The social-economic impact of Circular Economy in Europe: A comparative analysis

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MSc Thesis

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Foreword

The first time that I had the opportunity to bump into the notion of a Circular Economy, was during a lecture held at Wageningen University in 2015. Since then, I have become so enthusiastic about this concept that I decided to investigate and discover this new dimension. In January 2016 I therefore decided to join a group of active students, the Circular Economy Wageningen (CEW). One of the principal goals of the group was to raise awareness of the Circular Economy organising small events for students as well as professors. It was after this experience that Fons Janssen and I decided to merge the student initiatives of IBBESS (international bio-based economy student symposium) and CEW, by founding in September 2016 the Circular Economy Wageningen Student Hub (CESH) with the aim of sharing and stimulating the awareness of a circular and a bio based economy among students, companies, scientists and policymakers. It was through our passionate work, that I started wondering about the role that a Circular Economy could have in Europe.

It was after some consultations with Judith van Leeuwen, that I realised that my interest about a CE was real. I therefore asked Kris van Koppen to join and support me in this journey. I must say, that his support was of enormous help. My many interests and my continuous will to discover new angles and dimensions, have been brought under control by Kris. I have to thank you Kris for leading me in the right direction and for teaching me how to drive constantly while avoiding shortcuts and wrong directions. I feel that I have learned a lot growing both personally and academically.

I want also to thank the founders and representatives of the Circular Economy initiatives that I visited in Italy, Spain, Portugal and the Netherlands, for giving me the opportunity to widen my knowledge and to personally visit existing operational realities reflecting a Circular Economy in Europe. It was a great experience. Last but not least, I am grateful to my family and to everybody who has supported me. Without your support, maintaining a positive attitude could have been another big challenge to tackle.

Summary

In the last years the concept of a Circular Economy (CE), has gained relevance on a global scale for its capacity of challenging the current prevailing linear economical model, which is overburdening the carrying capacity of the planet. Relying on a system-wide innovation, CE aims to redefine products (both technical and biological) and services to design waste out, while minimizing negative impact and building social, economic and natural capital. Given the potentiality that CE represents, the European Commission decided to start a project that aims to implement CE within the European Union's economic system. The European Commission (EC), in fact, started a project that aims to implement a Circular Economy within the EU's economic system, with the scope of stimulating Europe's economy and its competitiveness. In order to promote the transition towards a Circular Economy, the EU set up a Circular Economy Package, which aims to create new jobs, foster sustainable economic growth and boost the EU's economic competitiveness (European Commission, 2016). This thesis explores the impact that a Circular Economy can have on the EU's social-economic dimension in terms of job creation, job quality and the distribution of other social benefits. In regards to the notion of job quality, the analysis led us to propose a definition of job quality as "the extent to which a job can reflect those working environments where aspects such as ambition, flexibility, creativity, cooperation, employees training and re-combination of skills can be fulfilled, in order to forecast beneficial outcome for the employees physical and psychological well-being". Apart from this, it is through the analysis of 5 selected circular initiatives reflecting the 5 different sectors (bio-mass and bio-products, plastics, food waste, construction and demolition and critical raw materials) in different EU countries (Italy, Portugal, Spain and the Netherlands) that a comparative analysis is provided. This analysis leads us to understand the performance of the selected initiatives in terms of employment and about the prominent role that dimensions such as knowledge, education, innovation can play for the establishment of a CE in Europe during this period of transition. Even though belonging to one sector or region than another can create differences in terms of a positive performance, the circular initiatives explored contributed to the creation of 62 job positions, where more than 50% were based on the provision of short term contracts.

The purpose of this thesis is twofold: first trace the conceptualization of a Circular Economy and its establishment in Europe. The second purpose is to explore the potentiality that selected circular economy initiatives are having on the social-economic dimension of Europe. Since the analysis of a CE within a broad context as the EU requires a system thinking, this research explores

the social-economic policies and strategies that are being implemented with the EU resulting supportive for the implementation of innovative models like CE. The concept and its impact on the social economic dimension in Europe, is now being explored by a wide range of experts and academics with position papers.

The research is structured as follow: in chapter 1, the explanation of the concept of a Circular Economy is examined as a context within which it is becoming an European policy concern. We then introduce aim and objective of this research and introduce the main research questions. In chapter 2, the methods used and the case studies selected will be introduced. After that, the chosen theoretical framework will be analysed in chapter 3 in order to realize in which context a CE is being implemented within the EU. Consequently, chapter 4 will provide a case study description where relevant aspects will be compared. It is in chapter 5 that we will offer a discussion and critique of some remarkable findings and limitations encountered during the analysis. Ultimately, in chapter 6, we conclude by addressing the main research questions and analysing the overall dimension under analysis. Moreover, we will suggest which future analysis and academic research could be undertaken, in order to further explore the social-economic dimension of the EU in this period of transition to a Circular Economy.

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Graphs and charts content

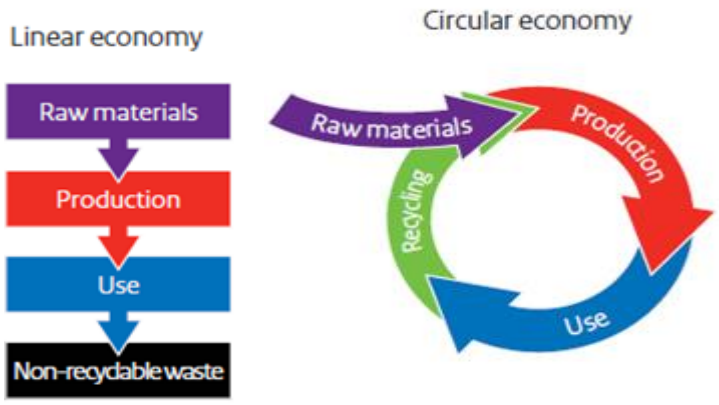
1. Introduction

1.1 Background

Nowadays Circular Economy (CE), is a concept that is gaining attention on a global scale. A circular economy represents a smart alternative to the linear make-consume-dispose economic model, that currently prevails worldwide. This linearity assumes that natural resources are available, abundant, easy and cheap to dispose of. However, this is no longer sustainable, as the world is moving towards and is challenging the carrying capacity of the planet (Steffen et al. 2015). Thus, the main aim of a CE is to transform the linear model into a model that is based on the notion of cycles in nature, where there is not any disposal waste and everything goes around in closed loops (Ellen McArthur Foundation 2013).

In the following graph we can see the differences between the economic models mentioned above:

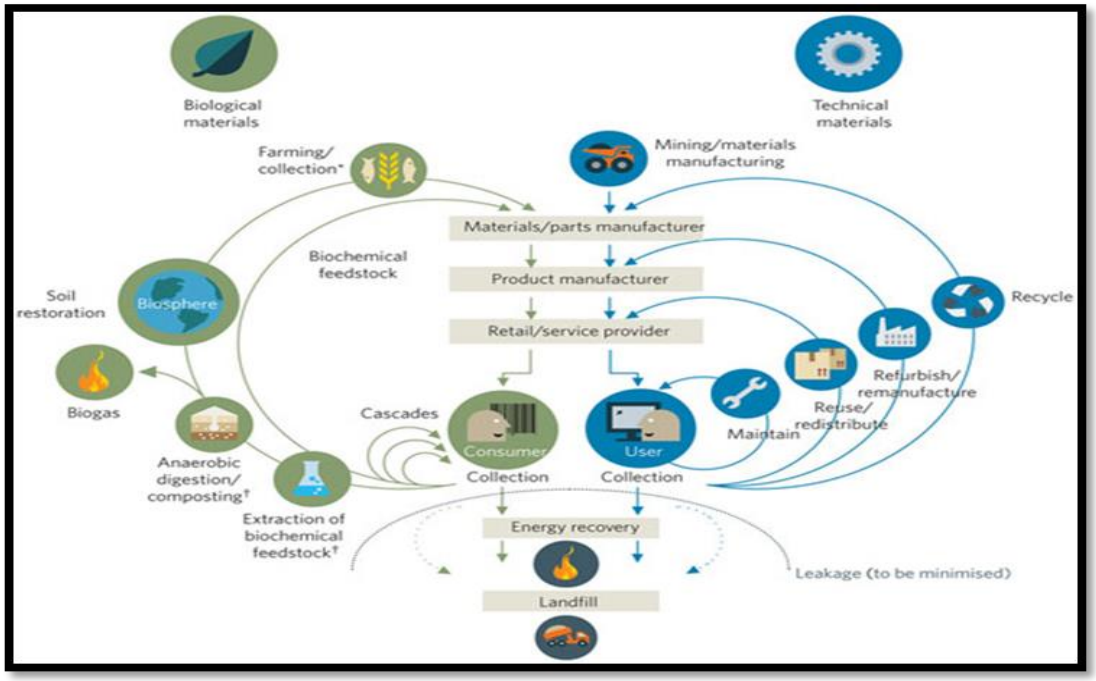
Graph 1.1 Linear and Circular Economy models



Source: Rijksoverheid, 2015

Essentially, through this graphic we can realize the revolutionary system that the CE is aiming for. The linear model relies in an approach were the raw materials extrapolated from the Earth at the end of the process are discarded and not recycled anymore. On the other hand, the circular economy model represents the ideal model, where raw materials are never depleted. This up-cycling model emphasizes the positive coupling capacity that can be identified between economic growth and the growth of natural resources (Rijksoverheid 2015). The butterfly model is another way for interpreting the mechanisms of CE:

Graph 1.2 Circular Economy Butterfly model



Source: Ellen McArthur Foundation, 2012

Basically this graphic relies on three main principles:

- **Preservation and enhancement** of natural capital by managing and balancing renewable source of flows, where the overall aim is to regenerate, valorising and exchange produced waste.
- **Resource yields and optimization,** where the regeneration, sharing and optimization of products and materials in both technical and biological cycles represent the main target.
- **Fostering** the implementation of this system view which aims to design out all the negative externalities (Ellen McArthur Foundation 2012).

Overall, we are talking about a system that aims to manage all the natural resources efficiently, by creating beneficial effects for the environment. Effects that can be categorized in five main benefits:

- **Resource benefits**: the aim is to improve resource efficiency and decreasing imports
- **Environmental benefits**: the minimum environmental impact is the main goal. It has to be measured beyond waste recycling and further reduced greenhouse gas emissions. Keeping track of the materials in the loops would enhance ecosystem resilience as well as the environmental impact of minimizing raw materials, often outside Europe.

- **Economic benefits**: in terms of opportunities for economic growth as well as innovation. A circular economy system can provide significant cost reductions in various industrial sectors.
- **Social benefits**: in the sense that such a model can create new values where producers and consumers' behaviour can be enhanced, where new job opportunities can be created and different social groups (as the refugees for e.g.) can be integrated in this new process.
- **Ecosystem benefits**: in the transition into a circular economy, it is fundamental to follow up the extent of environmental benefits that are encountered (EEA,2016).

What is stimulating is that a CE can be applied to all natural resources (ibid). Thus, the implementation of a circular economy system, can help in dealing with many challenges by improving the efficiency of the resource use, by reducing costs and risks while securing sustainability in the global economy. The application of circular economy can create new solutions that could give the input for the implementation of new sustainable dimension worldwide.

1.2 Circular Economy in Europe

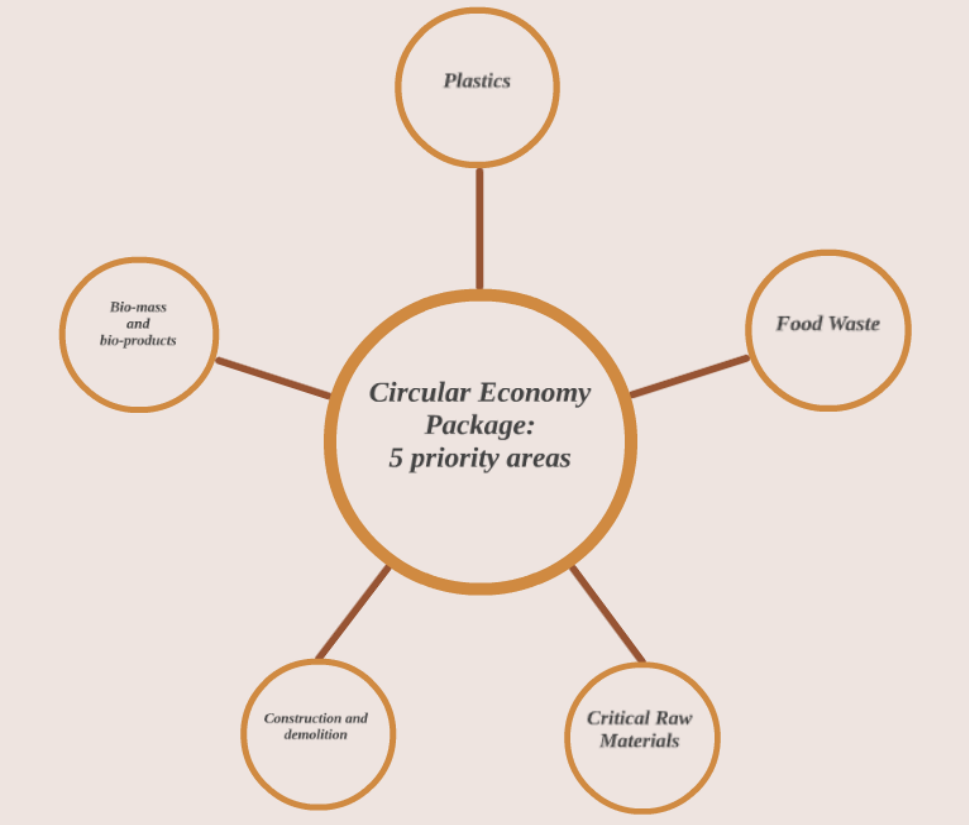
Given the potentiality that a CE represents, the European Union (EU) and its sub agencies, decided to start a project that aims to implement a CE within the EU's economic system. Recently, the European Commission (EC) adopted a "circular economy package to boost competitiveness, create jobs and generate sustainable growth" (European Commission, 2015). Thus, enthusiasm and the will to undergo the transition from the linear economy to a circular economy are growing. On the other hand, most of the actors involved in this process do not really know how to effectively achieve this transition.

Within the EU policy making a CE is seen as a solution-based perspective that could enhance economies and environmental constraints. Indeed, this is indicated in the 7 Environmental Action Programme, which identifies the need for a framework that could stimulate producers and consumers to promote resource efficiency and the circular economy (EEA, 2016). Thanks to the efforts provided by the Ellen McArthur Foundation, which had the largest impact with its report **Towards the Circular Economy** (2012), and smaller initiatives that are going through worldwide, the European community is increasingly indicating the circular economy as a political priority (Rijksoverheid 2015).

As mentioned above, the EC adopted an ambitious Circular Economy Package (CEP) that aims to encourage Europe's economic transition towards a circular economy. The CEP aims to improve EU's social welfare by creating new jobs, fostering sustainable economic growth and boosting global competitiveness (European Commission, 2015). In order to facilitate the transition, the EC is proposing an Action Plan that could take on all the phases of a product lifecycl: from production and consumption to waste management. Moreover, this plan being based on measures based on the idea of closed loops, aims to manage the market for the secondary raw materials (ibid).

Within this Action Plan it is possible to identify a series of actions that will target market barriers in **five specific sectors**: **1) plastics; 2) food waste; 3) critical raw materials; 4) construction and demolitions; 5) biomass and bio based products.**

Graph 1.3 CEP 5 priority areas



Overall, the main aim of the Action Plan is of focusing on issues (as waste prevention and management, eco-design and reuse for example) where the EU actions can make a difference on the ground (European Commission ,2015). By taking actions on the Green Public Procurement and by setting EU common targets on wastes, the EC aims to encourage member states to create platforms in order to assure a guideline towards sustainable and circular practices. On the other hand, after a public consultation on the Circular Economy that reflected the points of view of the main

stakeholder groups (50% from the private sector, 35% from individuals, 10% from society organizations and 5% from public authorities), the contributions have inspired the preliminary work of the CE action plan (European Commission, 2016).

Among several EU sub-agencies, the European Environment Agency (EEA), is producing a series of Circular economy reports in order to enhance and spread knowledge about CE in Europe. On the other hand, the EEA wants to emphasize the role of the EU in this process of transition to a circular economy, while the EU is bounded to the rest of the planet through multiple systems that continuously affect its social, economic and environmental dimensions. Due to the continuous challenges that the global economic crisis produces, the EU aims to evolve its economic and social systems so that its citizens will, in the near future, live well and without challenging the carrying capacity of the Earth (European Commission, 2013). The European Commission claims that the transition to a circular economy will be revolutionary (European Commission, 2015). Innovation and change will occur and will bring benefits that will go along with new challenges. We are talking about a manifold dimension that will therefore need to involve new social innovations as well as the acquisition of new skills and knowledge. Thus, the EU's Circular Economy Package can play an important role in bringing this about.

Nowadays, for example, there are several ongoing Circular Economy initiatives in Europe. This is an indicator that the transition to a circular economy is happening (TNO, 2013). However, it is difficult to establish in which period of the transition we are. Some good practice initiatives can give new input for further policy analysis. Analysis that is necessary to explore the contribution of the several ongoing circular initiatives in Europe. To chart progress especially in unexplored areas, can helps the policy making to pay attention in those sectors that required more attention.

Moving to a CE system represents an innovative challenge and, it is true that, every innovation before being officially recognized needs to show its positive impact. Such impact can be analysed from different perspectives: social, economic, environmental and so on. However, in the actual EU economic situation, there is the need of reliability. Is the CE producing social benefits through its projects and innovations? According to the EEA (2016), there are areas of social benefits that CE could create that haven't been explored yet. For example, more attention is needed in the employment sphere, especially in terms of job opportunities, job quality and the possible consequent distribution of benefits across different sectors of the population. Job quality, for instance, represents one of the dimensions that can help in the identification of citizens' wellbeing (OECD, 2016). Therefore, we decided to focus our attention on this unexplored social dimension of CE:

- **Problem Statement:** Little is known about the quality of new job opportunities that have been and that might be created within the CE sector (EEA, 2016).

1.3 Research Aim & Objective

According to the problem statements mentioned above, this research will focus on the identification of those initiatives that are making CE operational in Europe. The objective of this MSc thesis is to investigate and to compare those circular initiatives, reflecting the 5 priority areas identified by the Circular Economy Package, that can help in identifying the social benefits of CE in Europe in terms of:

- Job opportunities
- Job quality
- Social distribution of benefits

1.4 Research Questions

Main research question:

- What is the potential contribution that the selected Circular Economy initiatives are providing in terms of job opportunities, job quality, and social distributions of benefits?

Sub question 1:

- What is a quality job?

Sub question 2:

- What is the performance of the CE initiatives in terms of job creation and job quality?

Sub question 3:

- What are the characteristics that are making those initiatives representative of the transition to a circular economy?

2. Methods and case studies description

In this chapter the methodology chosen for the development of the analysis will be presented. Moreover, in section 2.2 a description of the reasons why we opted for a case study analysis will follow.

2.1 Methods selected

Method 1: Literature review

This method will be used to gain a deeper understanding about a CE in Europe in terms of policy making, social benefits and CE initiatives. Moreover, it will help in identifying the European policies and strategies in which a CE is being implemented.

Method 2: Case study

In order to analyse the case studies selected, we will conduct:

- **Semi structured interviews** with a wide spectrum of stakeholders will be held in order to gain a complete understanding of the selected CE projects in Europe. Interviews represent a useful instrument for getting valuable information about the participant's experience. Moreover, the interviews will provide information about the origin of each circular project, the quality of CE jobs, as well as the distribution (or not) of social benefits. The data collected will be used for the final discussion as well as for investigating on the context in which a CE is being implemented in Europe.
    - The interviews will be held during the fieldwork in the native language of the host countries.
- **Document analysis**, will be helpful for getting a better understanding of the existing literature, helping to analysis new and deeper insight in the theoretical perspectives and existing frameworks. Moreover, the document analysis will help in the identification or not of under-theorized dimensions regarding a CE.
- **Observations during the fieldwork**
- **Interview with Stefano Pascucci**, expert in Circular Economy and sustainability at Exeter University (UK).

2.2 Case studies selection

In order to proceed with the analysis, we decided that a case study method is the most appropriate for this research. Three reasons motivated this decision:

- **flexibility:** a case study can be conducted at various stages of the research process. It can be elucidative for developing ideas for future research.
- **capturing reality**, a case study can capture more details of real life experience better than other types of research methods, especially when accompanied by fieldwork
- **diversity**, a case study opens the door to new notions and ideas that can be introduced in every state of the research process (Zainal, 2007).

Overall, the use of a case study approach will help in identifying information that the complexity of the target population will not reveal in advance without the use of a case study approach. Aspects like the operational cost of social benefits, for example, are not easily accessible if they are not analysed via a case study approach.

2.3 Parameters of selection

The following criteria helped me in defining the thematic areas as well as the European countries to take into account:

- Five priority areas of the EU's Circular Economy Package
- The four sub-regions of the EU
- Gross domestic production (GDP)
- Operative and award winners
- Data availability

2.3.1 EU's Circular Economy priority areas

Considering that EU's Circular Economy Package is mainly focused on five priority areas, and in order to analyse their contribution for the transition towards a CE, the case studies are representative of the thematic areas indicated in graph 1.3.

2.3.2 Gross Domestic Production (GDP)

GDP represents the monetary measure of the market value of all final goods and services produced in selected periods**.** In particular, Nominal GDP estimates are commonly used to determine the economic performance of a whole country or region, and to make international comparisons. On the other hand, Nominal GDP per capita does not, however, reflect differences in the cost of living and the inflation rates of various countries; therefore, using a GDP PPP (purchasing power parity) per capita basis is arguably more useful when comparing differences in living standards between nations (World Bank, 2014).

According to a GDP analysis made by the International Monetary Fund (IMF, 2016), we decided to categorize the EU economies on the basis of their economic performance: high and low performance:

- **High performance**: The Netherlands, France
- **Low performance**: Spain, Italy, Portugal,

In our opinion a comparison between such categories will give a contribution to understanding better the social economic impact that the CE can have in these countries.

2.3.3 Operationalization and awards

Other parameters used for the selection of the case studies is a combination of the following criteria:

- **Operationalization** of CE initiatives, in terms of job opportunities, education and other social benefits. These are aspects that can illustrate their contribution in terms of a positive social impact.
- **Awards**: all the initiatives selected, were awarded by the EU for their sustainable innovation as well as for their contribution in the transition to a circular economy. Thus, they are all high level projects in terms of representativeness of the CE in Europe.

2.3.4 Data availability

The last parameter selected relies on a wide data availability of the following CE initiatives, that will also be analysed and compared on the basis of their economic performance on the 5 priority

areas. On the base of the mentioned parameters of selection, the selected case studies are the following:

2.3.5 Funghi espresso, sector of food waste, Florence, Italy

Interviewees: Antonio di Giovanni and Vincenzo Sangiovanni, co-founders

Funghi Espresso born in the year 2013, after that Rossano Ercolini (coordinator of the Research Centre of Zero Waste in the municipality of Capannori), suggested a case study on the role of coffee in agriculture as fund reuse. It was from this case study that the research centre of Zero Waste, in collaboration with Antonio di Giovanni (co-founder of Funghi espresso), realized the pilot project of environmental education *from coffee to proteins*, with the aim of growing mushrooms by using a substrate of coffee-grounds. Subsequently, the meeting between the agronomist Antonio Di Giovanni and the architect Vincenzo Sangiovanni, gave birth to the adventure of Funghi Espresso. It was in spring 2014 that a series of awards were assigned to Funghi espresso:

- April 2014, first award for the Best quality project
- June 2014, awarded as innovative start-up by Zero Waste Italy
- October 2014, awarded as best good practice in Tuscany during a competition called “call for ideas Tuscany”
- They got selected by the Ministry of Agriculture and Forestry (MIPAAF), among the most 25 original agricultural start-ups in Italy.

Thanks to this important recognition, Funghi Espresso took part in Expo 2015 in Milan (Funghi espresso, 2017).

2.3.6 BLC3, sector of bio-mass and bio-products, Oliveira do Hospital, Portugal.

Interviewee: Joao Nunez, CEO at BLC3.

Association BLC3 is a non-profit association founded in May 2010 by Joao Nunes, which covers the role of CEO. Since September 2011 the association has been operative in the technology and innovation fields at Oliveira do Hospital, in a very rural area of Portugal. BLC3 is the first and

only Portuguese entity devoted to the field of Circular Bio-economy with a special focus on the areas of Bio refineries, Bio industries and Bio products. Due to its multidimensional structure it has become an excellence in the field of research and technological enrichment in the above mentioned sectors, with a particular focus on concepts as mass flows, agro-forestry and agro-food. With its scientific-technical staff, BLC3 is developing its industrial bio-technological activities on a local, regional, national and international scale. There is a special focus on the valorisation of endogenous resources and of the genetic territorial patrimony as well as the Portuguese rural inner regions.

The main goal of BLC3 is to be the leader in the development of solutions for bio-industries and bio-refineries, as well as stimulating the concepts of Smart regions. This represents a dimension where environmental and educational problems of the agro-forestry and agro-food sectors can be tackled and introduced to the younger generations. Moreover, the concept of Smart regions, could give a further input for the spread of concepts like Circular Bio-Economy in Portugal. That's why establishing a link among different stakeholders, decision makers, companies, academies and technology centres is one the main interests of BLC3.

It is with the development of innovative research through its Incubator that the BLC3 promotes a new innovative, scientific, quality driven and entrepreneurship-guided vision for new entrepreneurs that want to create the implement of new sustainable products for the market. Moreover, the main core of BLC3 is represented by the Bio-refinery project, where the principal goals are the development of bio industries, bio refineries and bio products for the replacement of petroleum derivate, the minimization of forest fires, the valorisation of lingo cellulose resources and contaminated effluents and materials.

Overall, the BLC3 was awarded in 2015for its innovative multidimensionality, by the University Business Incubator (UBI) and by I3P (Innovative Enterprise Incubator) of the Polytechnic of Torino, for the presence, respectively, in the Top 10 and Top 25 of the European and World Best Incubators rankings. Moreover, the following year the association was awarded by the European Commission with the Regiostar awards, which is a recognition of **good practices** in regional development and highlight original and **innovative projects** that are attractive and inspiring to other regions in Europe (BLC3, 2017).

2.3.7 Revertia, sector of Critical raw materials, Pontevedra, Spain

Interviewee: Alejo Catalayud

Revertia is an authorized company that manages electrical and electronic waste equipment (WEEE) in the autonomous communities of Galizia and Madrid. Most of the electronic equipment treated in their facilities often have a second life. Thus, their philosophy, in line with the principles of a Circular Economy, is that electronic materials should be re-used, recovered or dismantled in order to recycle such materials in continuous cycles, without the generation of waste. It is with a team of professionals, technicians, experts in waste management, environmental legislation and corporate social responsibility, that they:

- Treat hazardous and non-hazardous materials
- Valorise and ensure that received appliances are given a new lease of life
- provides an integral waste management service to public and private companies and institutions
- Promote social responsibility among their clients.

Overall, their mission is to convert the obligation placed on companies by the WEEE regulations into a Corporate Social Responsibility opportunity through the re-use of IT equipment for charitable purposes. The company stands out for its commitment in re-using old IT equipment and components, guided by the principles of waste management hierarchy:

- prevention,
- preparation for re-use,
- recycling,
- other means of valorising and elimination (Revertia, 2017)

2.3.8 Bam, sector of construction and demolition, the Netherlands

Interviewee: Tom Blankendaal

Royal Bam Group is a construction firm operating in Europe as well as in niche markets worldwide. Their European markets are Netherlands, Ireland, Germany, United Kingdom and

Belgium. The mission of this group is to build sustainable environments that can enhance people's lives through the acquirement of the role that new technologies and materials can play within the construction and demolition sector. Moreover, Bam aims to provide solutions across the overall construction life cycle for their clients and generating the maximum value for its stakeholders. In order to achieve his goals, Bam joined the Circular Economy 100 programme (CE100), that enables organisations to develop and implement their circular economy ambitions. Bam through this programme and in collaboration with public and private stakeholders, reinforced its capacity and networks (Ellen MacArthur Foundation, 2013). Subsequently, in 2016 Bam launched its strategic programme "Building the present creating the future". Afterwards, the group defined its vision for 2020: to be recognised as one of the European leading sustainable and innovative construction groups., within the European market and selected developing economies around the world (Bam, 2017)

2.3.9 Plastic sector

Unfortunately, none of the companies that we tried to contact replied to our requests. After several attempts, we were not able to analyse any company representing the plastic sector. However, companies this sector have been indicated in the Annex.

Chapter 3
Theoretical Framework

This chapter will introduce the theoretical framework that has been chosen in order to comprehend in which context a Circular Economy is being implemented within the EU. After an analysis of the origins of a CE and its spread in EU, we then analysed the EU's social-economic dimension through the strategies and policy programmes that are currently being implemented: the EU2020 and the European Pillar of Social Rights (EPSR). Following there is an analysis on job quality that will describe how this notion is being comprehended and used for evaluating working environments. Ultimately, the interviews made with Stefano Pascucci, expert in circular economy and sustainability from Exeter University will be reported, in order to have a first insight on the main aims and research objective of this thesis.

3.1 A Circular Economy: origins and its spread within the European Union

According to the Ellen McArthur foundation (2012), the term Circular Economy cannot be linked back to one single momentum. Thru time the origin of the term has been associated with a range of meanings by different authors. Certainly, the notions behind the CE have existed for decades (H. Skene et all; 2015). As early as 1848, the first president of the Royal Society of Chemistry, R.W. Hoffman stated: "in an ideal chemical factory there is, strictly speaking, no waste but products. The better a real factory makes use of its waste, the closer it gets to its deal and the higher is its profit" (Lancaster, 2002). Moreover, in 1966 K. Boulding wrote "man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy" (pp. 7-8).

Nevertheless, the late 1970's represents the moment in which a CE was applied to modern economic systems and industrial processes. Stahel and Reday-Mulvey (1976) first mentioned the idea of a closed loop economy. Stahel was directly inspired by Boulding (1966, pp. 11-12) who wrote "I suspect that we have underestimated, even in our spendthrift, the gains of increased durability". Therefore, the term Circular Economy has been associated with a multitude of meanings by different scholars and scientists. What they generally have in common, is the concept of a cyclical closed loop system (ibid). Here it is worthy to mention that this idea has been also sustained by different schools of thought as, for example, Cradle to Cradle, Performance Economy and Industrial Ecology. Therefore, over the years, Circular Economy has become a new and

relevant school of thought in the field of sustainable development, having been adopted by relevant actors worldwide (Ellen McArthur foundation, 2012).

Thanks to the efforts provided by the Ellen McArthur Foundation, which had a great impact with its report **Towards the Circular Economy** (2012), a CE was so spotlighted that the European Union became interested in the benefits that the European community could receive from a circular system. Why has the EU so much interest in a CE? It is necessary to go back in time in order to analysis the reasons. The explosion of the economic crisis, in 2009, brought a burden of debt as well as a new pressure on the European social economic dimension that will stand for decades (European Commission, 2010). A natural consequence was the spread of socio-economic uncertainty and deterioration of working conditions for many workers. Millions of people became unemployed and European citizens lost confidence in the EU's operational capacity to develop sustainable development. Thus, it was a natural consequence to realize that the achievement of an economic independence from the global economy was going to became one of the EU top priorities (European Commission, 2012). Aspect that has been addressed within the EU2020 growth strategy.

3.2 EU 2020, the European Pillar of Social Rights and the European Social Model.

Realising that the economic realities were moving faster than political realities, the European Commission decided to offer a sense of direction to EU society and came up with the **EU 2020 strategy**. It is a ten-year strategy, started in 2010, that aims to show that the EU has the operational capacity to deliver and spread smart and favourable conditions for growth, employment and social inclusions (European Commission, 2010). The EU 2020 strategy is based on three main pillars that aim to:

1. **Smart growth,** for the development of an economy based on knowledge and innovation. The EU was one of the main movers in green solutions and in order to fight the challenge of the economic crisis, the EU has to maintain its lead in the market of green technologies and also maintain a strong position against its key competitors (China and USA).
2. **Sustainable growth**, for the promotion of resource efficiency, greener and more competitive economy. The aim is the achievement of an efficient low economy carbon that: 1) can decouple economic growth from resources and energy use; 2) reduce CO_2 emissions; 3) enhance competitiveness.
3. **Inclusive growth**, for fostering a high employment economy and delivering social and territorial cohesion (European Commission, 2010).

In the meantime, the world is moving fast and the main long term challenges, such as the pressure on earth's natural resources, are intensifying. Thus, the European Commission for challenging the difficulties brought by the economic crisis, in 2015 started to work on a new strategic plan: **The European Pillar of Social Rights (EPSR).** This new policy programme aims to build a more inclusive and fairer EU (Junker, 2016). Moreover, it is an attempt to rebuild the citizens' confidence in the EU's sustainable development capacity through a social economic policy. The policy aims to create good quality jobs and enabling people to achieve economic security in decent working conditions. The EPSR represents a reinforcement of the European social rights with the aim to prepare and empower European citizens in terms of knowledge, skills, time and space for significant economic participation. Thus, the EU is trying to develop a better European social model which genuinely aims at placing the quality of living as a priority, where the primary importance is given to individuals by aiming at full employment, ensuring satisfying social protection and offering quality services to everyone (European Commission, 2016). The EPSR represents a new stimulus to the EU's economy where special attention to employment is given. On this basis, we can identify three key areas of interest within the EPSR:

1.**Equal opportunities and access to the labour market**: there is the will to give an opportunity to unqualified people who are suffering vulnerable long term unemployment and experience greater difficulties in gaining access to services and participating in society. There is the need to implement new instruments such as a **skill guarantee. These new instruments** represent new rights for everyone, at every stage of life, to acquire essential skills for the 21th century. These new instruments include relevant skills for the green and circular economy, considering emerging industries as a key growth sectors and ensuring full outreach to people in disadvantaged situations (European Commission, 2017). On the other hand, the **education system**, should be inclusive, providing good quality education to the whole population. Enabling people to be active European citizens, preparing them to be capable to learn and adapt throughout their lives and respond to social and market labour needs.

2. **Fair working conditions**

3. **Social protection and inclusion**

In order to catalyse progress under each of the mentioned above pillars, the EC has also put forwards several flagship initiatives in its agenda, as for example:

- **Youth on the move**, to enhance the performance of education systems and to facilitate the entry of youngsters to the labour market

- **Agenda for new skills and jobs**, to empower people by the development of their skills throughout their life cycle. It aims in providing a series of key actions and supporting measurements for the creation of employment and the improvement of the labour markets, workers' skills and the quality of work. Workers skills should be adapted to the changes that are occurring within the European society, particularly in the sectors of innovation, new technology, education and environment (European Commission, 2012).

On the other hand, for the creation of a functional labour market and the reduction of structural unemployment, the EC decided to implement a **common principle of flexicurity**. This principle represents an integrated strategy for enhancing, simultaneously, flexibility and security in the labour market. Moreover, it is also a crucial element of the Employment Guidelines and the European Employment Strategy (European Commission, 2011).

The strategies that have been mentioned are part of a broader picture: **The European Social Model (ESM)**, which is a common vision that EU countries have for the social-economic dimension of Europe. The ESM provides evidence of the social-economic progresses at all levels (EECS, 2016). The ESM can be described as the European experience of simultaneously fostering social cohesion and sustainable economic growth (J. Pascal, 2005), with the aim of decreasing inequalities and creating a welfare system (Giddens, 2007). On the other hand, if the EU wants to concretely build its solid social pillars, the support of specific instruments and systems that can enhance and expand its operational capacity are needed. Due to the potentiality that CE represents, the European Union (EU) and its sub agencies, decided to start a project that aims to implement the CE within the EU's economic system. For this reason, the European Commission has adopted a "circular economy package to boost competitiveness, create jobs and generate sustainable growth" that could contribute to improve the EU's social economic dimension (European Commission, 2015).

3.3 Linking Circular Economy and the social economy.

A Circular Economy model can lead to the provision of social welfare for the people who are taking part in the transition. Thus, according to the benefits mentioned above, the potentiality of delivering considerable social benefits is high. On the other hand, it will be very important to view a CE as an integral part of jobs and competitiveness strategies (The Club of Rome 2016). According to the Green Alliance (2015), a CE can contribute to the creation of thousands of new jobs. Positive trends are expected for the near future (active link with forecast charts). Thus, it is possible to

correlate the European strategies and a Circular Economy in Europe. On one hand, the EU's strategies represent a nexus of values, achievements and social benefits, that can be realized by European countries in different forms and that are strictly connected to the idea of a welfare state (Prokurat S., 2010). On the other hand, the provision of social benefits as job opportunities and job quality, resulted to be a key aspect within a CE system. The graph shown below indicates the correlation that could be imagined between a Circular Economy and EU's visions and strategies.

Graph 3.1 Context and correlation of a CE and the EU's strategies and visions

3.4 Job quality

According to our knowledge, there is not an academic universal accepted definition of job quality. Several studies have been conducted about this notion and different interpretations have been made, such as the following:

- job quality can be defined "as the extent to which a job has work and employment related factors that foster beneficial outcomes for the employee, particularly, psychological wellbeing, physical wellbeing and positive attitudes such as job satisfaction" (Holman, 2015).

So, how is job quality analysed? It is analysed by bringing together various framework measurements by looking at a range of indicators (where most of the time special attention is given to the subjective wellbeing dimension). Several major initiatives have been taken into account at an international level to establish guidelines for measuring different concepts related to employment quality and for collecting indicators that would allow cross-country comparisons. Among others, the most relevant group which is leading the analysis on job quality is the **Organisation for Economic Co-operation and Development (OECD).** They claim that job quality is an aspect that matters because it is a key element of individual wellbeing which determines workers' commitment and productivity, creating the conditions for a better economic performance (OECD, 2015).

The OECD, in 2013 launched its job quality assessment framework, which is focused on the micro perspective of individuals' economic qualitative output as well as on the material and immaterial outcomes of the working experiences. Those dimensions have been summarized in three key benchmarks of the job quality assessment framework, shown below:

1. **Earning quality:** captures the extent to which earnings contribute to workers' wellbeing in terms of average earnings and their distribution across the workforce.
2. **Quality of working environment:** captures non-economic aspects of jobs including the nature and content of the work performed, working time arrangements and workplace relationships. These are measured as incidence of job strain characterized as high job demands, with low job security.
3. **Labour market security**: captures those aspects of economic security related to the risks of job loss and its economic cost for workers. It is defined by the risks of unemployment and benefits received in case of unemployment.

Graph3.2 Job quality indicators, Source: OECD, 2015

For the analysis of the dimension of job quality within the selected circular initiatives, the use of an indicator like this could be relevant. On the other hand, a CE implies other aspects that

have not been taken into account within the job assessment framework mentioned above. According to the Club of Rome (2016), there are other aspects that have been identified within the circular economy dimensions, and that could provide further insights regarding the dimension of job quality. Among others, skill mismatching, seems to be one of the key aspects that is challenging the professional training of the employees that are working within CE initiatives. However, this aspect will be addressed in the next section where the interview with the expert Stefano Pascucci has been reported. Moreover, job quality will be better explored in chapter 5 during the case studies analysis where further insights will be provided on this notion.

3.5 Interview with the expert Stefano Pascucci

Stefano Pascucci is an expert on circular economy and sustainability from Exeter University. Due to the experience of Pascucci on matters addressed in this thesis the interview was conducted with the purpose of discovering possible practical out-comings that could derive from the implementation of a CE in Europe. Starting with an overview of the contribution that a CE can provide in terms of social benefits and job creation, we will then move to handle the notion of job quality. Ultimately, an overview about the elements that could make the circular initiatives representative of the transition to a Circular Economy will be presented, before discussing the creation of possible future scenarios.

3.5.1 Social benefits and Job creation

According to the Ellen McArthur (2015), for the next decade a positive trend in terms of job creation for thousands of people around Europe is expected. These trends used to be calculated from the application of models and different methodological approaches. Even though Pascucci is supportive of such models, he believes that quantitative and macro-economic analysis on Circular Economy, have been calculated with the benefit of doubt in the perspective to legitimate CE in a new economic mainstream. Therefore, the term “new”, should be not interpreted as a critic, even if to a certain point in the history of CE it was necessary to say that this new system could have had a positive impact on the nations GDP, with a possible and consequently positive impact on social benefits such as job creation.

The same thing is also happening in the field of policy interventions. In this field some models that estimate sector impact and national added value of certain aspects reflect the social-economic dimension of a country. Studying policy analysis, it stands out that among many

unsophisticated models, there are a multitude of assumptions implied. Pascucci believes that qualitative and explorative analysis are more elucidative. He says: “if the result of the analysis is 100 instead of 0, my focus will be based on the magnitude of the phenomenon”. Thus, if a certain diversity in the models of emerging circular economy are maintained a series of activities and lifestyles could be pointed out. These models could help in finding interesting solutions from a socio-economic point of view creating unexplored job positions.

Nowadays, the current CE model can be described as niche models, conducted by big actors such as Uber o Amazon just to mention a few. Thus, at a certain point of time, the job positions that will be created will reflect the re-combination between and among the sectors. The result could be different from the sectors that we are aware of today. For example, it could be a resource based economy, where new sectors of interest can be identified. Consequently, new professional figures will emerge from the input of knowledge and skills during the recombination of sectors. The recombination factor will be sufficient in covering areas of interest that would usually be covered by a multitude of experts. The recombination, on the other hand, will create a multitude of new professional figures. The traditional professional figures will, in time, be replaced by the new professional figures. Overall, Pascucci believes that the process of change will automatically lead to the creation of new professional figures.

In this overall picture of creation and destruction, it is not possible to say that the summary will be equal to zero or to one, because the models that have given quantitative data so far, haven’t followed this line of reasoning. If models like Uber or Amazon will continue within the economic system, the series of functions and activities will be standardized and automatic. It will therefore be more likely that the result will be positive than negative. When the market is driven by the same actors it is more difficult to convert the dependency that have been created. The result of the summary will depend mostly on the kind of models that emerge. The matter of job creation should be handled in the context of how CE will be absorbed or will be developed in the existing model. However, Pascucci is imagining two different paradigms:

1) the substitution and sharing of the participation at work;
2) the destruction of this participation, because of the substitution effect of the working force with technologies and other intensive capital structures.

3.5.2 Job quality

With regards to the notion of job quality, Pascucci gave his opinion about which perspectives should be taken into account in order to discuss about job quality within working environments reflecting a CE. A starting point could be a discussion on the role that innovation can have. Innovation opens the door to continuous learning and empowerment. The creation and experimentation of new lifestyles can lead to new models and dimensions that are currently denied. These new models can bring about a positive impact on wellbeing. One of the paradigms that has to be taken into account is the diversity, which should be not intended as something imposed but as a source of inspiration and vehicle in creating a value that is not merely economical. This could be possible mainly in the bottom up processes, which are less main stream and where there is a contribution in the creation of working environments that could function as an ecosystem. Generally, these are **decision making processes**, therefore they could be an indicator of job quality.

Nevertheless, **skill matching** is also an aspect that can contribute to the creation of a quality job. The capability of reconstructing duties that can be linked to creativeness and trans-formativeness within the organizations would help to create quality jobs. Thus, skill matching can play a key role for being able to work on different platforms and to come up with more solutions. Consequently, a more functionalistic vision of the relationship between the processes can be achieved. Due to the line of reasoning on the recombination of competences mentioned above, according to Pascucci, in the high medium skilled categories more opportunities will be created.

3.5.3 Representativeness

Pascucci says that the line of reasoning about the representativeness of Circular Economy initiatives in this period of transition in Europe is something that should be at a level of economic and cultural elite. We are now in an umpteenth moment of formulation of new principles. It would be interesting to understand the applicability of this dimension to a wider participation. At the moment CE is still an elitist expression which reflects wide scale advantages and disadvantages for a low number of people. We are witnessing the preparation for the future that the next economic crisis will lead to: “it has been built for tackling the next management crisis”, says Pascucci. Thus, it is a necessary elitist parlour, that is dealing with issues such as natural resource scarcity and depletion, sustainable wastes management and so on. CE is trying to respond to all of this.

So far the application of CE in the field of development or development economics is very limited. Nobody is debating about a CE pro or against precariousness. There is not this kind of

approach. Hypothesis can be made but the future scene is still not clear. (where the crystallization of the concept will take place). Reactions from other elites could develop. The progress could be more vertical, or it could go in both the directions. So far this has not happened because CE is still an emerging concept undergoing consolidation

3.5.4 Future scenarios

In respect to the future expectations on CE in Europe, Pascucci imagines a predominance of big corporations that will strategically manage relevant materials in different sectors. Idea that reflects a plausible realization of sector convergence between resource management platforms, that could be more or less co-managed. This aspect will depend on the legislative and cultural nature of the countries where they are carried out. Depending how the rules will be codified (at a national level or supranational level), there could be a scenario dominated by big actors that operate in platforms and networks, both physical or not. Otherwise, there could be the establishment of antagonistic models where there will be research for alternatives to this dominant model.

In this overall picture, what is interesting to imagine is how and if the public authorities will be able to manage the debate over the property rights of the resources. Who will be the holder of such property rights? Banks, governments or a new entity? We are talking about an important institutional process, where the property rights over the resources is a key element. If there will be a correct management, the field will be dominated by big actors where privatization will prevail. The scenario could also present an enlarged antagonistic space that will, however, be less influential. On the other hand, under a proper regulation, there could be the possibility to see the realization of a more democratic process. Thus, the future scenario, will depend mostly on how the regulation over property rights and resources will emerge.

Chapter 4

Case studies description

4.1 Intro

In this section the selected case studies will be analysed with the support of semi structured interviews conducted during the fieldwork in Italy, Portugal, Spain and the Netherlands. The main aim of this chapter is to explore the dimensions of job creation and job quality, through the analysis of the selected circular initiatives and their performances for this purpose. Nevertheless, in order to explore these dimensions, for each case study we firstly analysed the data collected in 2 different sections:

- **Contributing and being part of the transition to Circular Economy:** In this section an analysis about the initiatives' position in respect to the role of CE in Europe and in their country of origin will be given. Moreover, after having analysed the factors that led the companies to join this venture to the transition, an insight on their contribution in terms of promotion of a CE will be given.
- **Development activities and expectations**: Here, the main aspects that lead the companies to grow as well as to be an example for other companies and the society, will be reported. Furthermore, the companies' perspectives about their future expectation and how they imagine the structural and operational establishment of CE in Europe, will be given.

Thus, after the analysis of these sections, in the third section called **job provision and job quality section**, we can move to the comprehension of the selected circular initiatives' performance in terms of job creation and job quality. Ultimately, a comparison between the information gathered will be given, in order to highlight noteworthy findings between the different sectors and countries under analysis.

4.2 , Bio-mass and Bio-products sector, Oliveira do Hospital,

4.2.1 Contributing and being part of the transition to a Circular Economy

Talking about Europe, CE represents an opportunity for the European economy for increasing its competitiveness with other strong economic realities, such as USA and China. We are talking about the opportunity for the EU to become more independent in a multilateral context where global economies are financially interconnected. Circular Economy can contribute to this. Analysing the role that CE can have in Portugal, Nunes believes that the Portuguese economy could benefit a lot from the application of circular economy principles, making it more competitive at a European level.

Three main factors led Joao Nunes to join this venture to the transition to a Circular Economy. He believes that through CE, it is possible to:

- Create interdependency, from other EU's countries in terms of expertise and export/import of natural resources;
- Improve the quality of life, with the contribution of emission reduction that can be created
- Make economic activities more sustainable and efficient.

In his opinion, these aspects are relevant because CE can contribute in tackling major global environmental issues that are being dealt with, such as natural resources depletion, which is threatening the global ecosystem. Moreover, CE can also create social benefits. Over the years the society has become more sensitive about environmental degradation and the implementation of new sustainable solutions. Overall, this context led Nunes to build up the association BLC3, which through the creation and production of bio-products and the development of a bio-refinery system, wants to give its contribution to the establishment of Circular bio-economy in Portugal.

In order to promote Circular Economy and the bio-economy, BLC3 is relying on the developments of 24 projects as well as on the transfer of scientific knowledge to young students, on topics such as science, sustainability and chemistry. The association believes that by investing in the future generations, through education transfer (both theoretically and practically), the next generations will contribute in the achievement of a more sustainable dimension for their country as well as in Europe.

4.2.2 Development activities and expectations

BLC, through its activities, projects and education transfer along the years has obtained positive results in terms of:

- Development of an international network, which is helping the association to stimulate new investments and research.
- Development of the Incubadora (incubator), the aim of this structure is to create and develop new products and advanced business projects that can create benefits for the Portuguese inner and rural regions.
- Growing employment rate over the years.

According to Nunes, the implementation of CE in Portugal is still at the beginning of its process. Since 2014 the Portuguese government embarked on a green growth agenda which incorporates circular economy policies and targets across various sectors such as construction and demolition, bio-mass and bio products, plastics that aim to a sustainable waste management approach (Ellen McArthur 2015). In that year the Portuguese government in collaboration with 100 organizations from business, academic and finance sectors along with public bodies and representative of the civil society, developed the Green Growth Commitment (GGC). It is a long term strategy that plot a pathway to recovery from the European financial crisis in 2009. Moreover, the GGC reflects the ambition of the Portuguese government to find a model of economic development that promotes long term benefits in national growth and social benefits, such as employment. This coalition is responsible of conceiving a national strategy to accelerate economic growth and jobs whilst addressing environmental challenges, such as natural resource depletion and climate change. Thus, the Portuguese government started to consider CE as a system that could enhance social-economic dimensions of Portugal.

What is expected by Nunes, is that in the near future more circular initiatives will be booming not only in the agro-forestry and bio-refinery sectors but also in sectors such as textile, food waste and construction and demolition. Moreover, the best scenario that Nunes is imagining, is the replication of the bio refinery concepts around EU, where the maximization of the mass flows could be realized and generated with high technology by the next generation of entrepreneurs.

From an organizational point of view, BLC3 is imagining the establishment of CE as a replication of small networks at a regional level around the EU, with the logic of pilot and smart

regions. Through cooperation the Smart regions in Europe will be able to share infrastructures, exchange expertise, build solid stakeholder structures and to involve the civil society. By working together, these regions will be able to address emerging opportunities and market developments in priority areas, such as circular economy and related fields (European Commission, 2016). Therefore, if Portuguese regions will be able to collaborate and to share their values, they could contribute to increase Portuguese economic competitiveness and improve its social-economic dimension, where employment cover is a primary role in this period of economic crisis.

Even though the European social-economic dimension is different in each European country, the establishment of a European Circular Economy network that could act at an European level starting from regional cooperation, represents the best scenario that BLC3 is looking for. On this basis, another small step has been made by Nunes, who launched the first Portuguese association of Circular and Bio economy on May 19 2017. Within this association different experts from different sectors and regions, will collaborate in order to make CE and the bio-economy a solid reality in Portugal. This is another signal that Portugal through the efforts made by Nunes and BLC3 in pursuing the transition to a CE.

4.2.3 Job provision and job quality

Another aspect that is contributing in making BLC3 become a solid reality in this transition is the contribution in terms of **job creation**. Since its launch in 2013, BLC3 through the development of 24 research projects, the promotion of its mission and vision, as well as the ability to build up an international cooperation nexus, has created 52 job positions reflecting 14 different skill areas in the field of bio-chemistry, bio engineering, management and economics. Considering the growing employment rate experienced by the association as well as the young average age of the employees (27 years old), BLC3 has become a national case study and thus, even more representative for the Portuguese society.

Of the 52 job positions, 47 belong to the highly qualified category, while 5 belong to the unqualified category. Therefore, approximately 10% of the job positions created are unqualified. Distinguishing between highly qualified employees or not, according to Nunes, the category of unqualified workers will have a better chance to be employed in the future. The present situation could be due to the technical nature of BLC3, that is specialised in the bio-refinery and agro-forestry sectors. These sectors demand more technicians that can develop operational bio refinery processes as well as contributing to the logistic side that is strictly connected to the development and implementation of new technologies.

It was through the publication of the job positions on their website that the association was able to offer up to the 95% of their employees a short term contract, while a long term contract to the remaining 5%. These numbers indicate that the economic power of such new circular dimensions are still not able to contribute to the creation of solid job positions. The aim of BLC3 is to offer long term contracts to a higher percentage of their employees. This could be possible by improving the association's economic power as well as its operation capacity. For example, in order to create more long term contracts, the association is developing a new course on the topics of bio-industry management and industrial bio-technology with the local high schools. The implementation of such courses will give the opportunity to the BLC3's researchers to improve their job contractual status.

As mentioned before in this section, BLC3 has created job positions that reflect 14 different skill areas. Dealing with different skill areas, is an aspect that is getting relevance within the CE dimensions. It refers to the notion of skill matching, which is an encompassing term that refers to different types of imbalances between skills offered and skills needed in working environments (ILO STATS, 2014). Skill matching that has been experienced by Nunes, in order to being able to cover the role of CEO and representing the dimension of Circular Bio-economy. They had to acquire further knowledge in the fields of management, forestry and agro food and to learn new skills in order to respond to this skill demand.

Investigating the notion of **job quality**, Nunes believes that two aspects are essential in order to create quality within CE dimensions:

- **Ambition,** which is needed for the growth of the professions connected to CE
- **Resilience**, which is important because not everyone understands the CE's high potential in a long term.
- **Skills training**, because it is necessary to train new generations of employees with multiple skills, expertise and knowledge. The recombination factor is becoming essential for the development and implementation of working activities within CE dimensions.
- **Cooperation**, because through cooperation, it is possible to share knowledge and operational capacity. Aspect that can contribute to create and improve new circular dimensions in Portugal and in Europe.

It is essential to be open minded in order to have the capacity to create complex systems, as a CE requires a complex architecture.

4.3 revertia , Critical Raw materials sector, Pontevedra, 

4.3.1 Contributing and being part of the transition to Circular Economy

The promotion of CE for Revertia is very simple. They promote the fact that they're contributing to the establishment of CE, by emphasizing the importance of re-use management practices applied to computer electronic equipment. Revertia considers that appliances that are at the end of their (useful) life cycle, represent a resource that can be reintroduced into the production system. Thus, by using electronic waste as a resource, they are a reflection of CE's principles within their business activities.

Revertia is also promoting responsible consumption because they support the idea that it is not always necessary to buy new computer equipment. By re-using and combining electronic components, it is possible to generate functioning electronic equipment that can be reintroduced into a secondary market. They are also contributing to this, through an online platform called Reboot. Where they offer access to computer equipment at very affordable prices. This practice, is very interesting from a social point of view because it helps to reduce the existing technological gap between the upper social class and the lower social classes.

According to Catalayud the implementation of CE in Spain is still at the beginning of its process. On the other hand, the company believes that the implementation of CE on a national scale, can launch the Spanish regions as well as the national economy.

4.3.2 Development activities and expectations

In time, Revertia has acquired a primary role in the practices of re-use and management within the sector of waste electrical and electronic equipment (WEEE), in terms of reduction of: 1) waste; 2) $C0_2$ emissions; 3) extraction of natural resources. All these efforts have been reported in one of the first case studies on Circular Economy in Spain. Consequently, Revertia had the opportunity of being involved in several seminars within their country and Europe. Relating on their expertise and business activities. When, for example, in 2016 the European Commission organized an event on the topic of WEEE management, they were the only company representing this sector. This makes Revertia a frontrunner within their sector, in the transition to Circular Economy.

Moreover, Revertia is also active in the climate change sphere. The company was able to give a positive contribution in terms of CO_2 emissions reduction. It is through the development of a tool that they were able to analyse the amount of avoided production and emissions of $C0_2$. The results from the year 2016, show a positive trend: approximately 190 Kg of $C0_2$ have been avoided. Moreover, it is through this tool that they are able to calculate the carbon footprint of their clients, who can also realize the extent of their contribution in terms of emission reduction. Even though we are now talking about a contribution in the creation of environmental benefits, this represents another way for comprehending to what extent the company is being active in the field of Circular Economy. The benefits that they are creating within their regions is an example of best practices.

Revertia believes that in the near future, other circular initiatives will be booming in Spain as well as in Europe. Not only in the WEEE sector but they will emerge in other sectors like textile, construction and bio mass. Catalayud agrees on the perspective of the European Commission, that states; "Circular Economy will be the future system that can revolutionize the European social-economic dimension, making it more sustainable and competitive in the long run" (European Commission, 2016). Moreover, he also believes that the future European economic system will be based on the principles of CE. One of the reasons that support this idea is that it is no longer possible to keep on relying on the natural resources of our planet. There is a need to adapt the current economic system and to make an effort for the future of our planet.

With regards to the establishment of CE in Europe under an organizational point of view, Catalayud believes that all the companies should implement actions strictly connected to the philosophy of CE. He would like to see the creation and implementation of a new European nexus were the companies around Europe could easily collaborate and try to create a large market of secondary raw materials and resources that are essential to the EU's economy. On this basis, the company established a partnership with the Belgian region of the Flanders. They set up specific objectives and common targets for the amount of WEEE waste that should be re-used: 3% within the end of 2017 and 4% in 2018. This partnership, more than creating further opportunities in terms of electronic waste management, creates a bilateral regional cooperation and the creation of new job positions.

4.3.3 Job provision and job quality

As regard to the dimension of job creation, Revertia believes that further investments in the WEEE sector can led to the creation of new job positions. In fact, from its launch in 2013, the

company has generated 4 permanent job positions, reflecting both the highly skilled and low skilled category: 1 position as junior consultant and 3 positions as computer technicians. However, over time the company has not experienced a growing employment rate. It aims to offer employment to more people in the near future. The company has started a process of enlargement of their operational capacity by opening a second branch in Madrid.

With regard to the aspect of job quality within Circular Economy initiatives, Catalayud believes that two aspects can contribute to its establishment:

1. **Flexibility and open mindedness,** in terms of being inclined to open you mind in creating collaboration with other companies and public institutions in order to generate more businesses opportunities.
2. **Skill matching,** which is relevant for being able to deal with the multidisciplinary nature of CE businesses. For example, Catalayud had to acquire knowledge about CE and to deepen it with further notions not completely related to his field of expertise, such as eco-design. Aspect that resulted to be relevant for Revertia that implemented eco design within their re-use management practices.

Analysing the European Commission perspective on the expected job positions for the near future, Revertia believes that it is too optimistic. The existing differences between European Countries at legislative and regulative level, are an indicator that without homogeneity the achievement of high results will not be easily achieved. Despite that, Catalayud wants to emphasize that there is an element that is missing and that could contribute to the creation of more jobs. We are talking about Circular Economy education. Over the years, many citizens have become aware about the concept of sustainable development. On the other hand, little is known about CE by the general public. Within this context a communication strategy could play a prominent role in highlighting the benefits that could derive from the application of CE. When people and companies will be aware about what is going on around them, achievements can be accomplished.

The best scenario that Revertia is looking for is the management of critical raw materials on a larger scale with the involvement of more stakeholders, both from the public and private sectors. So far 65% of the WEEE management and re-use is not properly managed. Thus, more efforts are needed if we want to see this sector playing a prominent role in this period of transition to a CE.

4.4 , Construction and demolition sector (C&D),

4.4.1 Contributing and being part of the transition to Circular Economy

Global challenges that are dealing with problems of natural resources scarcity, climate change and economic crisis have decided to aim for a sustainable future. According to the analysis made by the Ellen Macarthur foundation, our current economic system is not sustainable in a long run term. On the base of this, it was in 2013 that Bam realised it was necessary to make a change and to contribute for the achievement of a more sustainable future. Thus, the company decided in being part of the transition to a Circular Economy, in order to make the C&D sector more efficient and to concretely deal with ongoing global challenges, such as natural resources scarcity, climate change and economic crisis.

According to Bunkendaal, currently the construction and demolition sector relies on a traditional take-make-dispose approach which, as mentioned before, is not sustainable in the long run. The amount of waste that is being produced with this economic approach needs to be cut down with the introduction of new innovate solutions. These solutions can be offered by a system like Circular Economy. The construction and demolition sector, could receive great benefits through the application of a CE system. A CE system in the construction field would give the opportunity of building with the logic of coupling the principles of CE with new sustainable building materials. Thus, a prerequisite for aiming at cities with a long term sustainable dimension, is the invention of new materials that can be used and re-used over years. “Circular Economy can play a key role for the construction and demolition sector (Bunkendaal, 2017)

Circular Economy can also have a high impact on the society that can acquire a better understanding of the management of reusable and re claimable materials. With regard to the C&D sector, there is not that much difference between the deconstruction and demolition: Deconstructing is like demolishing. On the other hand, deconstructing implies the decomposition of building and the consequent collection of materials in the most optimum way. What can sustain the decomposition phase is a strict collaboration with the supply chain, in order to come up with the realization of new materials that could allow re-use practices. Believing in the development of new circular products and services for the C&D market, Bam is investing 75% of its turnover in the

supply chain. The main goal is to create sustainable building processes as well as to contribute to social learning, both for the citizens and businesses.

With regards to social learning, Bunkendaal believes that the creation of social benefits, is possible through education that could provide relevant information on how to generate and apply best practices. Knowledge can also give the population the instruments to notice and understand new developments in the environment in which they live. Analysing the construction and demolition sector, the consumption of global material is approximately 40-50% (Bam, 2017). There is the need to find a responsible way for minimising these numbers.

4.4.2 Development activities and future expectations

In 2013 Bam gave its contribution to the realization of the first town hall with sustainable re-usable materials, in the municipality of Brummen (the Netherlands). Contribution that gave them the opportunity of being involved in the realization of a business pavilion (that reflects the principles of CE) for ABN AMRO bank in Amsterdam. The role played by BAM in the C&D sector in the Netherlands, gave them the opportunity of being part of the Circular Economy 100 (CE 100) program developed by the Ellen Macarthur foundation. CE 100 is an innovation programme setup to enable organizations to generate new opportunities and accomplish their CE ambitions faster (Ellen Macarthur, 2015). They feel that they are playing the role of a frontrunner and a representative of the construction and demolition sector.

With regards to the future implementation of CE in the Netherlands and in Europe, Bunkendaal believes that more circular economy initiatives will be booming in their sector as well as in the sector of critical raw materials. He believes that fixing and re-using practices will grow and spread around the European Union. However, before CE becomes the system of the future and revolutionizes the European economy further steps have to be done. For example, BAM believes that an important goal to be achieved is to become independent from the use of imported materials and resources. In the long run relying on imports, could lead to new threats for our economy. Resource depletion is real and in the near future is uncertain. Therefore, the European social-economic future depends on the capability of creating interdependency from other countries.

From an organizational point of view, Bunkendaal imagines the establishment of CE in Europe as a big multi-sector network where different stakeholders and expertise from different sectors will collaborate together for the realization of new products and services. It should be based on a two-layer network (between same and different sectors), where collaborations could be enabled by the realization of a European Circular Economy platform for the development of programmes

that could help members to build capacity, network, cooperate around the circular economy dimension.

With regard to the future developments of Bam and the C&D sector, Bunkendaal is imagining more collaboration with the chain supply. He feels that it would be useful to organize a passport for materials that could serve for acquiring more knowledge on materials and their re-use management (especially when they're close to the end of their life cycle). More over BAM is working on the development of new business models that can lead to job creation, even though at the moment it is very difficult to talk about job creation within the C&D sector.

4.4.3 Job provision and job quality

Due to the nature of their business they have been unable to create job opportunities. As BAM is a project organization the job opportunities dependent on what kind of project they are involved in. Their contribution within the job dimension is getting their employees aware about the principles of CE. They carry out an activity of internal education, where their employees can explore the possibilities of CE innovation. The expectation of this educational process is that new circular engineering solutions could be created. For example, a project to increase the recycling content of the materials in the designs could be developed. Even if the demand is still low, the projects that they are working on take into account the principles of CE are slightly growing.

With regards to the notion of **job quality**, Bunkendaal believes that two aspects are crucial in creating a qualitative job within the dimension of CE:

- Training
- Skill matching

Both aspects are essential, especially in the design field, because they have to understand and become confident with the principles of CE. Where the technical destruction part is not all that different from the construction part. Thinking of starting a new project, while taking into account of what to do when the end of its life becomes closer, is essential for the implementation of CE within C&D sector.

Beyond that, Bunkendaal is also imagining more dialogue with the governments. It would be interesting to challenge governments in order to see the best scenario that they can forecast for the implementation of CE principles in each priority sector (Bunkendaal, 2017)

4.5 , Food waste sector,

4.5.1 Contributing and being part of the transition to Circular Economy

Funghi espresso believes that CE represents an opportunity for the European economy. More than a way of using a different economic system for generating profits, Circular Economy represents a tangible solution for tackling the main threats, like the depletion of natural resources, that our planet is facing.

Di Giovanni and Sangiovanni promote the fact that through the application of CE principles it is possible to re-use materials and natural resources for generating other resources. Coffee ground, for example, is a perfect substrate for growing mushrooms, because it contains minerals and useful nutrients for their growth. It can become a resource material. Taking into consideration Italy's peculiar economic situation after the explosion of the economic crisis in 2009 the CE represents an opportunity. An opportunity for reinventing a way of thinking as well as for creating new businesses in the green and blue economy field.

The idea of growing mushrooms using coffee ground, was something innovative and creative for:

- Re-inventing a way of making businesses
- Contributing to the reduction of resource depletion
- Trying to be representative in an innovative system like the CE, with a practical project.

Thanks to their efforts in avoiding waste generation, they have had the opportunity to join the network of Zero Waste Europe, where they have been promoted along with other European circular initiatives.

According to Di Giovanni, by applying the principles of CE, it is possible to build a more prosperous liveable and sustainable society. Thus, believing in the principals behind Funghi espresso, they have decided to give a contribution through monthly training sessions. Where they teach the principles of Circular Bio-economy and how to grow mushrooms using waste coffee ground to interested citizens. Therefore, by organising theoretical and practical sessions they're offering the opportunity to learn their area of expertise. Education that is being replicated at a local level within high schools and the faculty of Agronomy at the Universita' degli studi di Firenze.

4.5.2 Development activities and future expectations

It is through the share of knowledge and creativity, that they want to inspire citizens, students as well as other companies that are looking for inspiring practices for their future. “Whenever is it possible, we are trying to be an example for the society. We therefore use environmental friendly vehicles, like cargo bikes and our feet in our activity” says San Giovanni. Being the first group to use coffee ground for the production of mushrooms, Funghi espresso is feeling a frontrunner for the sector of Agriculture and innovations connected with the dimension of Circular Bio-economy.

With regards to the future development in the food sector of CE in Italy and in Europe, Funghi espresso believes that more circular initiatives will be booming in Italy and that the food waste sector will not be the only relevant sector. They believe that the sectors of textile, bio-mass and critical raw materials will play a relevant role for the future spread of CE. Due to their experience as a start-up they discussed the opportunities that are being given to emerging start-ups. In their opinion there is the need to change the European financial supporting system. Basically, it is structured on three phases where the injection of economic resources, provided in three different phases represents a limit for their development. “The EU through its financial system is giving a lot of hope but it is failing to help sufficiently further developments”, says Di Giovanni.

The financial support is not the only challenge that Funghi Espresso is facing. The other issue that is blocking the growth and making their business operational difficult on a national scale is cultural. Cultural problems that exist between the north and the south of the country. Different habits, different ways of interpreting the economy as well as different ways of appreciating products that are supporting the expansion of innovations that are behind their products over the country. While people in the north are looking at the design of the products, down in the south people are simply looking at the costs. On the base of that, Funghi espresso believes that more education all over the country is needed. Classes teaching topics connected to the principles of Circular and Bio economy are necessary.

Talking about their future, Funghi espresso is going to decide in which direction that they going to inter-take in the near future. Or continue producing and selling their products or focusing their attention on the training sessions and education in order to give a contribution in spreading knowledge of the principles of CE and the bio economy and their circular initiative.

4.5.3 Job provision and job quality

It is through the interest in their circular initiative that Funghi espresso was able to contribute to the realization of 6 job positions in the field of agriculture. At the beginning of their launch in collaboration of the municipality, they created 6 internship positions reflecting the category of low skilled workers. Moreover, they were able to help a person looking for political asylum and to a young citizen who was neither studying nor working at that time. Unfortunately, the employment rate did not grow in time. Although they were able to give their little contribution in terms of employment, they are sceptical about the forecasts related to job creation around Europe. In their opinion, considering the existing difference between the various European countries, regions and legislations, the figures that have been published are too optimistic.

With regards to the notion of **job quality**, Di Giovani believes that in order to talk about job quality within CE initiatives, 4 aspects are essential:

- **Resilience**: it is important to believe in your projects and development, especially when the nature of your work is based on new concepts and new ways of thinking:
- **Creativity:** in the field of Circular Bio-economy, you have the chance to invent o re-invent existing jobs and practices:
- **Cooperation:** it represents an essential component for the success of your activities. By collaborating with other stakeholders, you can share the values and economic benefits of your imitative.
- **Skill matching**: this is strictly connected to creativity. In many cases it is necessary to recombine practical skills and theoretical knowledge in order to make the recombination operational.

4.6 Case studies comparisons

In this section the core aspects of job creation and job quality will be analysed through a comparison between the CE's priority sectors and the EU country selected. However, before the analyse of such aspects, a comparative analysis will also be provided in terms of:

- **Contribution to the transition to CE**
- **Future expectations**
- **Job creation and job quality**

4.6.1 Contribution to the transition to a CE

In terms of contribution to the transition to a Circular Economy, there was a common opinion on the fact that a CE can entail benefits for the European Union and for their country of origin. Benefits that can be expressed in relation to the society, the economy as well as to geopolitical assets

4.6.2 Future expectations

With regards to the future scenarios, all the interviewees agreed on the fact that more circular initiatives will be booming in Europe as well as in their country of origin. Initiatives that will represent all the sectors indicated within the CE package. On the other hand, they also agreed with the European Commission's perspective that a CE will be the future economy system that could revolutionize the European social-economic dimension, making it more sustainable and competitive in the long run. However, different opinions were expressed on the forecast of job creation. **Funghi Espresso** and **Revertia** stated that the figures indicated by the EC as well as from other academics, are far too optimistic. The existing differences between the countries and their policy regulations and the inexistence of common policies will not help in achieving the numbers indicated.

With regard to the establishment of CE in Europe (under an organizational point of view), it was interesting to detect different opinions to this regard:

- **BLC3**, is imagining the establishment of small networks that will collaborate for the achievement of common goals. Besides that, the establishment of smart regions would be the best scenario, where each region should develop their own strategy and collaborate for the establishment of realities as Circular Bio-economy.
- **Revertia,** would like to see the realization of a European nexus where companies around Europe could easily get in touch and collaborate in order to create a big market of secondary raw materials and resources that are essential for the EU's economy.
- **BAM**, is imagining the creation of interdependency from other countries for the import of materials that are essential for the EU. Moreover, they would like to see the establishment of CE in EU as a European network where different stakeholders with different expertise and from different sectors will collaborate. It should be a two-layer network (between the same and different sectors), where a collaboration between the different sectors could be carried out through the realization of an EU platform.
- **Funghi espresso**, is hoping that the European financial supporting system will change in order to give more concrete support to emerging initiatives. Apart from that, the start-up believes that more education is needed for solving cultural discrepancies in their country. Talking about the establishment of CE in Europe, they would like to see the realization of a European network where all the circular initiatives belonging to the same sector could have the opportunity of collaborating, sharing their know- how and supporting each other.

As we can see all the initiatives are imagining the realization of European circular network where the collaboration between the sectors, at a national or European level, is an essential element. Moreover, this network should be created with the purpose of realising a big market of raw materials that could improve their management.

4.6.3 job creation and job quality

More than being an example of best practices for other companies and citizens, the circular initiatives under analysis believe that one of the major benefits that CE can lead to is the creation of job positions. Analysing the dimension of **job creation**, the results achieved by each initiative are shown below:

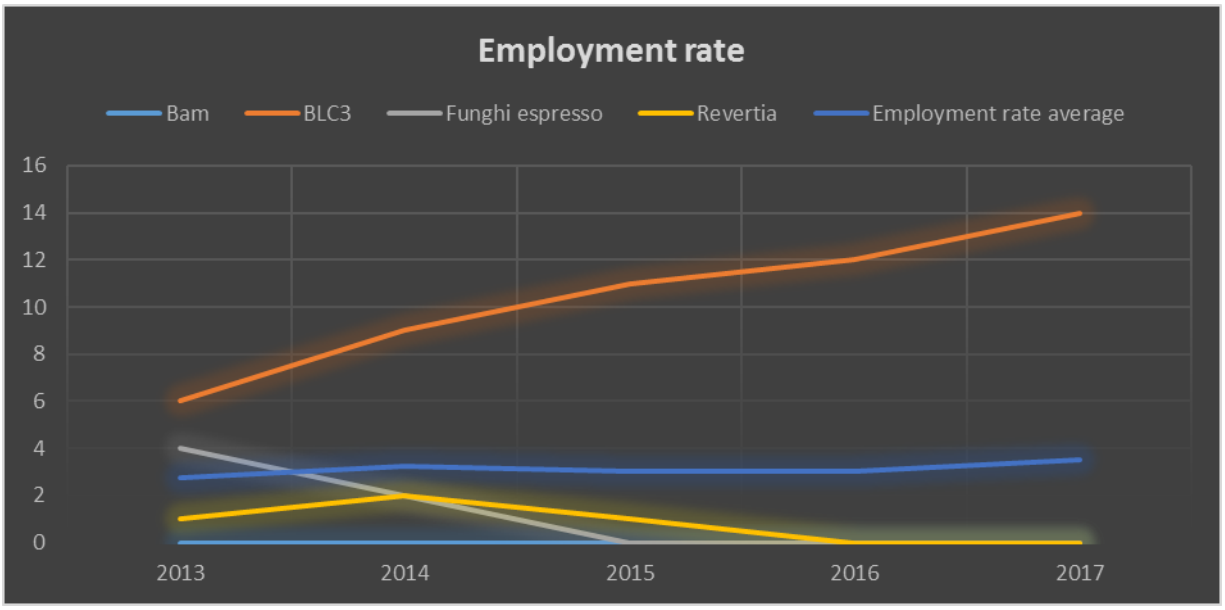
Table 4.1 job creation within the selected circular economy initiatives

Circular Initiative	Job position created	Short term contracts	Long term contrats	High qualified workers	Low qualified workers
BLC3	52	47	5	47	5
Funghi espresso	6	6	0	0	6
Revertia	4	0	4	1	3
Bam	n.a	n.a	n.a	n.a	n.a

Therefore, in the 4 circular initiatives analysed, 62 job positions have been created, with 48 representing the category of high qualified employees and 14 representing the category of low qualified. Overall, as we can see from the chart, BLC3 contributed to the realization of 90% of the job positions created in all the countries analysed. BLC3 is also the only one were high qualified employees have the opportunity to contribute in making their initiatives representative in the phrase of transition and the growth of the association. Noteworthy is the sector of construction and demolition, which among the others, was still unable to generate job positions for the categories indicated above.

All the circular initiatives believe that job opportunities in the low qualified category will increase. The following graph shows the employment rate growth that was experienced by all the circular initiatives starting from 2013 in a range of 4 year periods (all the companies launched their business and started to implement the principles of a CE in 2013).

Graph 4.2 Employment growth rate and average



As we can see from the graph, the average of the employment rate is slightly growing over the years. Even though this trend is highly maintained by the positive performance of BLC3, the other circular initiatives shows a declining or absent contribution in terms of job creation.

This dimension of job creation can be reconnected with an intrinsic dimension of working environments: job quality. According to the opinions gathered during the interviews, job quality represents an important aspect to take into account for the realization of a qualitative job in CE working dimensions. Shown below, are reported the most relevant qualitative index that each company identified for the realization of such dimension:

Table 4.3 Job quality indicators

Company	Qualitative indicators
BLC3, Portugal	Skill matching, Ambition, Resilience
Revertia, Spain	Flexibility, skill matching
Funghi Espresso, Italy	Resilience, creativity, cooperation, experimentation, skill matching
BAM, the Netherlands	Training, skill matching, cooperation

The graphic identifies 9 different qualitative indicators. It is noteworthy to point out that the aspect of skill matching was indicated in all the CE dimensions. According to the information gathered, this aspect results to be fundamental for implementing and complementing skills and knowledge within the managerial dimensions of the circular initiatives analysed. As mentioned before this index represents an important dimension for the achievement of qualitative jobs within CE dimensions. It is also true that they cannot be used for directly assessing job quality in these initiatives. For that kind of analysis, a more quantitative approach is needed in combination with the correct tools that are necessary in analysing such a dimension. Aspects that will be addressed more deeply in the following chapters.

Chapter 5
Discussion

5.1 Intro

The present study investigates the social-economic impact that selected Circular Economy initiatives in Europe are having in terms of job creation. Subsequent to this, attention is given to the notion of job quality as well as to those elements that are contributing in making this initiatives representative of the transition to a circular economy in Europe.

In this chapter the results obtained will be examined in relation to the research questions as well as in relation to other existing research regarding the investigation under analysis. This reflection will address three considerations:

1. **Limitations to the research**
2. **Remarkable findings**
3. **Theoretical discussion of the conceptual framework applied and additional perspectives**

The section of **limitations to the research,** will address the limitations encountered during the fieldwork, in terms of geographical scope and in terms of information availability. **Remarkable findings will** highlight remarkable discoveries in terms of job creation, job quality and representativeness, addressed in this thesis. Ultimately, the **theoretical discussion of the conceptual framework applied,** will highlight the consistency of the theoretical framework selected and previously introduced in chapter 3. Subsequent to this, an insight on new perspectives in support to a better analysis and comprehension of the dimensions analysed, will be provided.

5.2 Limitations to the research

During the case study analysis, several limitations were encountered. Firstly, it was not possible to fulfil the geographical scope of the research. As mentioned in chapter 2, several attempts were made to reach companies representing this sector. However, none were able to reply to my requests. Consequently, we missed an important sector in our sample, and the balance between northern and southern Europe is tilted.

Secondly, with regards to the analysis of the dimensions of job quality, we were unable to collect quantitative data during the fieldwork. Due to unfavourable conditions the questionnaires created, containing questions relative to the quality of the working environments, were not delivered to the employees of the initiatives under analysis. Albeit Funghi espresso expressed its availability in answering the questionnaires but on our arrival we realized that there were no employees working there anymore. It was, therefore, impossible to carry out this data collection. Furthermore, we encountered logistic problems with the other circular initiatives in terms of involvement of the employees. Revertia, expressed unwillingness in answering the questionnaires and BLC3 had a limited number of employees present on the spot, about 15%. The remaining 85% were on holidays or working abroad. Despite the limitations that were encountered, we gained valuable findings that will be presented in the following section.

5.3 Remarkable findings

In this section remarkable findings on the dimension of job creation (5.3.1) and job quality (5.3.2) are reported by underlining contrasting and new perspectives that have been gained during the analysis. Moreover, in section 5.3.2, the dimension of job creation has been analysed by underlining those elements that have facilitated or limited the creation of job positions

5.3.1 About job creation

In analysing the aspect of job creation during the fieldwork, we discovered contrasting perspectives on the benefits that CE can have in term of job creation. As already mentioned in chapter 3, the European Commission believes that a CE will contribute to the creation of 580,000 jobs by 2030 (European Commission, 2015). In contrast, the expert Stefano Pascucci, as well as the representatives of the circular initiatives **Funghi Espresso** and **Revertia**, expressed their scepticism on these numbers. According to Pascucci. the numbers are a result of models and tools that through selected parameters, are able to generate numbers on which academics and experts can rely on. On the other hand, as reported in chapter 3, all these models are not taking into account all the social dimensions, like cultural and regional discrepancies, that could be connected to the sphere of job creation. Therefore, the reliability of these numbers has to be minimised and evaluated with the correct considerations.

5.3.2 Job creation: Facilitating and limiting factors

Unexpectedly the only circular initiative that performed better in job creation was the association BLC**3**, that experienced a growing employment rate, with an average of 13/15 units per year. According to Nunez, the generation of job positions was facilitated by the fast growing rate of the sector that they belong to. Sector that is mainly focused on research and innovation, and practically expressed in design and development of new products and technologies for the national and international market. Public and private investments are attracted by the multiple benefits like the generation of commercial products and the generation of environmental benefits that the sector of bio-mass and bio-products can produce (Nunez, 2017).

The circular initiative that showed a contrasting situation in terms of job creation was **Bam**. According to Blankendaal, the sector of construction and demolition is involving the principles of Circular Economy at a slow rate. Since the market demand is still low, the consequent generation of new business models that could lead to job creation for activities regarding de-construction of dismountable materials, will come in a later moment during the transition. Secondly the need to develop more sustainable materials in order to increase demand and to start designing with a different mind-set has to evolve. Said that, a strict collaboration with the supply chain is needed in order to come up with the creation of new sustainable construction materials that could lead to the creation of job positions reflecting, for example, dismantling and disassembling working activities.

With regards to **Funghi espresso**, the performance in terms of job creation, was strictly dependent from the company's economic power, which relies on the success of their products within the market. Thus this aspect of economic capability, meets an interesting connection with the current cultural differences, between the northern and southern regions of Italy. Dimension that is undermining the appreciation of their products within the market. Another limitation encountered by the company was represented in the dimension of education. Little is known about the principles of CE and the innovation behind the realization of new products such as their mushrooms. Indeed, while citizens from the northern Italian regions show interest in design and innovation that is behind the products, citizens from the southern regions are more representative of the country's agricultural world. The main interest of this class is based on the final price of the products. In consideration of this the reduction of existing cultural discrepancies between the northern and southern Italian regions, is an important issue that should be tackled. While, in the case of **Revertia**, they experienced a slight and stable employment rate over the years. The impossibility of increasing job positions was determined by the role that their cash flow and operational capacity are playing. Dimensions that are being developed with the creation of new business opportunities in other

Spanish regions. Moreover, the agreements with the Belgian region of the Flanders, will give the opportunity of becoming more influent within the market of WEEE

The examination of the results in terms of job creation, are both contrasting as well as concurring to other existing research. Contrastingly the opinion about job creation are not in line with the literature and reports about the job opportunities that can be created through circular economy initiatives. On the base of the experience and the performance of the selected circular initiatives, trends do not seem to be so uphill. It is important to distinguish between short term job creation and job creation on a longer term. As indicated in chapter 5, BLC3 offered 46 short term contracts out of 52 job positions, followed by Funghi espresso where all the job positions offered were 6 short term contracts. In comparison with the 9 longer term contracts created in total by all the initiatives, we can realise that employers and employees are still operating in a challenging context post explosion of the economic crisis where short term contracts took predominance. Undoubtedly, these job contracts are one of the alternatives for tackling unemployment (European Parliament, 2016). On the other hand, the spread of this type of contract reflects the job insecurity that persists in Europe, as well as in the individual countries analysed in this thesis.

As mentioned before, there are a number of factors that can support or limit their performance. Factors that can be encased and interpreted through the analysis of two dimensions: **sectorial** and **geographical**. Regarding the former, it is true that belonging to one sector or another can make the difference in terms of public and private interests at the circular initiative. Aspect that can lead to a wide range of benefits as cooperation, investments and knowledge that can lead to the appreciation of the innovations that are growing day after day on a national and European level. In the case of BLC3 and Revertia, the aspect of collaboration resulted to be a positive aspect that led to enlarge their market as well as to a higher resource use efficiency. On the other hand, Funghi espresso, encountered several limitations in managing its business in this period of transition because of aspects such as cultural and regional discrepancies. Putting a lens on the aspect of education which could promote a role in: 1) reducing existing cultural discrepancies between and within European regions; 2) enhancing culture about CE and the innovations behind it; 3) enhancing the importance that cooperation represent for the European market. These elements can contribute to boosting competitiveness and that can lead to future social-economic developments during this period of transition towards a Circular Economy. While as for the latter matter the European regions in which circular initiatives have been implemented have encountered several difficulties in terms of culture and open-mindedness, interests and support (in terms of education, financial for example) that could be gained from public bodies and private actors.

Thus, even though the absence of more data from northern European countries is restricting the generalization ability of our analysis, it seems that not only northern regions are the most active when it comes to tackling issues such as unemployment and support the implementation of new business initiatives that are a reflection of a period of innovation and change within the labour market that a Circular Economy is leading to. Surprisingly, a southern EU country (Portugal), is positively performing in terms of job creation and can be seen as representative of its field of expertise in this period of transition. I believe that other circular initiatives can only learn and take their performing realities as an example.

5.3.3 Job quality

Believing that the notion of job quality, covers a prominent role within the working environments, as mentioned in chapter 3, we tried to analyse this aspect with the contribution of interviewees' personal opinion. Surprisingly, given the various aspect that a notion like this can involve, none of them were able to come up with a proper and concise definition. Therefore, in order to proceed with the analysis, we showed the interviewees a list containing a series of indicators that represent the dimension of job quality within working environments. The list contained the following indicators:

1. Earnings quality
2. Carrier opportunities
3. Skill development (both practical and technical)
4. Labour market security

As a result, the respondent's view on these indicators where similar because they all believed that they reflected aspects that can lead to job quality within working environments. On the other hand, as mentioned in chapter 5, they all mentioned the aspect of skill matching as an important indicator that should be taken into account if we want to analyses job quality within the working environments reflecting a Circular Economy.

Our findings seem to be in contrast to some reports on the role of skill matching nowadays. According to the World Economic Forum (2014), matching skills and job creation became a priority policy concern after the explosion of the economic crisis. Skill matching occurs when workers have fewer or more skills than the job requires. In the case of the circular initiatives

analysed, all the interviewees had to implement skills, both practical and theoretical, in order to have the possibility to deal with a dimension that requires a creative interpretation and application of several concepts from different backgrounds. However, as mentioned above, mismatched skills became more prominent after the economic crisis. Many employees reported difficulties in finding suitable skilled workers and in tackling unemployment during the crisis (Kloster D., 2014). The result of this process could be twofold: provision of right skills for dealing with the innovative job dimensions that are emerging, and secondly a contribution to those economic activities that can develop job creation. As can be noted, there is a correlation between the general assumption in regard to the role of skill mismatching and the role that skill matching is covering for those individuals involved in CE working dimensions. Therefore, it seems that all is moving in the direction that new skills are needed. What more, importance is being given to the recombination of skills that can undermine the classic dimension of working environments, where workers with different skills cooperate for a common goal. On the other hand, reducing skill mismatching is one of the main concerns of the policies today. Whose supportive of this idea believe that it is necessary to require co-operation from all the stakeholders involved. The first step is needed to decrease the existing gap between knowledge generated in the education system and the skills requested by employees (World Economic Forum, 2014).

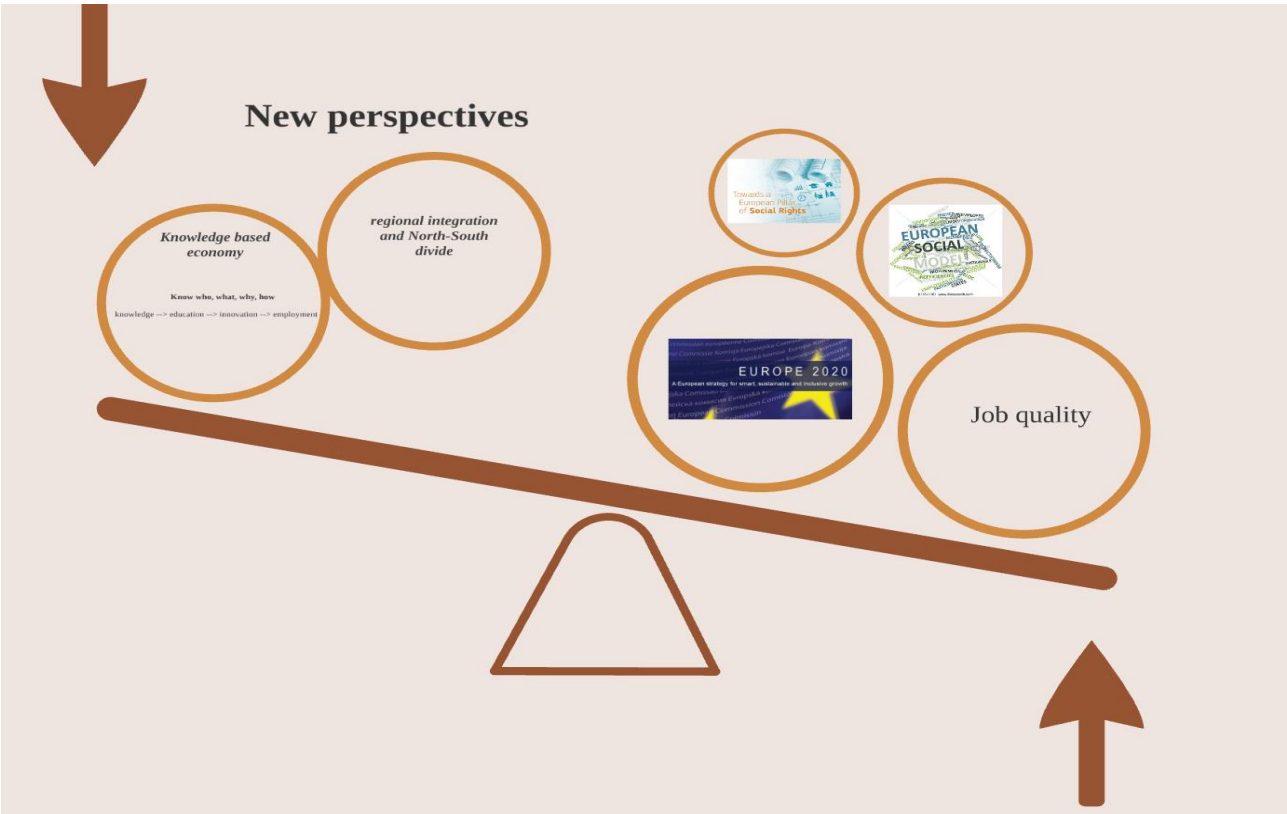
Unexpectedly, there seems to be a contrasting trend on the role that skill matching is going to cover in this period of transition towards a Circular Economy. According to the interviewees' the direction seems to be clear. CE seems to undermine the classic dimension of the working environments, through recombination approaches that are leading to the establishment of a new category of skill-sets. Moreover, in order to support this change, the interviewees believe that more education is needed. A correct education could provide a better understanding about CE itself as well as about the skills needed for the labour market that CE is generating. There is the necessity to generate economic dynamism while generating employment. Thus, it means improving the role of education and training for the labour market through strengthened channels of communication with education, public institutions and workplace stakeholders (World Economic Forum, 2014)

5.4 The EU's strategy towards a Circular Economy

This section will evaluate the consistency of the theoretical framework chosen for the development of this thesis, by assessing the support that other perspectives could have given for a better comprehension of the dimensions under analysis. In the light of this, we have to say that the

theoretical aspects analysed in chapter 3, resulted to be supportive for the development of the results. On the other hand, it was during the fieldwork and the case study analysis, that new perspectives came into light. The consistency of these perspectives helped us to achieve a better balanced and deeper understanding (see graph 5.1) of the selected theoretical framework (chapter 3): the **knowledge based economy** and the **regional integration and north-south division in the EU**.

Graph 5.1 new perspectives balancing the chosen theoretical framework



After looking into these new perspectives, a comparison with the selected theoretical framework will be given.

5.4.1 Knowledge based economy

The term knowledge based economy, has been recognised for indicating the role of knowledge, as embodied in human capital and the role of technology nowadays (OECD, 1996). It is in this period of re-invention of the businesses activities and related practices, that this notion is becoming relevant. The core message of this theory is simple: innovation goes along with knowledge. If we talk about knowledge, we have to focus our attention over three main aspects as

education, communication and information. Education that should be provided on the base of the following structure:

- **Know what:** refers to knowledge about facts and it is based on information sharing
- **Know why:** refers to scientific knowledge of the principles of law and nature
- **Know how**: refers to skills or the capability of being able to do something
- **Know who**: refers to who knows what and how to do what

The importance of these aspects relies on the fact that knowledge has to be firstly transferred through education to the community and the public bodies, who should be informed on new developments within national and transnational boundaries. Therefore, if the EU wants to share new developments and innovation (a process of discovery) within the EU community, there should be active interaction of different stakeholders (community of actors and institutions for example). The result could lead to the implementation of innovative systems as Circular Economy. Such interaction could it pictured as the following assumption:

Education→ knowledge→innovation→employment

Thus, through education, knowledge can be generated and then lead to the development of new concepts and ideas and thus, to innovation. It is through innovation that we have the opportunity of creating positive social returns like the creation of job positions. Within this linear idea, cooperation plays an important role, considering that it can be passed over from one business to another, where innovation can be replicated and lead to the creation of benefits, in the most positive scenario.

However, all of this has to be supported by government policies and through their capacity in contributing to the realization of systems and regulations that could be supportive for:

- **enhancing knowledge diffusion**: the support to innovation needs to be broadened from mission oriented to diffusion oriented programs
- **improving human capital**: policies should promote broad access to skills and competencies, improving the capability of learning
- **promoting organisational change:** particularly in relation to new work arrangements and developments within the labour market, were new jobs are being created and skill matching is becoming more prominent.

Therefore, if the EU truly believes that a Circular Economy is a system that can contribute to the improvement of the social-economic dimension of the Union it should support and promote the dimensions of knowledge, education, innovation that together represent a formula for the creation of social benefits.

Surprisingly this new perspective, commonly used within theories of innovation policies, gave us a better overview on the role that knowledge, education and innovation can play together. In comparison to what mentioned by the EU 2020 strategy and the European Pillar of Social rights, unexpectedly, here we have more specific insight about the dimensions that reflect what the selected circular economy initiatives are dealing or looking for. However, it is important to realise in which context circular economy initiatives are being implemented. Therefore, there is also the need to study the existing differences between European regions, both at domestic and European levels. This dimension can be developed better in the following section, which will look into the notion of regional integration and the aspects that divide northern and southern EU.

5.4.2 Regional integration and north-south division in the EU.

All the aspects mentioned in the previous section, can give us further insight to analysis better the social-economic dimension of the EU today. After the economic crisis, southern EU countries like Spain, Italy and Portugal have failed to reduce their national deficits sufficiently to meet EU targets. Moreover, the crisis led to perceive the EU differently. For example, a distinction between wealthy countries and not, between debtors and creditors, emerged. Such perceptions have led to discussing about the existence of a North-South division (Stratfor, 2016).

Therefore, to regain competitiveness has become one of the EU's priorities. The goal is to generate systems that can lead to self-efficiency an aspect that is crucial in increasing its competitiveness. The goal is to export success and the transition to Circular Economy could be supportive in this sense. On the other hand, according to Stratfor (2016), northern European countries are taking a stance distance from the southern countries' high deficits. It is within this north-south standpoint that aspects, such as competitiveness, can gain importance.

The EU is the most advanced example of regional integration in the world. It has the power to combine intergovernmental and supranational traits. The contribution to regional integration is provided by the application of EU's social policies which consists of the provision of social and labour standards for the realization of a social cohesion, whose goal is to minimise territorial discrepancies within the EU (ibid). European social policies that can be actualised within three different dimensions:

- **Euro social legislation**: where the EU can enact binding regulations on certain aspects in regards to employment and labour regulations
- **Non-binding procedures of policy coordination**: the EU plays a prominent role in the coordination of national policies in various fields, among others, of employment and education. Coordination that is framed within the EU 2020 strategy, which (as stated in chapter 3) aims at promoting the transition to a greener, smarter and more inclusive EU economy (European Commission, 2015)
- **EU funding,** in particular the European Social Fund that provides funding for national initiatives aimed at helping people to improve their skills and their job prospects.

Therefore, it is through the application of the above mentioned dimensions that the EU can support the scenario of the transition towards a Circular economy. During the transition phase aspects such as employment, education, investments and skill training are all fundamental for the development of operational and representative circular economy dimensions in Europe.

Chapter 6
Conclusions and recommendations

This thesis set out to assess the impact that a Circular Economy (CE) is having on the social-economic dimension of Europe. The research has been conducted by investigating 5 circular economy initiatives, reflecting different EU' regions and the priority areas of the Circular Economy Package (promoted by the European Commission). The investigated initiatives were:

- BLC3, sector of Bio-mass and bio-products, Portugal
- Funghi espresso, sector of Food Waste, Italy
- Revertia, sector of Critical raw materials, Spain
- Bam, sector of construction and demolition, the Netherlands

Special attention was given to the social performance of such initiatives in terms of job creation and other social benefits. Subsequently, a further insight has been on the characteristics that are making these initiatives representative of the transition to a CE in the European Union. Overall, the research questions addressed in this thesis are the following:

1. What is the potential contribution that the selected Circular Economy initiatives are providing in terms of job opportunities, job quality, and the distribution of social benefits?
2. What does the term job quality mean? Definition of job quality
3. What is the performance of the CE initiatives in terms of job creation and job quality?
4. What are the characteristics that are making these initiatives representative of the transition towards a Circular Economy?

With regards to the notion of **job quality**, on the base of the indicators mentioned in chapter 5, we suggest the following definition of job quality. A job quality can be defined as "*the extent to which a job can reflect a working environment where aspects such as* ***ambition, cooperation, flexibility, creativity, employees training and re-combination of skills*** *can be fulfilled, in order to pursue beneficial outcome for the employees physical and psychological wellbeing*". Therefore, a definition like this aims at underlining the role that these aspects can play for a better comprehension of job quality, especially within working environments reflecting a Circular Economy model.

Analysing the dimension of job creation, the results showed an unequal performance in terms between the selected initiatives. The selected circular initiatives contributed to the creation of 62 job positions, 85% of which were short term employment contracts. The majority of these contracts were assigned to the category of high qualified workers. This, however, is in contrast with the interviewees' opinion, because they believe that the category of low skilled workers will have more opportunities of being employed in the near future

Analysing the dimension of **representativeness,** the following can be understood through the analysis of common elements that have been detected between the selected circular initiatives**.** Firstly, they gave a true contribution to job creation where short term contracts are still an expression of the challenging period post explosion of the economic crisis that we are still dealing with. Secondly, they are leading towards the setup of a new working environment where re-combination factors can play a determinant role and where aspects like cooperation, education and discrepancies (both cultural and regional) play a key role for the establishment of a CE in Europe. Looking into the aspect of education which can play a prominent role in: 1) reducing existing cultural discrepancies between and within European regions; 2) enhancing culture about CE and the innovations that are involved in CE; 3) enhancing the importance that cooperation represents for the European market. All these elements can contribute to boosting competitiveness and that can lead to future social-economic developments during this period of transition to a Circular Economy.

Overall, the analysis conducted in this thesis should be taken into account by everybody involved in the transition towards a Circular Economy. As mentioned before, there are a wide number or difficulties that are challenging the operational capacity of the circular initiatives in achieving their goals, both social and economic. However due to the positive signals in terms of job creation and other social benefits the projects involved in this transition should continue to promote, sustain and include aspects such as knowledge and education that can support the growth of their operational capability. We are talking about a system that can generate social and economic benefits and that will involve various stakeholders and all European citizens. How can the EU imagine to implement successfully a system like CE, if there are still bridges missing between CE's priority sectors, between the EU's social policies and their real application, as well as between bottom up and top down dimensions? I believe that it is crucial to start listening to the difficulties encountered by the operating circular initiatives and supporting them in growing in order to become more representative of this period of transition. A positive contribution from the EU should be directed to the dimensions mentioned above as well as to the setting up of a material and resource management project that will give a contribution to the self-efficiency of the EU economy. In this overall picture

where discrepancies between European regions exists, in terms of economic power or cultural differences, a common ground should it be provided where the set-up of the EU internal market should be built with the involvement of the equal share of power of all the stakeholders. The potentials for an improvement of the European social-economic dimension already exist. It is time to use these operational dimensions in order to start thinking how to coordinate the transition to a Circular Economy in Europe.

6.1 Recommendations for further studies

This study reinforces the recommendation for further studies on the role that circular initiatives are having and will have in this period of transition to a Circular Economy. I believe that to conduct a larger study, both quantitative and qualitative, on the base of the dimensions explored in this thesis, it would it be interesting to achieve a deeper understanding about future developments in this period of transition. Moreover, on the basis of the insights obtained during the analysis, it would be interesting to see future studies also in the following areas:

- **The role of a CE for the development of smart regions**: the logic of smart regions, shortly mentioned in chapter 5, seems to be correlated with the application of a CE in Europe. A general research questions could be: How can the CE contribute to the development of the regional cooperation, with the logic of smart regions?
- **The role of bottom up initiatives in the transition to a Circular Economy in Europe:** In an EU market regulated by big corporations, it could be interesting to understand if the CE will have the possibility of giving more voice to the bottom up initiatives. It is therefore interesting to understand how this dimension of CE will evolve. Will there be any possibility, that a CE will be connected to the masses and will there be an interactive process that will influence the elite, (where the society will be elected at an elitist level)?
- **Resource based economy, material flows and geopolitical interdependency**: as mentioned in chapter 5, a CE system could lead to the creation of self-efficiency and interdependency from the import-export of raw materials. This could be interpreted in the logic of geopolitical interdependence, where the EU aims to challenge other developed economies such as China and USA. An analysis of such dimensions, could widen the understanding of the importance that a CE has for the EU, not only in terms of social-economic interests.

- **Job quality assessment instrument in the era of a CE:** as mentioned in chapter 5 different indicators have been detected for the evaluation of job quality within working environments reflecting a CE system. By taking into account such indicators and by using existing job quality assessment tools, it would be interesting to understand if it is possible to realize new assessment tools that could be applied in evaluating the dimension of job quality within Circular Economy initiatives.
- **European policies supporting the transition to a Circular Economy:** The European Commission and the European Parliament are still working on the legislative proposals that could lead to the realization of the first official EU policy in the field of CE. In the meantime, legislatively speaking, how are European countries coordinating the implementation of a Circular Economy within their jurisdictions?

As we can see, a Circular Economy being part of complex architecture like the European Union, can find a common floor with a variety of aspects and dimensions. I truly believe that the suggested areas of research need attention if we want to understand the pro and cons and strategies that should be implemented during this period of transition to a Circular Economy.

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8. Annex

European Union GDP analysis:

- http://data.worldbank.org/region/european-union

Circular Economy job creation forecasts:

- https://www.ellenmacarthurfoundation.org/assets/downloads/circular-economy/Growth-Within-Report.pdf
- http://ec.europa.eu/environment/archives/ecoinnovation2014/2nd_forum/pdf/ecoap-forum-17th%20report.pdf
- https://mvonederland.nl/sites/default/files/media/EU-circular-economy-labour-potential.pdf

OECD job quality analysis in Europe:

- https://www.oecd.org/std/labour-stats/Job-quality-OECD.pdf
- https://stats.oecd.org/Index.aspx?DataSetCode=JOBQ On the base of what mentioned in section 7.1, this model could be interpreted as a starting point for the development of a job quality assessment framework for evaluating job quality within Circular Economy working dimensions.

8.1 Other Circular Economy initiatives detected in Europe:

Priority Area	High Economic Performance	Low Economic Performance
Critical Raw Materials	**The Netherlands** **Initiative**: Fairphone **Goal**: to create positive social and environmental impact from the beginning to the end of a phone's life cycle **Website:** **https://www.fairphone.com/**	**Italy** **Initiative:** Cobat **Goal:** management of obsolete computer equipment that can often have a second life or otherwise be recycled **Website:** http://www.cobat.it/cobat/punti-cobat

Plastics	**France** **Initiative:** Veolia **Goal: finalize** solutions to enable resources to be reused e.g. the production of biogas from waste and sludge from treatment facilities, collecting furniture and recycling goods to turn them into a secondary source of raw materials. **Website:** **http://www.veolia.com/en/veolia-group/media/news/circular-economy-sustainable-opportunity**	**Romania** **Initiative:** Green Group - Green Fiber **Goal:** Green Group is the biggest integrated recycling park in South-Eastern Europe, integrating the operations of six companies specialized in collection and recycling of waste. **Website:** **http://www.green-group.ro/en/**
Biomass and Bio-product	**Belgium** **Initiative:** Bio Base Europe Pilot Plant **Goal:** service provider for process development, scale-up and custom manufacturing of bio based products and processes. A wide and flexible spectrum of modular unit operations enables us to translate our bio based lab protocol into a viable industrial process. **Website:** **http://www.bbeu.org/pilotplant/bordeaux-wine-industry.html**	**Portugal** **Initiative:** BLC3 **Goal:** management of bio mass and organic waste. Several projects are ongoing. **Website:** **http://www.blc3.pt/**

Construction and Demolition	**United Kingdom** **Initiative:** Multiplex London **Goal:** creating large-scale and complex landmark buildings, commercial structures and infrastructure projects. Forward-thinking and focused, we build sustainable futures and enrich communities **Website:** **http://www.multiplex.global/**	**Spain** **Intiative :** Acciona **Goal:** creation and management of sustainable infrastructures **Website:** **https://www.acciona.com/about-acciona/**
Food Waste	**The Netherlands** **Initiative:** Instock **Goals**: to turn food surplus into delicious meals **Website**: https://www.instock.nl/en/	**Italy** **Initiative:** orange fiber **Goal:** production of materials out of wasted oranges **Website:** **http://orangefiber.it/**

8.2 Questionnaire used for the semi-structured interviews:

On 2 December 2015, the European Commission put forward a package to support the EU's transition to a circular economy. We are talking about a model that can bring major benefits, contributing to **innovation and social economic growth within the European Union.**

- Why did you choose to become part of this transition of CE in Europe?
- In your opinion, do you believe that your choice entailed **social benefits** in your country/region?
- What types of social benefits?

As said before a CE can contribute to innovation and growth. Especially after the explosion of the economic crisis in 2009, the aspect of job creation as a social benefit is under the spotlights.

Job creation and job quality

- How many job positions did you create?
- What sort of jobs were created?
- In terms of job competences, which categories of employees did you employ: skilled and qualified or unskilled and unqualified?
- Which modality of hiring do you use?
- Which type of contracts have you been able to offer: e.g. long/short term or on call?
- Did you experience a growing employment rate over the years?
- Which factors influenced job creation?

One aspect that is strictly connected to job creation is job quality, which can be described as the combination of several factors as:

1. Earnings quality
2. Carrier opportunities
3. Skills development (both practical and technical)
4. Labour market security
5. Quality of the working environment

- According to the studies on job quality in the CE initiatives, the aspect of skill matching is often dealt with. Have you ever coped with that?

It also said that the CE model can create low and high-skilled jobs.

- Is this the case within your circular initiative?
- How would you characterize the job quality of the jobs created by your initiative?

Analysing Representativeness

- Which factors were determinant for you in order to get awarded?
- Taking into account also this recognition, are you feeling representative of the transition to a CE in your country/region? Do you feel representative of this period of transition to a CE?

- How do you promote CE?
- Are you contributing in raising awareness about CE and your initiative/s?
- Do you feel like a front runner in the transition towards CE within your sector?
- Do you think that other circular initiatives will be booming in your country?
- Will it be in your sectors or others?
- According to the European Commission, the Circular Economy will be the future system that could revolutionize the European Social Economic dimension, making it more sustainable and competitive in the long run. What do you think about this European Commission's perspective?
- From an organizational point of view, how do you imagine the establishment of the Circular Economy in Europe?
- Which is the best future scenario that your company is looking for within the transition towards CE in Europe?