UNIVERSITÀ DEGLI STUDI DI FERRARA

Dipartimento di Economia e Management

Could Circular Economy be an efficient growth strategy?

Mazzali Claudia

Vassalli Giulia

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Summary

In our century, where the population is still growing and the resources cannot supply the demand, innovate is the only solution. The production system, through the development of new technologies, has to change from a linear model, in which products are dismissed at the end of their life cycle, to a circular one. In this kind of model, products can be recovered and reintroduced in the productive process. The circular model meet up with the definition of Circular Economy. Referring to the definition given by Ellen Macarthur Foundation website, adopting Circular Economy, products, components, and materials are kept at their highest utility and value of any age. With this model industries and clients can gain strategic benefits, due the fact that they nourish efficiency and eco-innovation.

Introduction

As Paul Krugman said: "Productivity isn't everything, but in the long run it is almost everything".[1]

Lots of countries, don't have extensive mineral wealth or oil reserves, and thus can't get rich by exporting them. Otherwise, many of the countries that do have a large amount of resources are often crippled by low growth rates and poverty. Therefore, the only way for the society to become wealthier and to improve the standard of living is to keep getting more goods and services from the same number of people. Innovation is how productivity growth happens and the most important force that makes our society wealthier.

Economist Bob Gordon, one of the most respected researchers of productivity and economic growth, underlines the role of new, green technologies in propelling economic growth and progress.

This work is divided into 4 chapters. In the first one will be analyzed the main theme of this essay, namely the circular economy compared with the linear one. We tried to outline the differences between the two models and to give the lecturers an idea of what is the actual context in term of innovations and technologies arose. In the second one will be analyzed the regulatory framework in Europe concerning the circularity of economy and the practical steps to enhance the EU package. In the third chapter, will be explained how green industrial policies are fundamental to provide technological capabilities, economic benefits, competitive advantage in global markets. Moreover, we will provide an overview on the growth opportunities of circular economy with a focus on the job market. In the last chapter, will be described what is the current situation of development of the circular model and how make it possible. Lastly, there will be an analysis of a practical example of a Social Cooperative of Ferrara to traduce into reality the main concepts outlined in the essay.

[1] Krugman P., (1994), *The Age of Diminishing Expectations: U.S. Economic Policy in the 1990s*, third edition, MIT Press

Chapter 1 - From Linear to Circular

1.1 Linear Economy, Circular Economy and Circular Advantage

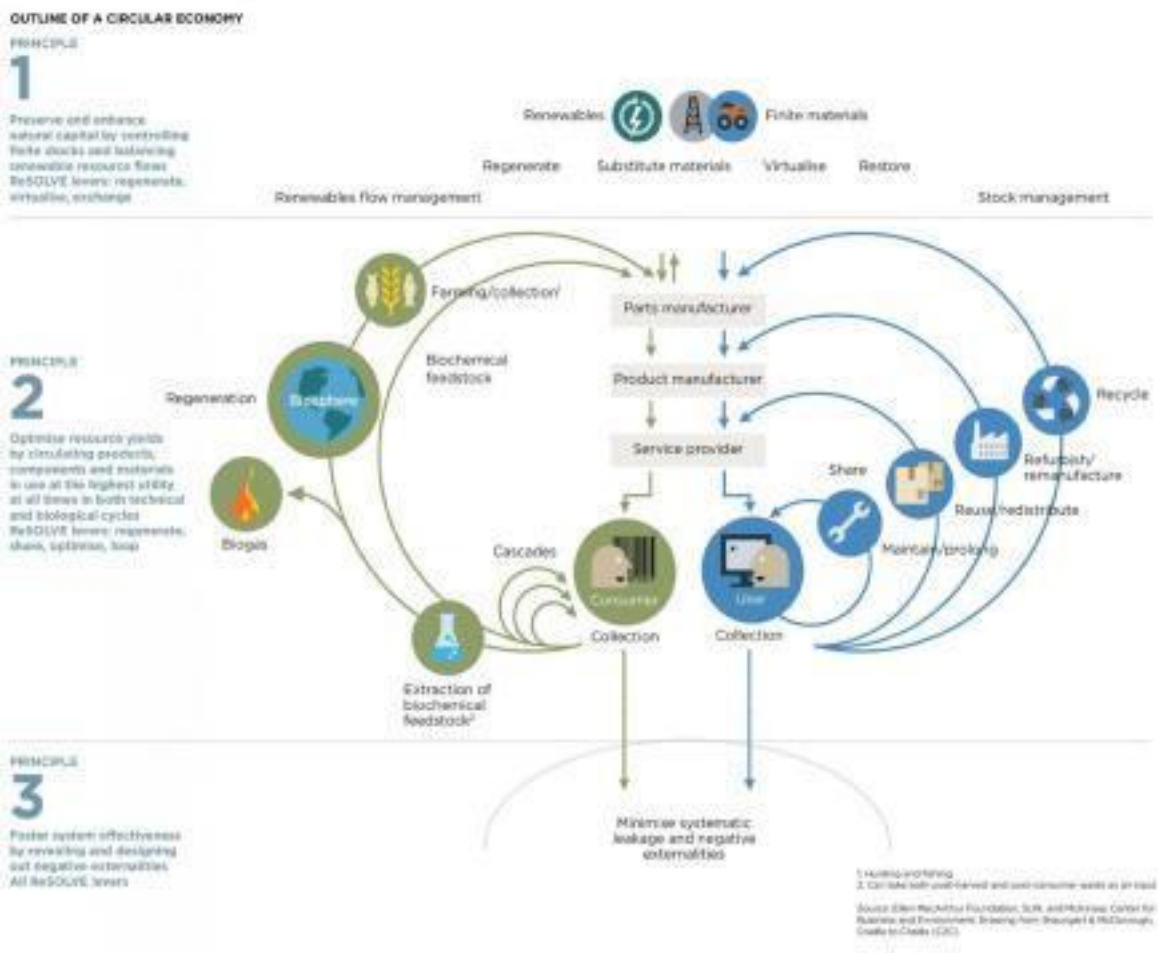
Nowadays, the production system of consumption and, especially, of waste, recovery and recycling is based on the linear model. In this model **"linear"** refers to the flow of natural resources, and it recalls a "take-make-waste" process. Using this model, the environmental impact is disregarded and products at the end of their life are dismissed instead of reused in the production process. When there are lots of resources at a discrete low price and the environmental impact is minimal, the actual linear approach of demand satisfaction may lead to excellent results. However, because of the increase of population and wealth, the availability of non-renewable resources cannot keep up with the demand. Actually, the economic system is unsustainable.

The fundamental weakness of linear growth model is its inability to extend the life cycle of a product and to ensure that its components maintain the same value as at the origin of production process. It is a model in which there is a waste of value, materials, energy and workforce. In order to satisfy the increasing global demand, world requires a new growth model that ensures a higher productivity of resources. This model is **circular economy**.

The idea of the circular economy has been around for a few years, but only recently has it gained some global momentum. To quote from the very informative Ellen Macarthur Foundation website: "A circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times. The concept distinguishes between technical and biological cycles".[2] The circular economy model is designed to be "instantly repairable". The used materials are of two types: renewable biological materials, and non-renewable technical materials.

2. https://www.ellenmacarthurfoundation.org/circular-economy/overview/concept, 20/11/2017, 15.30

FIGURE 1. – The Butterfly Diagram



SOURCE: Image https://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram, the 20 November 2017, hour 14.15

The so called **"Butterfly diagram"** illustrates the continuous flow of technical and biological materials through the 'value circle'. At its core, a circular economy means that products no longer have a life cycle with a beginning, middle, and end, and therefore contribute less waste and can add value to their ecosystem. When materials stop being used, they go back into a useful cycle, hence the circular economy according to the fact that everything was designed to be restorative and regenerative.

As illustrated in the chart above, we can see how, technological and biological nutrient-based products and materials, cycle through the economic system, each with their own set of characteristics.

Furthermore, circular economy is based on some simple principles. First of all, it aims to design garbage thanks to products implemented and optimized for a cycle of disassembly and reuse. Benefits are not only operational, but also strategic for industries and clients because they nourish efficiency and eco-innovation. Tight cycles of components and products distinguish circular economy from mere disposal and recycling, that are processes in which there is a consistent loss of energy and work.

Second, circularity introduces a strict differentiation between consumable and durable components of a product. **Consumables** are made by biological ingredients that can be safely given back to biosphere. On the other hand, **durable materials** (as computers or engines) are unsuitable for biosphere, so they are designed from the beginning in function of the reutilization.

Third, the energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase systems resilience.

These principles all drive four clear-cut sources of value creation that offer opportunities and ways to take advantage of the price difference between used and virgin materials:

- **Power of the inner cycle**: minimizing comparative materials use. The tighter is the circle, the less a product has to be changed in reuse and remanufacturing and the faster is the return to use, the higher the potential savings on the shares of material, labor, energy and capital still embedded in the product;
- **Power of circling longer**: maximizing the number of consecutive cycles and the time in each cycle. Each prolonged cycle avoids the material, energy and labor of creating a new product or component;
- **Power of cascaded use**: diversifying reuse across the value chain;
- **Power of pure inputs**: uncontaminated material streams increase collection and redistribution efficiency while maintaining quality, particularly of technical materials, extends product longevity and thus increases material productivity.

Companies operating in a circular economy aim to create value by managing resources in an efficient mode. In fact, they create zero waste chains supplied by regenerative energy and natural resources are used in connected circuits. Industries that use the circular model as fundamental element of their growth strategies could achieve a competitive advantage called **"circular advantage"**. Separating growth from commitment of poor resources, companies could react to increase of prices, changes in supply and reduce environmental impact. Furthermore, this helps to create a new value proposition for customers in terms of: prices, availability, quality, performances and sustainability.

The operational principles to adopt in order to use a circular model are:

- **Design out waste**: garbage disappears from the productive cycle when biological and technological components are designed to get back in the cycle as biological materials;
- **Building the resilience through biodiversity**: industrial revolution and globalization used only natural processes that are unique and repetitive so that ecosystems are instable. Circular economy could manufacture products favorable for resilience;
- **Rely on energy from renewable sources**: use energies with low-entropy, as the sun, in order to lower the regeneration process;
- **Systemic thinking**: elements are considered in relationship with its infrastructures, the environment and its social context. This way of thinking allows to understand evolutionary and regenerative processes instead of restricting the attention on short time effects;
- **Waste is "food"**: waste has to be considered as something that could always return in different forms in the productive process. Moreover, when it is not reusable, industries must try to restrict its production as less as possible.

There are many factors that are feeding the success of companies that are using circular economy but all starts from evaluating options, create the right external environment and expand the ecosystem.

First of all, choosing the **right business model** and the correct **strategy implementation** is essential to make a successful switchover to circular economy. In order to succeed, industries have to understand how it employs resources. Moreover, they have to know in which points of the value chain there are wastes in production, usage and disposal processes. The main goal is to create a firm "future-proof" compared to impacts on revenues, costs, risk and reputation. This goal is reached in two ways: "dropping" growth from limited resources and ensuring that revenue flows are linked to the new circular model.

Secondly, industries have to create the **right external environment**, i.e. they have to introduce some enablers that offer services and capacities more efficiently. Facilitators help firms to reduce time, costs, complexity and risks during the implementation of a new business model. They could offer different type of services as management of supply chain, crowd shipping, design of products that are more efficient and recyclable, platforms in support of circular activities and financial services that facilitate adoption of circular models.

Thirdly, industries that will adopt a circular model must **expand their ecosystem** through the involvement of ranges of customers, suppliers and key partners. The scope of ecosystems based on circular economy can get from local optimization to global cooperation: it depends on the product or service on which it is based. Moreover, in a circular ecosystem, clients interact either with producer or with its partners along the whole lifecycle of the product. This means that that the relationship between producer and consumer changes and there is the opportunity of a greater and more permanent loyalty.

1.2. Circular Economy and Eco-Innovation

The industry cannot avoid to innovate; over the centuries we have seen a series of industrial revolutions that have changed the structure of companies. Innovation is synonymous of mistrust, very often companies, even the large ones, are led to "fear" the new innovative processes because of habit and tradition that led them to success. On the other hand, innovation brings with it many positive sides since in a modern world, companies cannot stand still and watch technologies become.

With the current linear model, we have reserves for only a few years more of many of the materials on which technology is built. Since the world's population is growing and is consuming more and more, we have to remember that our resources are finite, so we have to change the way we do things before resources run out. If we want to fully reach some kind of Fourth Industrial Revolution, we must first pass through a circular economy model, so we need new industrial policies, new investment criteria and new business models. Companies both large and small can make a big impact with circular models across multiple sectors. And the opportunity is one of massive growth. By simply shifting from today's model of "take, make, waste" the global economy could unlock $25 trillion of otherwise lost revenue by 2050.[3]

The growth of the industrial sector and the circular economy have to develop at the same time because it both represent an enormous opportunity for European and world's economy. The development of industries provides to circular economy, eco-innovations and technologies to become more efficient and effective in waste management, design of sustainable products and in extending the life cycle of products, in order to reduce environmental risk, pollution and other negative impacts on resources use. Vice versa, circular economy can be the best business model to reach a competitive and economic advantage, allowing a delinking between economic growth and environmentally harmful factors.

As Shafik and Bandyopadhyay state: "It is possible to 'grow out of' some environmental problems, but there is nothing automatic about doing so", and if we want to fully reach a circular

3. https://waste-management-world.com/a/entrepreneurs-key-to-circular-economy-success, 29/11/2017, 21.40

economy model, we need new industrial policies, new investment criteria and new business models.[4]

Chapter 2 – Circular Economy in Europe

2.1. European Regulatory Framework

Policies, considered as all government actions that affect the industry and promote the change towards circular economy, to be more efficient and effective and to obtain a better coordination, have to be adopted at the European level. Janez Potočnik, co-chair of UN International Resource Panel and former European commissioner for the environment said:

"We need a strategy strong enough to decouple Europe's economic growth from natural resource use, because our future competitiveness depends on it. An action plan of initiatives in Brussels will help, but will not lead to systemic change. The framework must be set for coherent actions by member states, and above all for the private sector to invest in the right direction. Systemic change is possible only if the circular economy concept is fully accepted in all policy areas and integrated in the economic governance process. [...] I particularly hope that the new proposals will deal effectively with waste prevention, including food waste".[5]

Businesses today are willing to move ahead faster, implementing and consolidating a circular economy process instead of the linear one, until perpetrated today, but they are not getting strong signals from customers, investors and especially from policymakers to accelerate change. CEO's are looking for governments to get more involved in removing barriers, because policy plays a critical role in the growth of circular economy markets. According to the study of the Italian Foundation Accenture, three elements should be combined[6]:

- Financial incentive for companies;
- Regulation to discourage waste generation;
- Information and infrastructure to facilitate circular resource flow.

Current regulations give the linear growth model an unfair advantage by making it more financially attractive to grow by expanding resource use. These two kinds of models must give to industries equal treatment in terms of taxation, funding and financial attractive, and to do that policymakers have to support circular principles.

Talking about taxation, they need to be developed for an economy where resources move from one lifecycle to the next, and at the same time the governments also should provide real incentives for firms.

So, essential is the role of political institutions and government to facilitate this transition; This is why the Action Plan presented on the 2nd December of 2015 by the European Commission

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[4] Shafik N., Bandyopadhyay S. (1992), *The Virtuous Vice: Globalization*, Siamack Shojai, p.165

[5] https://www.theguardian.com/sustainable-business/2015/jun/30/the-european-circular-economy-package-expert-opinon, 27/11/2017, 12.30

[6] Lacy P., Rutqvist J., Lamonica B. (2016), *"Circular Economy: dallo spreco al valore"*, EGEA spa - Fondazione Italiana Accenture

is of great importance. The Plan is a package of proposals for a Directive of the European Parliament and of the Council:

1. Amending Directive 2008/98/EC on waste;
2. Amending Directive 1999/31/EC on the landfill of waste;
3. Amending Directive 94/62/EC on packaging and packaging waste;
4. Amending Directives 2000/53/EC on end-of-life vehicles, 2006/66/EC on waste batteries and accumulators, 2012/19/EU on waste electrical and electronic equipment.

The Guidelines cover all the management involved at the end of life products, but the proposed changes, relying on the principle of extended producer responsibility, embrace the entire lifecycle of the product, so as to complete it.

The package of measures proposed is rather complex and key actions include:

- Funding to over 650 million euro from the Horizon 2020 fund and 5.5 billion euro from structural funds;
- Actions to reduce food waste with the aim of reducing to half by 2030;
- Development of quality standards for secondary raw materials obtained from recycling;
- Measures for the eco-design that promotes reparability, longevity and recyclability of products, as well as energy efficiency;
- Review of its regulations about fertilizers;
- Strategy for plastics that addresses issues related to recyclability, biodegradability and presence of dangerous substances;
- Actions aimed at water reuse.

The proposal also foresees the achievement of a recycling rate equal to 65% for municipal waste, 75% for packaging waste and the landfill ban of more than 10% of the waste by the year 2030.

The proposed actions will contribute to "closing the loop" of products lifecycle through greater recycling and reuse, and bring benefits for both the environment and the economy.[7]

2.2. How to enhance the EU package

As said before, the recent trends suggest that the consumption and the production in large-scale has become unsustainable form the environmental and economic perspective. In 2014 the amount of municipal waste in EU generated per person was 475 kg and form this only 28% was recycled, 28% landfilled, 27% burned and 16% composted. [8] This trend is obviously alarming especially in Europe.

The Action Plan aims to stimulate Europe's transition towards a circular economy to boost global competitiveness, foster sustainable economic growth and generate new jobs. It gives a clear signal to economic operators that the EU is using all the tools available to transform its economy, opening the way to new business opportunities and boosting competitiveness.

Together with the Action Plan, the Circular Economy package aim is to promote re-use and stimulate industrial symbiosis, as well as economic incentives for producers to put greener products on the market.

[7] http://ec.europa.eu/environment/circular-economy/index_en.htm, 19/11/2017, 17.50

[8] http://ec.europa.eu/eurostat/statistics-explained/index.php/municipal_waste_statistics 12/12/2017 15.30

Especially the Environmental Fiscal Reform provides the perfect conditions for the transition to a circular economy thanks to green taxation, VAT reduction and tax breaks for green initiatives. Consumers but also European businesses can benefit from these instruments, at the same time, can help the implementation of these new policies, because of course there are some "challenges to implementation" like:

- Lack of transparency throughout the value chain;
- High transition costs especially in the initial phase;
- Multi-level governance approach needed with different administration working in synchrony on different policies areas;
- Different business models and consumer behavior required;
- Current pricing system does not encourage resource reuse and does not reflect environmental costs of production and consumption.[9]

In the last year the European Commission has taken measures in areas such as waste, eco-design, food waste, organic fertilizers, and innovation and investment. Circular economy principles have been gradually integrated in industrial best practices, green public procurement, or in the use of cohesion policy funds, nonetheless the legislative packages presented in 2015 are still in discussion at the European Parliament and Council.

The Commission proposed, also, a targeted improvement of legislation on certain hazardous substances in electrical and electronic equipment. [10]

Circular Economy, as we will see in the next chapter, can incentivize employment and spur growth due to the labor-intensive activities (repair, research, development…). So, this is a better solution in all perspectives, because in this way we can incentivize greener services and innovations instead of increasing the cost of natural resources and pollution as well as decreasing the cost of labor.[11]

[9] Anatasio M., (2016), *The Circular Economy: Practical steps to enhance the EU package*, Green Budget Europe.

[10] http://ec.europa.eu/environment/circular-economy/implementation_report.pdf, 12/12/2017, 17.00

[11] http://ec.europa.eu/environment/integration/green_semester/pdf/Session_report_5-4.pdf 12/12/2017, 17.00

Chapter 3 - A green, economic opportunity

3.1. Green Industrial Policy

"Green growth can be defined as a trajectory of economic development that is based on sustainable use of non-renewable resources and that fully internalizes environmental costs, including most critically those related to climate change. Green growth requires green technologies: production techniques that economize on exhaustible resources and emit fewer greenhouse gases. The availability of green technologies both lowers social costs in the transition to a green growth path and helps achieve a satisfactory rate of material progress under that path. A critical task facing policy-makers is to ensure investments in green technologies take place on an appropriate scale".[12]

According to Rodrik's definition, we can say that green growth has generated the idea that policies that promote environmentally friendly technologies are advantageous. In fact, such policies provide technological capabilities, economic benefits, competitive advantage in global markets and jobs.

The greening of industries requires effective and coordinated governance regimes to champion and support the implementation of green industry policies and initiatives. Clear government commitment needs to come from the top, with supporting leadership throughout the public sector.

Governments can support the greening of industries through effective policy development and implementation. Consultation with business and other stakeholders is imperative during all policy development processes and governments can establish consultative bodies or task forces which may include representatives from the community.

Governments can positively influence the internal decision-making processes within enterprises through policies and incentives that promote improved production efficiencies and environmental management. Long-term partnerships between governments and business are important in fostering improved efficiencies and environmental management.

We can easily point out four important pillars of green industrial policy that are important to promote a green growth and develop the right environment to construct a circular model of economy.

The four pillars are:

1. **Integrated framework to support the greening of industries**: policy and institutional integration is fundamental, and this can be supported by clear processes for include environmental, social, and economic goals in industries. Policy integration might take place both "vertically" between different levels of government, and "horizontally", between different sectors of government;
2. **Creating an enabling environment**: financial institutions are important for supporting new business opportunities and for the development and distribution of new technologies. Governments can use environmental financing as an instrument for promoting resource efficiency measures through financial institutions or independent funds. Demand conditions play an important role in stimulating new market opportunities, and improving environmental practices among firms. The greening of

[12] Rodrik D., *Oxford Review of Economic Policy*, Volume 30, Number 3, 2014, pp. 469–491

industries is encouraged through supporting local communities that are well educated about the environmental, social, and economic benefits of resource efficiency, cleaner production, and responsible life cycle analysis. education and training for resource efficiency should be undertaken as a continuing commitment throughout the educational curriculum;

3. **Supporting industry-led initiatives**: industry-led initiatives such as eco-labelling, Environmental Management Systems (EMSs), standards, corporate social responsibility and environmental accounting can be promoted by governments through incentives and funding support. Policies should be designed to promote pro-active actions, rather than providing a means of avoiding compliance. Governments can promote responsible life cycle analysis through initiatives such as extended producer responsibility and through standards and assessments required for green supply chain networks;
4. **Exploitation of environmental technologies**: science and technology plays a vital role in encouraging manufacturing industries towards using sustainable patterns of production and economic growth. Since the most developing countries make technological advancements by adapting and adopting pre-existing technologies, government assistance programs should facilitate both the absorption and diffusion of new technologies. Governments can facilitate knowledge transfer and the diffusion of environmental technologies through infrastructures such as science parks, clusters, incubators, global networks etc. Financial support instruments, such as Research & Development (R&D) grants, tax-breaks, and venture capital funds are important for supporting the development and widespread use of environmental technologies.

Moreover, in order to favor green growth in circular economy it is necessary to overcome some important barriers that cause loss of efficiency in terms of lack of waste exploitation and pollution. These causes may cover all the actors involved in the management of material flows that cross the life cycle of products and services that are on the market:

- **Informative asymmetries**: producers and consumers often do not have knowledge about the environmental impact caused by some products/services or underestimate them;
- **Business priority**: usually business strategies focus on short term objectives and not on long term ones, as environmental performance improvement;
- **Market barriers**: all productive sectors suffer from a strong distortion in product price, that cannot reflect costs related to environment impact of production sectors where they originate. So, it happens that firms who pollute more, sustain lower costs (because they do not invest in innovation) and can fix lower prices for their products. This shall ensure them better competitive performance and more attractiveness for consumers;
- **Habits and culture**: purchase habits and consumer culture have an important role in assessing the possibilities of reuse and recycle products that could succeed on the market;
- **Geography and infrastructural development**: big distances and extension of geographical boundaries impede and obstacle the handling and the management of products backwards in supply chain;
- **Technology**: there are limits to the speed with which innovation rate develops and to substitution of technologies, and these factors lead to a low recovery of raw materials rate;
- **Regulamentation**: often there are normative limitations that make it difficult to close cycles and to have circularity of industrial processes.

These external barriers distract potential resources to the circular model but there are some **green internal policies** that each business could implement in order to favor circularity:

- **Circular chain**: this type of practice offers access to inputs that are fully renewable, recyclable or biodegradable in substitution to them linear. Products with biological nature, called also biological nutrients, could substitute toxic and non-renewable inputs and, after use, they degrade safely in a natural environment. On the other hand, synthetic nutrients can be reused and recycled indefinitely without loss of resources along the value chain and resources are not contaminated. The matter is to create something that will have a value and whose production will have an economic sense;
- **Recovery and recycle**: firms have to search value not only when considering final products, but in all material flows that pass through its activities. According to this internal green policy, all what was previously considered waste, is now reintroduced for other uses. Recovery chains of resources turn waste into value through recycling and upcycling. Furthermore, by using new technologies and bidirectional supply chains, firms could recover almost each issued resource as output at a level that is equivalent to the initial investment. In fact, this model eliminates losses of materials and maximizes the economic value of return, because it makes favourable for companies to produce big volumes of by-products that could be recovered and reworked at low costs;
- **Extension of product life**: by stretching the useful life of a product by generating turnover through longevity instead of volume. This policy aims to focus on characteristics of products as the ability to last, quality and functionality. Obviously, this type of products need an initial investment that is huger and this could represent a barrier for producers and consumers. Nevertheless, the solution could be the change of the revenue model;
- **Sharing platform**: in other words, to offer a platform in order to connect owners of products with individuals interested in using them. Instead of accepting that products remain unused, the platform increases their productivity by allowing shared access or co-ownership. The creation of a platform allows more clients to use same resources and to increase consumption without producing something new. In addition, the benefits obtained by clients are flexibility and availability because they are able to have access to thousands of products with different prices and places;
- **Product as a service**: Companies maintain the property of the product and offer it to one or more clients in the area of the so called “product service system”. In other words, companies offer the tangible product and the services necessary to maintain it in use through the phases of design, use, maintenance, reuse, regeneration, recycle. All this is made in strict relationship with clients that become “users” instead of “consumers” of a product.

3.2. Growth Opportunities of Circular Economy

While developing, countries need to expand their industries, unsustainable economic growth is resulting in resource depletion and severe environmental degradation. In many countries, production and consumption patterns are outpacing the renewal capacity of natural resources and the capacity of local governments to manage waste products. The greening of industries by governments is a proactive way to decouple environmental pressures from economic growth.

Given that we are still at the beginning of a journey to circularity, and assuming that we can identify profitable new options to establish circular setups we believe that a substantial scale-up from

the current starting position is possible and in fact highly likely. Eliminating waste from the industrial chain by 'closing the loop' promises production cost savings and less resource dependence. The benefits are not merely operational but also strategic, not merely for industry but also for users, and not merely a source of efficiency, but also a source of innovation and growth. The potential identified so far represents only a small fraction of what could be possible if circular business models were to be applied at scale.

In the following section, we will therefore explain how economies, companies, users and consumers will take advantage from this model.

From an economic point of view, the opportunities of circular economy are:

- **Increase in the disposable income**: the circular economy scenario could increase the disposable income of an average European household through reduced cost of products and services and a conversion of unproductive to productive time. This could result in increased consumption and thereby higher GDP growth. Today's disposable income of an average European household could increase as much as 18 percent by 2030 and 44 percent by 2050 in a circular scenario, compared with 7 and 24 percent in the current development scenario. European GDP could increase as much as 11 percent by 2030 and 27 percent by 2050 in a circular scenario, compared with 4 percent and 15 percent in the current development scenario, driven by increased consumption due largely to correcting market and regulatory lock-ins that prevent many inherently profitable circular opportunities from materializing. Thus, in a circular scenario, GDP could grow with 7 percentage points more by 2030 than the current development path and could increase the difference to 12 percentage points by 2050[13];
- **Innovative economy**: adopting more circular business models would bring significant benefits, including improved innovation across the economy. While the exact GDP implications of more innovation across an economy are difficult to quantify, the benefits of a more innovative economy include higher rates of technological development, improved material, labour, and energy efficiency, and more profit opportunities for companies;
- **Job creation**: a move toward a circular economy could potentially create moderate benefits, either in terms of job growth or employment market resilience, in fact, 500,000 jobs are created by the recycling industry in the EU, and this number could well rise with circular economy;
- **Environmental advantage**: circular economy could be a strong decoupling force, decrease Europe's consumption of virgin resources (e.g. for steel, concrete, energy, water, and other commodities) and CO2 emissions could drop as much as 48 percent by 2030 and 83 percent by 2050, compared with 2012 levels.

The circular approach offers developed economies an avenue to resilient growth, a systemic answer to reducing dependency on resource markets. It also provides a means to reduce exposure to resource price shocks and mitigates the need to absorb disposal costs — which consist of the loss of environmental quality and the public costs for treatment that is not paid for by individual companies.

Beyond its fundamental value creation potential over the next 10 to 15 years, a large-scale transition to a circular economy promises to address fundamentally some of the economy's long-term challenges. Improved material productivity, enhanced innovation capabilities, and a further shift from mass production employment to skilled labour, are all potential gains that will significantly increase the resilience of economies. They will also provide fundamental changes that would make it harder to revert back to the troubles of a linear 'take-make-dispose' based economy. Importantly, with its greatly reduced material intensity and a production base that is largely running on renewable sources of energy, the circular economy offers a viable contribution to climate change mitigation and fossil fuel independence.

[13] http://dynamix-project.eu/sites/default/files/Session%204_3_Ekins%20_Modelling_RE_reflections.pdf, 5/12/2017, 18.00

Talking about companies, they are set to win in two ways. On the one hand, the circular economy will offer new profit pools in building up circular activities. On the other, the benefits of the circular economy will address a number of the pressing strategic challenges of today's businesses.

The main drivers of growing opportunities of companies are:

- **Collection and reverse logistics**: are an important part of any system aiming to increase material productivity by ensuring that end of life products can be reintroduced into the business system. Logistics service providers are increasingly looking at reverse logistics as an attractive stand-alone business;
- **Product remarketers and sales platforms**: are rapidly expanding and growing into substantial enterprises, facilitating longer lives or higher utilisation for goods. The omnipresence of network technologies and social media is reducing distribution cost for providers of sales and remarketing services;
- **Material recycling systems**: they typically take the form of regionally structured multi-user organisations or of specific companies. Both group and single-company solutions require a standard purity level suitable for high-quality recycling processes. Consequently, the market has generally developed into regionalised, specialised players with natural barriers to growth beyond their starting footprint;
- **Financing**: individual companies and groups of companies will need not only support with change-in-ownership models but also funding for R&D and new technologies. As in the linear economy, the financial sector has an important role to play in the circular economy;
- **Less product complexity and more manageable life cycles**: providing stable, and reusable product and treating other parts of the product as add-ons (such as software, casings, or covers) enables companies to master the challenge of shorter product life cycles and to provide highly customised solutions;
- **Innovation boost due to system redesign/rethinking**: any increase in material productivity is likely to have an important positive influence on economic development beyond the effects of circularity on specific sectors. Circularity as a 'rethinking device' has proved to be a powerful new frame, capable of sparking creative solutions and boosting innovation rates;
- **Improved customer interaction and loyalty**: instead of one-time transactions, companies can develop life-time service relationships with their customers. With 'consumers' of durable goods now becoming 'users', companies will have to evolve as well. New long-term customer relationships will be vital to smooth the processes of providing maintenance, product upgrades, and other product-related services, and coaxing customers to return products at the end of each usage cycle.

Moreover, referring to users' and consumers' opportunities, the net benefits of a closer loop are likely to be shared between companies and customers. Advantages extend to reduced costs of obsolescence, increased choice, and secondary benefits:

- **Reduced obsolescence** with built-to-last or reusable products will improve budgets and quality of life. For the customer, overcoming premature obsolescence will significantly bring down total ownership costs and deliver higher convenience due to avoiding problems associated with repairs and returns;
- **Choice** is increased as producers can tailor duration, type of use, and product components to the specific customer. Looking at the world from a circular design perspective will allow to further segment our customer base to provide better service at more competitive cost;

- **Secondary benefits** according to the fact that customers will also benefit from the drastic reduction of environmental costs associated with circularity.

Circular economy seems to hold much promise for Europe but would require abandoning many beliefs formed under the old economic paradigm. The circular paradigm offers resource independence, innovation, employment, and growth but, navigating the transition remains a formidable leadership challenge at many levels of society.

3.3. The effects of the Circular Economy on the job market

Researcher are trying to study how will change the job market, what professions will be required and what will pass away. From the research "The Future of the Jobs" exhibited at the World Economic Forum comes to light that, in the following years, technological and demographic factors will deeply influence the evolution of the job. Some, as cloud technology and the increase in flexible work, are already affecting this market and will affect it more in the next 2-3 years. The effect will be the creation of 2 million job positions, but, at the same time more than 7 million positions will disappear, with a net balance of 5 million. According to the research, this loss will be compensated by financial area, management, information technology and engineering. Consequently, abilities and skills required are changing: in 2020 problem solving, creativity and critical thinking will be the soft-skills more required.[14]

High and uneven unemployment is one of Europe's most pressing socioeconomic issues. Unemployment rates across Europe have averaged 10 per cent or more for the past three years, and the imbalance within and between countries is a source of significant political tension. However, the discrepancies reveal a structural mismatch in the labour market, which means that high unemployment is likely to persist, even as economic growth returns. Eliminating structural mismatch requires not just boosting the economy or creating more jobs, but aligning job creation with the types and areas of employment where unemployment is highest.

Less visible or discussed, but equally problematic for labour market economics, are differences in unemployment rates between occupations. "Across the EU28, 'managers' have an unemployment rate of 4.13 percent while 'elementary occupations' have 21.39 per cent unemployment"[15]. "By 2030, mid-skilled, mid-wage jobs are projected to decline due to growing mechanisation and offshoring. But around 90 percent of circular economy jobs created in these vulnerable occupations will last at least a decade, offering good employment prospects for a group with an otherwise uncertain future".[16]

The distributed nature of circular economy activity lends itself to geographically dispersed job creation. While new "servitization" jobs are more likely to be concentrated in cities, repair and recycling jobs are likely to be seen in all parts of the country, and growth in remanufacturing could create new opportunities in former manufacturing areas. Different circular economy activities also offer opportunities at different skill levels.

The circular economy itself is a source of technological innovation. New recycling, remanufacturing and biorefining techniques, as well as business model innovations like "servitization", may see labour market requirements change in the long term, but circular economy industries are likely to provide good quality employment for the foreseeable future.

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[14] http://www3.weforum.org/docs/WEF_Future_of_Jobs.pdf, 30/11/2017, 10.30

[15] https://www.researchitaly.it/uploads/14174/Bioeconomia_%20Unemployment%20and%20the%20Circular%20Economy%20in%20Europe.pdf?v=f9b7468, 30/1/2017, 11.00

[16] Coats E., Benton D., 2015, *Unemployment and the circular economy in Europe*, Green Alliance and J Morgan & P Mitchell, 2015

Currently, it's estimated that there are 3.4 million people employed in circular economy jobs such as repair, waste & recycling and rental & leasing sectors across the European Union. Expansion in circular economy potentially offers employment opportunities in all Member States (large and small) and jobs that match the skills that are under supplied in the market. On the current development path, by 2030 expansion in circular economy in Europe could:

- create an extra 1.2 million jobs;
- reduce structural unemployment by around 250,000.

However, a transformational expansion in circular economy in Europe, by 2030 has the potential to:

- create an extra 3 million jobs;
- reduce structural unemployment by around 520,000. Liz Goodwin, CEO, WRAP said:

"Providing the bigger picture for the jobs potential from the circular economy for each individual Member State makes the case for the EU to adopt an 'ambitious' circular economy package even stronger. This added layer of detail is the missing piece of the jigsaw that shows how the circular economy supports the themes of the Commission's wider plan for job creation and growth. It's clear that many countries could see considerable benefits which could improve the jobs market, the economy, as well as the environment."[17]

The environmental benefits and cost savings of a resource efficient economy already provide ample justification for Europe to become more circular, but there are some social benefits too. Circular industries are well positioned to create jobs in occupations and regions with persistently high unemployment rates, and to contribute to cutting structural unemployment.

[17] http://www.wrap.org.uk/content/circular-economy-study-identifies-3-million-jobs-across-europe, 3/12/2017, 14.45

Chapter 4 - The shift has begun

4.1. 'Mainstreaming' the Circular Economy

Our economies are strongly locked into a system where everything from production economics to mindsets, favours the linear model of production and consumption. This lock-in, however, is getting weaker in the wake of powerful disruptive trends that will shape the economy for years to come.

First, resource scarcity and tighter environmental standards are here to stay and this perception is increasingly accepted by the business sector. In a 2011 McKinsey Quarterly executive survey, the number of respondents who pursue sustainability initiatives to reduce costs or improve operating efficiency was up 70% over the previous year. Also the investments in environment-related areas has increased dramatically, referring to a joint report by the World Economic Forum and Bloomberg, global investment in green business initiatives in 2010 alone totalled USD 243 billion, a 30% increase over the prior year. Given their superior resource performance, it seems likely that investments in circular businesses will be systematically rewarded over the 'take-make-dispose' ones.

Second, we now possess the information technology that will allow us to shift, for example we can trace material through the supply chain, identify products and material fractions, and track the product status and costs during its use period. Most importantly, there are social networks now that can mobilise millions of users around a new idea instantaneously—from motivating consumer awareness to facilitating concrete action.

Third we are witnessing a pervasive shift in consumer behaviour. For example, we can think about sharing economy. Organised car sharing is growing rapid and it t would replace the production of new vehicles. The list of 'shareware' extends beyond cars, however, and in some regions, even includes articles of daily use, such as bicycles, toys, musical instruments, and power tools.

Taken together, circular business design seems finally poised to move from the side-lines and into the mainstream. And yet some significant barriers must be overcome. What is needed for this revolution to take place?

- **Companies will build core competencies in circular design**: circular product (and process) design requires advanced skills, information sets, and working methods that today are not readily available;
- **Companies will drive business model innovation**: firms have to forget ownership; it will be performance that counts. Shifting consumer perception from products to performance, manufacturers are challenged to approach their products as 'resource depots' and the raw materials will remain available for future generations. Treating material usage as a service allows companies to benefit over time from improved material productivity and product longevity, which would not be rewarded in today's short- term price competition at the time of sale;
- **A transformational action is needed on the part of the corporate sector working jointly with government**: advancing the current taxation, regulatory, and business environment to support pervasive adoption of the circular economy will require joint effort to foster cross-

chain collaboration, develop collection systems at scale, redirect marketing efforts, provide education, and involve service industries (such as the financial sector);

While the above suggestions focus on the transformation of the economy, there are specific ideas worth pursuing as they are likely to drive benefits rapidly for the pioneers in the public and private sectors and might allow them to start on building a competitive advantage:

1. **Tightening circles along supply chain**: firms with strong influence and control over their current supply chains and those that exchange large volumes of products with a limited set of business partners could map out the leakage points of their current linear set-ups and apply their clout to move others in the chain towards tighter circular setups. For example, managing to convince suppliers to comply with its higher standards of non- toxicity and purity of materials, necessary to allow it to achieve higher recycling rates;
2. **Catch the wave at the start**: we are at the beginning and will see the formation of several new industries and product categories that will transform the economy by themselves. It is an opportunity to embed circular principles right from the design stage of the product, via material choices, through the establishment of service-based delivery models, right up to the optimised setups for circular reverse cycles;
3. **Activate (local) community**: as last-mile distribution, consumption, and disposal are typically local activities, communities should follow the example of municipalities which collaborated with the food retailing sector to introduce biological- nutrient-based packaging to increase the purity of communal food waste. Community members could rapidly establish local pilot applications of collaborative cross-sector participation to further provide tangible proof of concept and refining circular setups prior to national/international rollouts;
4. **Leverage individual and collective market clout**: there are many nascent ideas on how to innovate and serve users better in the future with new offerings based on circular business models. Individuals, companies, and customers can now fast- track adoption by exercising their right of choice to demand, take up, and—jointly with the provider—continually improve products and services. Governments can lend the full weight of their collective purchasing power to supporting circularity initiatives and de-risking the critical initial phase for pioneers;
5. **Build matchmaker businesses and profit from arbitrage**: there is plenty of low-hanging fruit for the first movers in adopting circular setups at a profit. For example, there are business models that aim to facilitate new relationships between the producers of material-based products and users simply interested in performance to establish a simple method for determining prices that gives both the users and the suppliers an incentive. They are capitalizing on the new transparency of the web and eroding transaction costs. This business model not only provides a profit stream but also boosts circular business.

4.2. A “Green” turning point in Ferrara

Within the Ferrara’s territory, we found an important reality that confirms how circular economy could be an efficient strategy that creates wealth for the entire society.

Our attention focused on a Social Cooperative called "La Città Verde". Its mission is to build and develop the welfare, providing quality services and products at a fair price. The Cooperative operates in green care, in waste management and recovery, installation and maintenance of urban furniture and social agriculture. Moreover, it creates employment opportunities, sociability and integration for people in need.

At the beginning, this agricultural Cooperative was created with the purpose of helping people with mental health and social problems, through rehabilitation programmes. These programmes focus on the Cooperative's core business that is the green care and the waste management. In 1996 they entered in the public register of waste shredders and one of their last success was the opening of an important composting plant in Bevilacqua.[18]

Industrial innovation, sustainable waste management, reuse and recycling: these are the peculiarities that led the Cooperative to win the title of "Champions of circular economy" given by Legambiente to the representatives of the most successful realities of Emilia Romagna.

We choose this example because the Cooperative puts into practice two of the main concepts of circular economy: recycling and waste management and job creation.

The problem of waste management has become more and more relevant due to consumption growth and progressive urban development. To this day, landfilling has represented the best solution. Nowadays, the European domestic policy proposes, above the reduction of waste production, the separate collection as an optimal alternative to mixed collection. The development of differentiated waste above reducing the volume of materials to be landfilled, contributes to manage waste treatment and to help the environment.

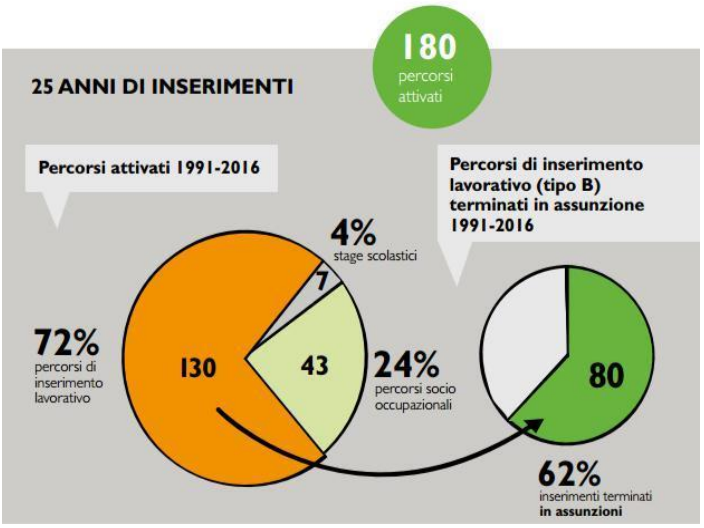
In our case study, the Cooperative deals with treatment and management of waste. The **treatment sector** consists of recovery of building discards that are reduced, separated and re-sold as second raw material. Moreover, they put in reserve non-hazardous waste with urban and industrial origin (cardboard, paper, glass, metals, wood, plastic). Meanwhile, the **management sector** consists of:

- Mechanical and by hand sweep of public and private areas;
- Door-to-door collection;
- Collection of bulky waste on the territory;
- Collection of hazardous waste with commercial, industrial and artisanal origin.

The second main concept of the mission of this Cooperative is the creation of job opportunities, especially for disadvantaged people. La Città Verde welcomes and plans (figure 3):

FIGURE 3. – Job opportunities of La Città Verde

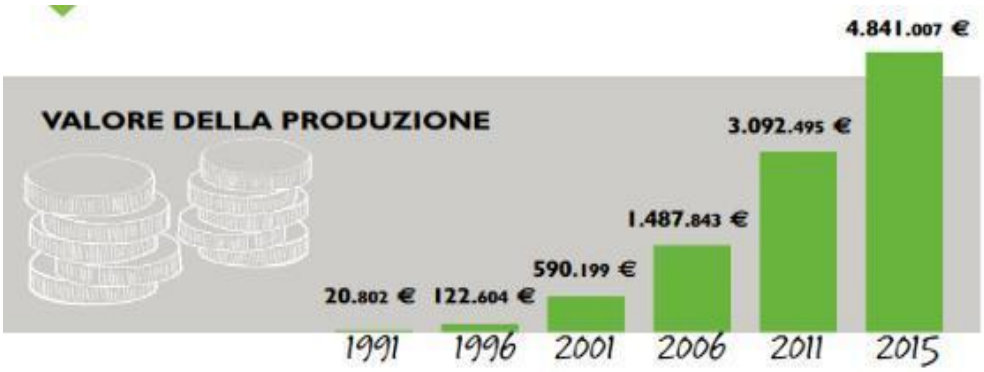
[18] http://lacittaverde.coop/, 5/12/2017, 10.20



SOURCE: http://lacittaverde.coop/wp-content/uploads/2016/11/pieghevole_bassa.pdf, the 6 of December, hour 14.00

- Educational internships for able-bodied and disadvantaged students;
- Socio-occupational paths which aim is to increase employer's level of autonomy, self-esteem and social integration;
- Paths of employment inclusion for people reported by territorial services with the aim of rehabilitation of social and employment competences.

FIGURE 4. – Production value of the Cooperative



SOURCE:http://lacittaverde.coop/wpcontent/uploads/2016/11/pieghevole_bassa.pdf, the 6 of December, hour 14.00

To conclude, we chose this social cooperative as an example, as it represents perfectly the success of the circular economy in our territory. In a reality where companies have to increasingly try to differentiate through the valorisation of new technologies and innovations, circular economy becomes the ideal model for creating added value and winning a key competitive advantage. This cooperative has managed to do exactly that.

As shown in the figure above, the Cooperative has experienced an exponential growth in its production value from 1991 to present. This is due to its ability to focus on a model based entirely on resource circularity that has led to offer to its customers an innovative and environmentally friendly service.

"La Città Verde" is a proof that, in our territory, circular models and the introduction of green policies could be efficient growth strategies that will advantage not only companies but also customers and the society as a whole.

Conclusions

Moving away from wasteful material consumption patterns could prove to be the start of a wave of innovation no less powerful than that of the renewable energy sector. It offers new prospects to economies in search of sources of growth and future employment. At the same time, it is a source of resilience and stability in a more volatile world. Its inception will likely follow a 'creative destruction' pattern and create winners and losers. As well as long-term benefits, the circular economy also offers immediate opportunities that are waiting to be seized.

The concept of a 'closed-loop' economy offers a promising avenue for corporate leaders to escape the trade-off between growth and resource protection, reconciling prosperity and sustainability. One element of the circular economy, however, seems largely undisputed: It helps to minimize the economic impact of resource scarcity. In light of history's most dramatic resource demand shock and emerging signs of scarcity, improving the productivity of materials and natural resources is a crucial competitive response at company level and **self-preservation reflex at market level.** For these reasons, governments and companies have started looking at the circular model not only as a hedge against resource scarcity but also as an engine for innovation and growth. This paper suggests that this opportunity is real and is opening a rewarding new terrain for pioneering enterprises and institutions.

'Nothing is impossible, particularly if it is inevitable'
Herman Mulder
Chairman of the Global Reporting Initiative

Sitography

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