respond to this economic challenge based on customer needs. Indeed, the majority of them are tired of seeing their electronic devices obsolete after only a few years when the technological performance is huge. Thus, the CE invites companies to rethink their strategy in order to ensure customer loyalty or to open up new markets (Hillary & Burr, 2011).

2.2.2.2 Environmental

Environmental dilemmas are currently at the heart of global challenges. We are aware of issues such as the **intensive exploitation and depletion of resources**, both renewable and non-renewable (Karlsson et al., 2006; Pereira et al., 2020). In addition to this, there will also be massive urbanization by 2030 leading to a decrease in agricultural land (Moreno et al., 2014), an increase in GHGs emissions and climate change issues (Ellen MacArthur Foundation, 2015). These issues have dramatic and irreversible consequences for biodiversity and ecosystems (Moreno et al., 2014).

The Ellen MacArthur Foundation tried in 2013 to quantify the potential positive effects on the environment of the transition to a more circular economic model. By studying the three main components of household expenditure in Europe, it turned out that 60% of their income are consumed in mobility, food and accommodation. The Foundation also estimated that CO₂ emissions could decrease by 48% by 2030 and 61% by 2050. For its part, the European Commission has estimated that the circular economy could reduce the annual emission of GHGs by 2 to 4%.

If the positive effects of the circular economy on the environment cannot be precisely quantified, it cannot be questioned that fundamental principles such as the ecodesign of products, the recycling of waste or the sharing of common goods will naturally have beneficial effects in favour of environmental protection and climate-related issues.

The ultimate challenge for the CE is therefore to respond to this issue by proposing a new economic model that is part of a responsible and environmentally friendly approach. Moreover, we can observe a better consideration of **environmental performance within companies**, with the objective of differentiating themselves from competing organizations (Anderson et al. 2014). Since 1995, the number of sustainability reports submitted annually by companies has increased dramatically, as has the number of eco-labels worldwide, being a clear indication of the willingness of companies to get involved in these environmental challenges (Preston, 2012).

2.2.2.3 Cognitive

Making the transition from one economic system to another requires action on the part of businesses, public authorities, managers and consumers themselves (Lacy & Rutqvist, 2016). However, before we can consider a change in terms of means and actions, a **change in**

mentality and behaviour is required (Calogirou, 2010). An important point not to be underestimated is the training and provision of information to current consumers with little or no knowledge in this area (Biondi et al., 2002). This is why, in recent years and under the influence of consumer organisations, users have been receiving more and more information concerning “energy performance” and “ecological footprint of durable goods”. The challenge is to move from a system of over-consumption to one of responsible consumption. A period of adaptation is therefore essential in order to successfully change our economic model for the better (Oghazi et al., 2018)

2.2.3 Barriers towards the CE

Rizos et al. (2015), Jenkins (2004) or Doern (2009) investigated, among others, the main obstacles to the development and growth of the CE in SMEs. In the following chapter, we will explain what these barriers are for the local economic development and job creation.

2.2.3.1 Environmental culture

The management of a SME is often the responsibility of the owner, who has influence over its strategic options. Thus, the development of practices that take into account the environmental aspect depends on the attitude of this person (Biondi et al., 2002). Indeed, some executives tend to favour green orientations in the activities of their companies, while others adopt a negative attitude towards them. In addition, the company's sector of activity could play a decisive role in its positioning with regard to environmental policy measures (Ede et al., 2000).

2.2.3.2 Financial barrier

The transition to the CE model requires the implementation of new business models based on a process of innovation. However, this leads to additional costs that are in most cases unsustainable for SMEs (Trianni & Cango, 2012). In addition, a transition to a circular model requires the mobilization of human resources and time, which is usually a barrier for SMEs (Biondi et al., 2002). Therefore, the provision of a financing framework for SMEs seems necessary to accompany them towards a sustainable and innovative approach in order to improve their performance.

2.2.3.3 Lack of governmental support and legislation

It is undeniable that the transition to a circular economy will not be possible without governmental support (Kovavic et al., 2019). Thus, the provision of a financing framework, the promotion of training and a tax system that is favourable to the circular economy are among the factors that could promote the transition to this new model (Rizos et al., 2015). In addition, the lack of a legislative framework to encourage SMEs to integrate greener approaches into their industrial practices can have a significant influence, especially for small businesses, which are more subject to the influences of regulatory frameworks than large companies (Calogirou, 2010).

2.2.3.4 Lack of information

The lack of knowledge about the benefits of implementing a CE is an obstacle to the development of more circular practices within SMEs (Winans et al., 2017). In such cases, companies not only lack information on the possible gains that could be generated by the adoption of a circular economy, they are also unaware of the costs they incur through investment in increasingly scarce resources. Therefore, implementing an approach to effective resource management would turn these costs into gains (Jenkins, 2004).

A study was carried out in 2018 by the High-Level Expert Group (HLEG) financed by the European Commission among 300 companies with an interest in sustainable development. It showed that the majority of these companies had never heard of the CE or did not understand its real meaning (European Commission, 2018).

2.2.3.5 Administrative burden

The transition to circular practices could lead to administrative burdens arising from existing environmental legislation (Rizos et al. 2015). This would entail costs that would require the mobilisation of financial resources and time, which SMEs may not have (Lepoutre & Heene, 2006). Indeed, although these companies are familiar with the general framework of environmental legislation, they do not always master all the specific elements to comply with the requirements of this legislation.

2.2.3.6 Lack of technical skills

Typically, SMEs do not have the knowledge for developing technical skills that can help identify opportunities for efficient resource management, in terms of environmental sustainability and business cost reduction (De Los Rios & Charnley, 2016). They, therefore, give priority to the technologies they know and are used to. In order to detect potential leads and evaluate new opportunities, these companies need to acquire new technical skills and more knowledge. However, this can lead SMEs into dependency processes on behalf of external experts or even their own suppliers (Rizos et al. 2015).

2.2.3.7 Lack of support from the supply and demand network

The lack of momentum and an enabling environment for the implementation of CE is undoubtedly a barrier to the implementation of this new model within companies (Stuetzer et al., 2014). Indeed, in order to achieve an opposite situation, where it is encouraging for SMEs to make the transition, consumers need to integrate the purchase of sustainable products into their consumption priorities (Oghazi et al., 2018). In addition, it is necessary that suppliers also engage in the development of sustainable activities (Korhonen et al., 2019). SMEs cannot bring these suppliers to take such a path because of the insignificant influence they have in the negotiation processes.

2.2.3.8 Summary

| Opportunities | Barriers |
|-----------------------------|------------------------------|
| | |
| Reducing costs | Environmental culture |
| Reducing needs of materials | Financial barrier |
| Massive urbanization | Lack of governmental support |
| Environmental performance | Lack of information |
| Cognitive | Administrative burden |
| | Lack of technical skills |

2.2.4 Wallonia

2.2.4.1 Key figures

As stated, Wallonia is the south region of Belgium. In Wallonia, SEs and SMEs have made a major contribution to the growth of the region's economy, accounting for 99.5% of all companies. On average, a Walloon company employs 9 people (PWC, 2016). The following figure shows the total number of small to medium enterprises (SMEs) in Wallonia in 2017, by industry. As of 2017, there were approximately 1.1 million SMEs in the country. This statistic shows that just over 84,000 SMEs in Wallonia were active in the services industry.

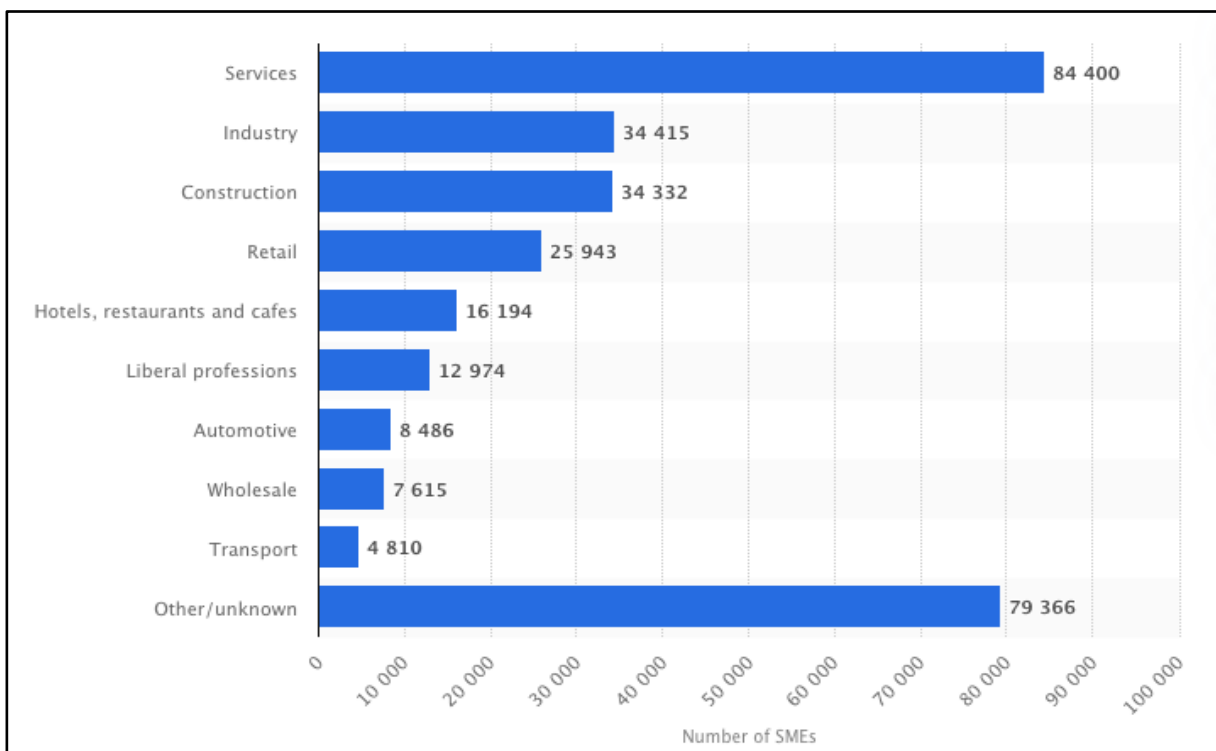


Figure 3: Total number of SMEs in Wallonia in 2017, by industry

According to PWC (2016), Wallonia presents itself as having a particularly suitable structure for integrating the CE and efficient use of raw materials on its territory. Since its strong industrialisation, it has put its expertise and capacity for innovation into practice for waste collection, the use of secondary resources and recycling (CIRIEC, 2016). This know-how of Belgian companies is the driving force behind the deployment of new markets (SPF, 2014). Its ambition is to "position itself as one of the main European pioneers in the development of a circular economy by 2030" (Rapport au Parlement Wallon, 2019).

2.2.4.2 Public support

In order to support its entrepreneurial sector, economic growth and job creation on its territory (Rapport au Parlement Wallon, 2019), Wallonia has decided to position itself as a key player in this circular transition, with a program called "NEXT", promoted by the Minister of the Economy and developed on the field by "Société Régionale d'Investissement de Wallonie (SRIW)". To ensure the effectiveness of the program, the Minister surrounded himself with leaders of the Belgian industry (Solvay, Recitel, Janssen, etc.).

This program consists of minimizing the use of resources (energy, water, materials) by bringing together companies that are subject to material and energy flows. In this way, waste from one company can be used by others in their production process. Example: a power plant uses water to cool its reactors. It discharges hot water that can be used by a neighbouring aquaculture farm, thus saving a second water withdrawal. *"In a context where the prices of raw materials and energy are constantly rising, it is a question of survival for companies"* (Jean-Claude Marcourt, 2019).

In addition to this program, "the Agency for Enterprise and Innovation (AEI)" provides financial support and guidance for SEs, SMEs and project leaders wishing to embark on a circular process. According to PWC (2016), the further development of the CE on Walloon territory is a matter of supporting small circular projects already implemented and helping them to generate more impact.

The CE contributes to a creation of added value ranging from 169 to 447 million euros, i.e. 1 to 2% of the added value generated by the Walloon industry (Rapport au Parlement Wallon, 2019). The estimate for growth in value added through the development of new circular projects is, depending on the sector, ranging from 2,2% to 3,29%. The development of circular projects has created 3,728 jobs (including 1,400 in the construction sector, almost 400 in the manufacture of metal products, 200 in the food sector), which represents 1.6% of Walloon employment. Finally, employment growth estimations are between 4.04% and 5.21% with a significant growth in the construction sector (Rapport au Parlement Wallon, 2019).

3 Methodology

In the previous chapter of this dissertation, a review of the scientific literature has been carried out to define the circular economy as a solution towards a more sustainable ecosystem. Then, we have defined and identified the main barriers and opportunities for SEs and SMEs to be part of this transition and set out the geographical context of the study.

This next chapter introduces the methodology used for the research. The collection of data is explained and the justification for a qualitative study rather than a quantitative study is given. To conclude, a brief introduction of the companies seems appropriate to fully grasp the discussion and findings in the following chapter.

3.1 Research Method

This study employs a qualitative approach. There are two reasons for this choice. First, the aim of this research is to understand what prevents companies to adopt circular practices and how to support them, meaning it is not a matter of developing metrics or numbers, but rather a matter of opinions, experiences and circumstances which couldn't be assessed with a quantitative approach. On top of that, Kovacic et al. (2019) pointed that developing metrics to quantify circularity is only relevant to monitor progress of specific projects, which is not our case here. Secondly, Corbin and Strauss (2008), argue that qualitative approaches are employed to achieve deeper insights on complex issues resulting in a better understanding of the problem at stake.

We conducted semi-structured interviews to gather primary data, followed by an in-depth qualitative analysis. The main advantage of semi-structured interviews is the flexible structure as the design and questions can be modified or mixed to a greater extent depending on how the interview goes (Maxwell, 2012). The detail of data on individual experiences and information is also a great argument in favour of these types of interviews (Corbin & Strauss, 2008). As a result, a complex situation is easier understood and interviewees have sufficient freedom to determine what is relevant for them (Flick, 2011).

3.2 Data Collection

A non-random judgment sampling approach (also known as deliberate sampling) was used to select interviewees. In this method, according to Marshall (1996; p. 523), “*the researcher actively selects the most productive sample to answer the research question*”. The aim was to assemble a set of interviewees having the highest potential to give credible and current information about the circular economy in Wallonia.

In order to collect the information necessary for the analysis, we proceeded to collect data from eleven field actors. These eleven stakeholders can be divided into three categories: There are four companies that have adopted a CE approach (two out of these four have been supported by the NEXT Program), three companies that have not adopted a circular process, and four consultants working in the field. The wide spectrum of stakeholders enables to gain a complete understanding of the topic.

Although 11 interviews might not seem much, due to the qualitative nature of this research, we were able to reach some degree of saturation. In addition, previous research noted that for homogeneous populations, between 6 and 12 participants should be adequate to reach saturation (Saunders & Townsend, 2016).

From the first category of stakeholders, we collected information on the motivations that led the companies in which they work to move towards the circular economy. We also asked them about the obstacles they may have encountered, the levers introduced, the developments observed and the future plans. For those companies that have not adopted this CE approach, we wanted to determine the reasons why, what their visions and their needs are. In order to benefit from external advice to companies, we also went to meet CE consultants. These consultants are active in the field and have a facilitating role to raise awareness and guide companies.

The contact persons were first contacted by mail between the 1st and 7th April 2020 asking if they were willing to discuss the topic in the scope of this dissertation. All the interviews were conducted with the help of the videoconferencing tool *Zoom.us*, due to Coronavirus disease (COVID-19) outbreak situation. The interviews followed an interview guide (Annex A) and lasted on average 45 minutes.

The companies in the sample were selected on basis of the following criteria:

- located in the Walloon Region.
- being a SE or SME.
- has adopted an CE approach through one or more of the seven pillars: ecodesign, economy of functionality, industrial ecology, recovery, reuse, repair, recycling.
- Companies that have not adopted this CE approach within their operations.

The experts and consultants were selected on basis of the following criteria:

- A person with a role as a consultant or field coach.
- A person involved in the CE.
- A person from an organization helping companies on the field.

3.2.1.1 IsoHemp

IsoHemp was created in 2012 following the development of a study project at the Catholic University of Leuven. After two years dedicated mainly to the installation of the industrial tool (machine and plant), the company started to market hemp-lime blocks for the renovation and construction sector. The product is environmentally friendly, has a low CO2 impact and is 100% recyclable. IsoHemp currently sells its products in Belgium, Luxembourg, France and the Netherlands.

3.2.1.2 Carrière de Gres

This non-profit association was created in 1990 to promote materials, in all their forms (blue stone, black and red marble, white stone, sandstone, etc.), from the Walloon Region. Their activity consists in federating the promotional actions of about thirty extraction companies in Wallonia. They also recycle materials made of lime or cement. Since the extraction activity requires efficient water management, they try to manage water in closed systems. In addition, an industrial ecology project is underway.

3.2.1.3 Car2Go

Car2Go is a carsharing company. The primary objective was to position themselves as the missing link in terms of mobility in order to allow a reduction in car ownership in Brussels. They want to improve the quality of life of users (lower costs, less congestion, favour alternative

transport, etc.). It is therefore not a matter of corresponding to the definition of the so-called "economy of functionality", but it is the theory that best suits their activity.

3.2.1.4 Restor

This social enterprise collects, sorts and resales household bulky goods. Their primary objective is to promote re-use. They offer a complete service, i.e. they take back all objects (good and bad quality) and then assess the rate of reusability (often above 25%). They also do upstream sorting, recycling and energy recovery, oriented towards burning.

3.2.1.5 Big Mat

Big Mat is a large distribution company in building materials and tools.

3.2.1.6 Mathias Bois

Mathias Bois named his company by his own name. He is active in the manufacture of wooden windows, stairs, doors and in the sale of other products including PVC windows. He also takes care of the installation of his manufactured products.

3.2.1.7 Automobiles Val d'Argenteuil

The main activity of this company is the sale and maintenance of motor vehicles including the Volkswagen, Skoda, Seat and Audi brands. The manager owns six car dealerships all located in Wallonia.

3.2.1.8 Agence pour l'Entreprise et l'Innovation

The AEI is a public organisation of the Walloon Region. The mission of the agency is to offer support to SEs and SMEs in Wallonia, with the coordination of seven operators. The AEI also has a mission at the educational level.

3.2.1.9 Idelux

Idelux is one of the seven European Community Business and Innovation Centres (ECBIC) operating on the Walloon territory and is the AEI's point of reference concerning the CE. Their job is to make companies aware of innovation, to detect projects that strengthen their competitiveness and to accompany them in the field for the concrete implementation of their projects.

3.2.1.10 Innove

Innove is also one of the seven ECBICs. Their mission with regard to the CE is similar to that set out for Idelux.

3.2.1.11 Comase Management Consulting

Comase accompanies companies with regard to the creation and development of sustainable projects.

In the following table, we can see that the companies selected for our sample follow the rules laid down by the European Commission as well as the rule of the number of employees. The data concerning the turnover were collected via the annual publications on the website of the National Bank of Belgium. It should be noted that *Carrière de Gres*, one of the companies in the sample, is a **non-profit association** federating the actions of Walloon stone quarries and is therefore positioned as a "representative" of these quarries in our analysis. They don't generate any revenue. The stone quarries are composed of SEs, SMEs and larger companies as well.

| Company | # Employees | Turnover | Interviewee | Analysis |
|------------------------------|-------------|------------|---------------|----------|
| IsoHemp | 4 | 2.343.443 | Founder | CE |
| Car2Go | 22 | 964.580 | Founder | CE |
| Restor | 4 | 1.128.021 | COO | CE |
| Carrière De Gres | 4 | / | Manager | CE |
| Big Mat | 35 | 24.811.683 | Sales Manager | not CE |
| Mathias Bois | 5 | 1.239.210 | Founder | not CE |
| Automobiles Val D'Argenteuil | 20 | 33.556.124 | Sales Manager | not CE |

Figure 4: Characteristics of sampled companies

| Consultant | Company |
|-----------------------|-------------------|
| Pascale Delcomminette | AEI |
| Catherine Beco | Idelux |
| Gregoire de Hemptinne | Innove |
| Marc Crispin | Comase Consulting |

Figure 5: Consultants in the CE

3.3 Data Analysis

We used a thematic analysis approach for the analysis of the data. Thematic analysis is described by Cassell & Bishop (2019) as a flexible plan that qualitative researchers use to generate themes from interview data. Braun and Clarke (2006) define it as “*a method for identifying, analysing and reporting patterns within data*”. Thematic analysis enables to have an “*overall picture of the experiences of every driver in relation to a particular topic*” (Cassell & Bishop, 2019). It also permits to compare all respondents’ comments on specific issues resulting in a top-notch qualitative analysis.

Once all the interviews have been conducted, the first step (King & Brookes, 2018) consisted of identifying and grouping the main insights into more general categories. In order to do so, we started by browsing through our transcripts and by making annotations of our first impressions. At this early stage, we verified the presence of potential bias following Marshall’s (1996) guidelines: “*the researcher should acknowledge preconceived notions and actively work to neutralize them.*” Then, we conceptualized and segmented the data. This process allowed to establish the bulk of the data in a cohesive way by naming the categories and describing the connections between them.

In a second step (King & Brookes, 2018), we analysed the categories and determined if there is a hierarchy among them. With the use of secondary data (various reports on the circular economy), it was safe to say that some barriers were more important than others and some solutions more effective. Finally, we brought all the insights together and build the core of the answer to our research question using the abduction approach as it was an interactive process between empirical findings and existing theory (Agar, 2010).

4 Findings and discussion

In this chapter, we analyse the data collected from the eleven interlocutors presented above. The objective of this section is to compare the information, opinions and situations encountered with the literature review.

4.1 Barriers

In the literature, we identified several types of barriers to the implementation of a circular dynamic. These barriers were economic, organizational, technical, regulatory and cognitive in nature (Rizos et al., 2015). Throughout this section we will compare theory with practice.

4.1.1 Cognitive

We have pointed in the literature that authors stress the importance of information and knowledge to promote the development of circular projects. However, this knowledge may, in some cases, be cruelly lacking (Winans et al., 2017) and thus constitute a decisive brake. We can observe that theory and practice are converging because this is also observed in the field. As for the companies that have not integrated the CE, two of the three companies interviewed mentioned a rather limited knowledge of the concept (Mathias Bois, not CE & Big Mat, not CE). To the manager of the third company, *Automobiles Val D'Argenteuil*, the CE was totally unknown.

In addition, three of the four consultants point a lack of discussion and interaction between companies. In the majority of cases, companies do not know their neighbours and are therefore not aware of possible synergies. However, “*the opportunities and possibilities for collaboration are not limited to economic criteria alone*” (Gregoire de Hemptinne, consultant). This consultant from *Innove* explained that raising awareness and networking are both essential. On the other hand, Catherine Beco (consultant) pointed out that this process is already in place, particularly in the province of Luxembourg where companies have the opportunity to meet at organised events by *Idelux*.

The founder of *Restor* (CE), talked about the difficulty to change mentalities and habits. As part of his activity, he aims to change consumer mentalities and behaviours towards an alternative model to the one that currently prevails (over-consumption, individual ownership, etc.). We can

therefore conclude that a certain asymmetry of information persists between the various actors in the field. A significant lack of collaboration and communication also emerges from this observation. Although, one of the reasons may be external (i.e. the institutions in charge of promoting this new form of economy are not able to raise awareness among all the companies in the region), we can unfortunately notice that most Walloon companies persist in a linear and individual approach.

To conclude, it is clear that the cognitive brake must be considered as one of the first obstacles to overcome if the transition to a new model is to be accelerated.

4.1.2 Economic

One of the main obstacles raised by three consultants (Pascale Delcomminette, Gregoire de Hemptinne and Marc Crispin) concerns economic profitability. For two of them, companies are reluctant to engage in a CE approach because they are primarily focused on short-term profits and do not place enough importance on long-term concerns. Moreover, the high costs which companies have to face in the short term do not encourage them to abandon the linear model in favour of a circular model. Indeed, this requires short-term investments, while the benefits will, in most cases, only be possible in the long term. Pascale Delcomminette (consultant) was able to observe that, despite the free support offered to companies, they only commit to it if they see the results quickly.

Other economic barriers may stand in the way of the CE, according to *Marc Crispin* (consultant). He highlighted the role of multinationals in breaking prices and thus counteracting the development of the CE. This financial brake has been identified by Trianni & Cango (2012) and is also experienced by *Carrière de Gres* (CE) facing tough Asian competition. For *IsoHemp* (CE), the lack of financial resources is a barrier as well.

For the three companies that have not adopted this concept of circularity, the economic brake concerns insufficient customer demand for this type of "circular" product or service (Mathias Bois, Big Mat, Automobiles Val D'Argenteuil). Although customers or suppliers are sometimes attentive to the environment, for *Mathias Bois* or *Big Mat*, the demand for eco-designed or ecological goods is not sufficient.

On the one hand, we can conclude that the economic character guides the choices of companies to switch (or not) from one model to the other. This criterion remains the main concern since

the primary objective of a company is to be profitable. Constraints related to uncertainty and the risky nature of returns or investments were considered in the literature to be among the elements hindering access to CE (Rizos et al., 2015). These characteristics probably also explain some of the brakes observed in the field.

On the other hand, “*we can see that the deployment of CE is also market driven*” (Marc Crispin, consultant). If consumers are not aware of such an approach and do not wish to consume sustainably, it will be more difficult to extend this economic model to other horizons (Gregoire de Hemptinne, consultant & Marc Crispin, consultant). This shortfall in demand has also been identified in the literature by Oghazi et al. (2018).

Finally, as mentioned by *Pascale Delcomminette* (consultant) “*circular terms and conditions depend on those of the current market.*” Take the secondary market as an example, it will only be viable when it is economically more attractive than the primary market. She drew a parallel by pointing out that “*as long as raw materials remain cheap, it will be economically unattractive for companies to look into alternative methods like recycling, sustainable sourcing or ecodesign.*” In this way, a legislative obligation towards these alternatives is among the possible solutions because economic interests will (almost) always prevail over other interests (Blomsma, 2019; Mura et al., 2019 & Marc Crispin, consultant).

4.1.3 Size of the firm

One difficulty encountered by *Car2Go* (CE) concerns the arrival of large groups in small economic niches where SMEs are already present. In most cases, these large companies have a short-term logic and financial power that smaller companies do not have. This observation is also shared by *Restor* (CE), seeing that large groups such as H&M or Ikea are also increasingly launching this type of approach. Ikea, for example, is offering vouchers in exchange for old furniture.

However, according to the managers of *IsoHemp* (CE), *Car2Go* (CE) and *Catherine Beco* (consultant), large groups do not have the same vision as smaller companies. These will be guided by the remuneration of their shareholders (short term), which is not always compatible with a long-term vision. Maximising short-term profit on the one hand and bringing innovation on the other (on waste treatment, for example), where profitability is quite low, are two aspects that are difficult to reconcile (Russo & Perrini, 2010). It is therefore a question of keeping a balance where ethics remains an essential point, despite the arrival of these larger groups.

We did not find evidence of this obstacle in the literature review but we found that it is a significant obstacle in the field. We can therefore observe that competition is still quite strong for small businesses. They must therefore highlight their strengths (flexibility, speed of adaptation, technical characteristics, etc.) in relation to the financial power of big corporations.

4.1.4 Technical

The technical barrier is not an issue that has been raised by the consultants during the interviews with the exception of *Marc Crispin* (consultant). When monitoring the implementation of a reverse logistics process in a plastic company, he was confronted with technical difficulties because, although Belgium is efficient in terms of sorting and recycling (PWC, 2016), this sorting is mainly carried out only for traditional waste (paper, cardboard or metal). Moreover, the consultant mentions that certain technical obstacles may be found in the field due to the fact that the recovery of by-products or waste is not always possible.

On the other hand, certain technical obstacles were mentioned by companies that have not yet integrated a circularity project. The manager from *Big Mat* (not CE) underlines the fact that their company does not master the production cycles since their main activity is only the distribution of building materials in this case.

As far as *Mathias Bois* (not CE) is concerned, the infrastructure is not adapted to this type of process. When the company has to replace frames, in the vast majority of cases this means that the frame is rotten and the wood is therefore no longer reusable. The manager also stresses the fact that reworking wood that has already been treated is complicated and quite harmful.

According to Sales Manager of *Automobiles Val D'Argenteuil* (not CE), the infrastructures present in a car dealership do not allow recycling or ecodesign, for example. We can see that the technical obstacles have not been observed by the companies already present in this circular approach but that this obstacle is rather found within the companies that have not undertaken this approach. If we do a parallel analysis with the cognitive brakes, a correlation exists between these two sections because this second category of firms probably does not have adequate information to look at this new model. These companies have not been made aware of the processes and means available, the technical possibilities and the potential benefits.

4.1.5 Regulatory

Few of the companies interviewed encountered obstacles linked to the legislation. The founder of *Car2Go* (CE) underlines the fact that he is “*totally transparent in terms of data towards the political authorities.*” In his view, this transparency should be required for politicians so that they can assess the real impact of each company.

A long-term vision of policies is also indispensable condition for the development of a new model as it is mentioned in the literature. Rizos et al. (2015) highlight the difficulty associated with the globalization of this concept and the need for regulatory changes. *Gregoire de Hemptinne* (consultant) mentioned the complexity of “*forming a consortium with foreign countries and that internationalization could be a brake because it often frightens companies.*” Moreover, the financial aid offered by the Walloon Parliament under the NEXT program is not accessible to all companies because they have to meet selection criteria, eligibility, etc.

Restor (CE) and *Carrière de Gres* (CE) underline these obstacles linked to well-established administrative and regulatory mentalities that are difficult to change. This is in line with what Calogirou (2010) and Kovavic (2019) argued, i.e. the need to adjust current regulations.

4.2 Solutions and Levers

4.2.1 Unconscious involvement in the circular economy

A positive finding observed throughout these interviews concerns the fact that a number of companies are already (partially) active in a circular process without being aware of it. For *Catherine Beco* (consultant), this is a lever not to be underestimated because “*companies have the intrinsic ability to switch from one model to another, especially if they already have a foot in the door.*”

According to her, these companies have the opportunity to **go further** in this circular dynamic. Below, we present the "unconscious circular" approaches used in the three companies that did not integrate a circular approach in our sample. We can observe that, despite the fact that they are not in this circular perspective, the players are placing more and more importance on the environmental side of their business. “*In the majority of cases, these companies are guided*

either by environmental legislation or by a cost-reduction approach.” (Catherine Beco, consultant).

Big Mat (not CE), introduced a deposit on their bags in order to encourage the reuse and tries to move towards **recyclable packaging**. According to *Mathias Bois* (not CE), the Walloon Region also carries out many strict controls on compliance with the rules on sorting and recycling. As far as his business is concerned, the untreated wood (manufacturing waste) is recovered by another company in order to transform it to heat during the winter. The paint he uses is also water-based and environmentally friendly. Finally, he recovers as much cardboard as possible to protect the frames or other products leaving the workshop.

We can therefore consider these multiple actions as a springboard to bring these mainstream companies into the circular economy or at least convince them to take a further step towards a circular approach. We have previously said that the **reluctance to change** and the lack of success stories did not encourage companies to embark on such an approach (Stuetzer et al., 2014; Korhonen et al., 2019). All these actions, however small, tend to prove to companies that the transition is possible. In addition, although sometimes constraining for companies, we have also noticed that legal obligations play an important role as companies commit and respond to them.

4.2.2 Partnerships

In section 4.1.1 above, the consultants identified the **recurring lack of communication** and, as a result, collaboration between companies. As consultants *Marc Crispin* (consultant) and *Catherine Beco* (consultant) have pointed out: “*networking is essential.*” Indeed, within our sample of companies that have integrated a circular approach, we can observe that each of these companies maintains partnership relations or strong links with other players.

Our interviewee at *Carrière de Grès* (CE) explained they carried out collaboration projects with Fediex, the Belgian Federation of Non-Fuel Rock Mining and Processing Industries. This collaboration deals with topics such as the preservation of biodiversity, water and stone management, etc. For some years now, the association has also been in contact with *Rotor*, which is doing the same kind of work with the wood trade, another great Walloon resource.

As far as *Car2Go* (CE) is concerned, they have, from the very beginning, set a high importance on partnerships. However, their criteria are precise because they choose their partners on an

ethical and non-financial basis and look for partners who "look like" them. They have also developed a partnership with public transport with the "*aim of complementarity from a mobility point of view.*"

IsoHemp (CE) also maintains strong relationships with its customers and suppliers and, according to its director, this was "*naturally built around this circular concept.*" The same applies to *Restor* (CE), which currently has a partnership with the larger TERRE group. We can see that the collaborative approaches were initiated fairly quickly within these four companies, thus **promoting networking** and **better communication between the players in the same territory and industry.**

4.2.3 Regulatory

According to the consultant *Marc Crispin* and *Gregoire de Hemptinne*, the fact that the state does not impose enough "*immediate legislative constraints*" to companies remains a major obstacle at the moment. The introduction of **legislative standards** is necessary because important action must be taken to address the global issues the world is facing. "*Rules could be easily established to require producers to use environmentally friendly components or to encourage ecodesign.*" (Marc Crispin, consultant).

As Calogirou (2010), Kovavic (2019) or (Rizos et al. 2015) expressed it in the literature, public incentives and interventions are essential. "*Out of 100 companies, 80 will change their behaviour by constraint while only 20 will change in anticipation*" (Gregoire de Hemptinne, consultant). However, some legislative levers such as the "pollution tax" are already applied on Belgian territory. We can also recall the strict rules imposed by the Walloon Region regarding sorting and recycling mentioned earlier.

For *Gregoire de Hemptinne* (consultant), the authorities can go much further. We realize that the legislative and regulatory side has a primary place in the path towards a CE and that this side falls under the power of public authorities. Fortunately, at least according to PWC (2016), the Belgian government has the means and instruments to stimulate this economic model.

If we take a step back and look at the macroenvironment of this study, coordination between the authorities of the EU may also play an important role. Indeed, legislation can diverge from one country to another and become an obstacle if it is not taken into account. Policy involvement at all levels is therefore emerging as the basis for a drive towards a new economic model.

Regulatory levers are of great importance in order to develop CE, both locally and internationally.

4.2.4 Cognitive

Throughout this section, we noted that the levers identified were related to different aspects (unconscious involvement in CE, partnerships and governmental support). Beyond these criteria, some participants in the analysis were able to observe a positive evolution in the awareness, mentalities and/or behaviours adopted by the various categories of actors (*IsoHemp*, *Restor*, *Car2Go*, Catherine Beco). Within the stone industry (*Carrière de Gres*, CE), there was also an internal intention to bring this CE concept to the stone industry.

The idea is to invite industry leaders to **reflect on the impact of their actions** (with packaging, for example), which “*at the same time encourages an improvement in social and environmental performance.*” (Catherine Beco, consultant). As a result, this lever will be extremely significant in the evolution towards a new economic model. Furthermore, *Pascale Delcomminette* (consultant) insists that the concept of the CE should not be interpreted just as recycling but underlines other principles such as eco-design, reverse logistics (RL) and industrial symbiosis (IS), which are key to the transition as well.

4.3 Summary Table

This table shows the motivations, pillars, brakes and levers identified within the four companies that have integrated the circular economy concept and the three companies that have not integrated the circular economy concept. For reasons of consistency, this table only includes in the "pillars" column the axes mentioned in section 2.1.2.

| Company | Analysis | Motivations | Pillars | Barriers | Levers |
|------------------------------|----------|---|---|---------------------------------------|---|
| IsoHemp | CE | No initial motivation but "natural" involvement | Ecodesign Reverse logistics Reuse Recycle | Economical | Partnerships Cognitive |
| Car2Go | CE | Improve Brussels' mobility Decrease in the rate of car possession | Economy of functionality Extension of PLC | Regulatory | Partnerships Cognitive Regulatory |
| Restor | CE | Willingness to act on over-consumption, obsolescence and landfilling | Reuse Recycle | Economical Cognitive Regulatory | Partnerships Cognitive Regulatory |
| Carrière de Grès | CE | Economic Restore the image and taste for natural Walloon materials | Ecodesign Reuse Recycle Industrial symbiosis | Economical Regulatory | Partnerships Regulatory |
| Mathias Bois | not CE | / | / | Cognitive Economical Technical | Unconscious involvement in the CE |
| Automobiles Val d'Argenteuil | not CE | / | / | Cognitive Economical Technical | Unconscious involvement in the CE |
| Big Mat | not CE | / | / | Cognitive Economical Technical | Unconscious involvement in the CE |

Figure 6: Summary table

5 Conclusions, Limitations & Future Research

The aim of this research was to provide a better understanding of the evolution of the circular economy in Wallonia. We have defined the concept of circular economy through the seven pillars, as a new economic model. Then we compared data from companies that have and have not integrated a circular economy approach to identify which are the barriers, levers and solutions for SEs and SMEs. We concluded that three companies that are not part of a circular economy approach share exactly similar brakes and levers. However, for companies that have integrated a circular approach, some different brakes and levers are observed. The analysis allowed us to answer the main research question: "How to accelerate the transition to a circular economy in Small Enterprises (SEs) and Small to Medium-sized Enterprises (SMEs)?"

We have been able to observe that on Walloon territory, the concept of the circular economy is currently not very well known and developed. Indeed, the process is still at the awareness stage. The linear functioning of companies and the reluctance to change induce a difficult transition from one model to another. Moreover, companies will mainly focus on short-term issues and profitability, leaving out the long-term ones.

Not all brakes are internal to companies. There is information asymmetry, lack of awareness, lack of collaboration between companies and insufficient demand for these types of products or services. Besides, competition and the market also push companies to persist in a linear and individual system.

Many levers have been identified that can support the emergence and development of the circular economy. Companies that have integrated a circular approach can count on levers such as partnerships, while other companies that have not integrated the circular economy concept can rely on their slow and unconscious involvement in this process. This unconscious involvement in short circuits is an important solution as they facilitate the switch from a linear to a circular model step-by-step.

Governments also have an important role to play by introducing regulatory levers to overcome the obstacles encountered. Moreover, the analysis underlines the importance of the involvement of the business leader as well as all stakeholders in such a process.

The aim of this research was to provide a better understanding and a contribution of the circular economy to strategic sustainable development in Walloon SEs and SMEs. We have carried out an analysis with the available data. However, as the circular economy is a fairly recent concept with a large potential, we can conclude that this theme encourages further research.

This study is limited by information and the period when the research has been carried out. Due to the Covid-19 outbreak, we haven't been able to establish contact with different important players that could have given a whole new angle to this study. The experts had impressive industry knowledge, lot of experience and stories to tell, that would be valuable for this study and to summarize all the information collected.

Previous research has demonstrated the benefits of the CE in the industrial, manufacturing and energy sector (Blomsma, 2019; Cavaleiro de Ferreira, 2019; Chen, 2019) and the barriers to implementation for SEs and SMEs in certain geographical areas (Mura et al., 2019; Wooi et al., 2010). The present work is designed to be the first to consider Belgium in such a context. This research introduces the idea of supporting partnerships within same industries and underlines the importance of unconscious involvement in the CE. The present findings clearly contribute to the literature by providing fresh findings and demonstrating the untapped potential of the CE in Wallonia.

The CE concept in Wallonia is at the awareness stage and future valuable research must be considered. It is important to explore and understand the possible coordination actions between companies and conduct studies on specific industrial projects or feasibility studies of eco-designed products. Future research can be done on the effectiveness of the different European and Belgian campaigns like The European Green Deal or the Marshall Plan 4.0 in Wallonia. Eventually, we hope that more and more people will adhere to the circular economy and that together with everyone, we will save and change our world for the better.

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7 Annexes

7.1 Annex A – Interview Guide (Companies)

Section 1: Purpose of the interview guide

The aim of this interview guide is to analyse the evolution of the circular economy (CE) within small enterprises (SEs) and small and medium-sized enterprises (SMEs) in Wallonia. For an SME that has adopted a circular economy approach, information will be collected at three points of time.

The first set of questions aims to highlight the starting point and the motivations that led the company to consider a circular approach. Then, we will try to determine the brakes, the levers as well as the benefits or failures observed during the implementation and application of this circular model within the company. The strategies and processes implemented as well as the behaviour of the various actors will also be evaluated. Finally, the company's vision and future plans in terms of the circular economy will be the subject of the last section.

For an SME that has not adopted a circular economy approach, it will be necessary to determine what concepts and knowledge the members of the organization have concerning the topic. The purpose of this guide will be to highlight the reasons why the company has not chosen such an approach. The interviewee's viewpoints on the incentives and obstacles to the integration of the circular economy within the enterprise will be sought after.

Section 2: Presentation of the interview

- Can you briefly introduce yourself?
- Can you specify what your function is within the company?
- Can you give a brief introduction to the company?
- Could you describe the company's mission?

Section 3: Participation of the company in a circular economy

- Does your company participate in a circular economy approach?

If yes: see sections 4 to 11.

If no: see section 12.

Section 4: The circular economy approach

- How long has your company been doing this? Can you describe this path, since the implementation of the circular economy approach in the company?
- How did your company learn about opportunities related to the CE?

- What were the driving forces and motivations behind the decision to integrate the circular economy within the company? Please sort by order of importance.
- On the basis of which pillar(s) of the circular economy is the company based? (ecodesign, industrial ecology, economy of functionality, repair, reuse, recycling and reuse). Why?
- If none of these seven pillars were used, what other ways were used? Why?

Section 5: Corporate Strategies and Policies

- Which levers has the company put in place to ensure optimal integration of the circular economy within its activities? Why? Please give examples.
- Which (new) strategies had to be put in place? Please give examples.
- Has the company's mission and/or vision remained the same or been redefined?

Section 6: Evolution and Performance

- What changes have been observed within the company?

Economic

- Has the company seen an improvement in its financial performance?
- How was the company able to measure that performance?
- Has the company been able to gain new competitive advantages on the market?

Social

- Has the company seen an improvement in its social performance?
- How was the company able to measure that performance?
- Has the company been able to gain new competitive advantages on the market?

Environmental

- Has the company seen an improvement in its environmental performance?
- How was the company able to measure that performance?
- Has the company been able to gain new competitive advantages on the market?

Section 7: Brakes

- What were the obstacles and limitations encountered?

Section 8: Behaviours adopted by the various actors

- What were the behaviours adopted by the company's leaders and top management?
- Has there been a change in these behaviours? Can you describe these behaviours?
- What were the behaviours adopted by the company's employees?
- Has the company seen a change in the behaviour of the company's customers/users?
- Has demand (from customers and users) been modified by this decision to embark on a circular economy?

Section 9: Knowledge of the various actors

- Did the directors or top management already have knowledge of circular economy?
- Did the employees already have any knowledge of the circular economy?
- Have the company's customers been informed that the company is embarking on this circular economy approach?

Section 10: Government support

- Was this approach supported by the public authorities? If yes, how?
- Is the company part of a program to support the circular economy (at federal, Walloon and/or local level)? If yes, how? If no, why?

Section 11: Future Vision & Conclusion

- What is the future vision of the company in terms of a circular economy?
- What three words would you use to characterize your practice of the circular economy?

Section 12: The company does not participate in a circular economy approach

- Do you know what the concept of circular economy is?

If you do:

- How did the company learn about it?
- What are the company's reasons for not wanting to incorporate this concept into its business plan?
- What would the company need in order to embark on such a process?

- What incentives do you think would be needed to encourage a company to step into a more circular approach?
- What do you think would be the obstacles to integrating a business into a more circular approach?
- Would it be possible for your company to integrate this concept of CE in the future?

If not:

- Would the company possibly be interested in obtaining more information?
- What incentives do you think would be needed to encourage your company to enter into a more circular approach?
- What do you think would be the obstacles to integrating a business into a more circular approach?

7.2 Annex B - Interview Guide (Consultants)

Section 1: Purpose of the interview guide

The aim of this interview guide is to analyse the evolution of the circular economy within Small Enterprises (SEs) as well as within Small and Medium-sized Enterprises (SMEs) in Wallonia. To this end, this guide will aim to gather information from consultants operating in the circular economy. The aim will be to analyse the current positioning of the circular economy in Wallonia, to identify the challenges, the levers and the obstacles to its implementation in Walloon companies.

Section 2: Questions

- How many years has the circular economy been integrated in Belgium?
- How can the circular economy be positioned today in Wallonia? Give examples.
- The NEXT programme aims to position Wallonia as a pioneering region in the circular economy, can we observe an evolution since its implementation?
- We can read in the literature that the circular economy is an opportunity to be seized, offering many possibilities to companies; what are the obstacles to its implementation?
- In your opinion, is the circular economy positioning itself as an inevitable alternative for the future? Why?
- What current challenges can the circular economy respond to?
- What are the levers to be put in place in order to develop this concept of economy in companies? Can you sort by order of importance?
- What is the place of CE in companies?

- What do businesses need in order to integrate the circular economy into their activities?
- Are start-ups and/or small businesses more likely to engage in a circular economy than existing companies or large companies? Why?
- Is the implementation more complex than in theory? Why?
- Is there a discrepancy between practice and theory? Why?
- In your opinion, what will be the evolution of the circular economy in Wallonia?