

PRINCIPLES OF THE CIRCULAR ECONOMY

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Received: 31.03.2020 Accepted: 15.04.2020

Abstract

Sustainability has become a vital part of many business strategies in the companies, which has prompted growing interest in the circular economy. While the terms circular economy and sustainability are increasingly gaining traction with academia, industry, and policymakers, the similarities and differences between both concepts remain ambiguous.

The holistic view is fundamental to understanding the circular economy, which is not simply focused on using less. The circular economy aims to keep products, components and materials at their highest utility and value at all times. It is restorative and regenerative, and ultimately does reduce resource consumption. But it is also a classic economy in the sense that all activities are aimed at generating an economic benefit.

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Keywords: circular economy, principles, sustainability, circular economy model, green economy.

JEL Codes: A13, Q59

1. Introduction

The modern development of society is unthinkable without the cultural and creative industries. (Raya Madgerova, Vyara Kyurova, 2019, pp.104). Thus, the circular economy, through a creative approach, creates incentives for market participants to contribute to a more sustainable approach to natural resources. In essence, the circular economy seeks to replace today's linear, „take-make dispose“ approach to resources -

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where many materials are made into products, the products are used, and then the materials are thrown out. Ideally, in a circular economy, the materials are cycled constantly back through the value chain for reuse, resulting in less energy and resource consumption.

The concept of the circular economy comes from the idea that waste, once adequately treated, can become a resource again become a resource, thereby forming a loop in the production-consumption chain. Nevertheless, it is also a wide-reaching concept with a number of accepted meanings that should at present be analysed. The point is to ensure that economic activity consumes less natural capital than it can regenerate, by mobilizing all levers, from the most traditional (such as recycling) to the most innovative (and notably the digital technology and its many possibilities: sharing platforms, virtualization, 3D printing, etc.).

It is important to highlight certain essential characteristics of the circular economy and to specify what it is not. Firstly, the circular economy is not a shrinking economy. Its aim is to provide goods and services, sometimes new ones, to end-users, while minimising the impact on non-renewable resources and natural regulatory functions. Its objective is not to slow economic growth nor to diminish the benefits for end-users.

The circular economy is not synonymous with the concept of the frugal economy, which shares many essential characteristics with the circular economy even if they differ in some aspects. Both of them rely on the existence of profitable business models that allow industrial actors to invest and develop new types of value chain.

They both aim to be sources of innovation and growth. However, the circular economy also refers to heavy industry with huge capital expenditures, which is quite far from frugal models. Compared to a linear economy, which is primarily transactional, the circular economy encourages greater collaboration between economic actors. Even though some levers promote an economy based on short-loop and local recycling and reuse, as well as local manufacturing initiatives, certain economies of scale or global value chains can lead to more wide-reaching models.

There are many benefits associated with activating the various levers of the circular economy, both for the environment and for economic growth. It is a process of innovation and transformation of business models, which, despite having a very positive overall impact, could see both winners and losers, notably among companies whose value chain will be affected.

2. Principles of the circular economy

The fundamental constructs and constituent elements of circular business models can be derived from the main principles of the circular economy. In the literature, such components are understood and Sustainability 2016, 8, 43 6 of 28 defined variously, for instance: the ReSOLVE framework (regenerate, share, optimize, loop, virtualize,

exchange) (Ellen MacArthur Foundation and McKinsey Center for Business and Environment, 2015), ways of circular value creation (Van Renswoude, K., et al., 2015), normative requirements for business models (Boons, F., Lüdeke-Freund, F., 2013), and areas for integration (Laubscher, M., Marinelli, T., 2014).

The Ellen MacArthur Foundation of the above-mentioned definition is formed by **three principles**:

- 1) Natural capital preservation and enhancement,**
- 2) Resource yields optimization, and**
- 3) System effectiveness management.**

There are six business actions to implement the principles of the circular economy and which represent major circular business opportunities depicted by the **ReSOLVE framework** (Ellen MacArthur Foundation, 2015):

➤ **ReGenerate** - Regenerate signifies the shift to renewable energy and materials. It is related to returning recovered biological resources to the biosphere. Thus it aims to reclaim, retain, and regenerate the health of ecosystems.

➤ **Share** - Share actions aim at maximizing utilization of products by sharing them among users. It may be realized through peer-to-peer sharing of private products or public sharing of a pool of products. Sharing means also reusing products as long as they are technically acceptable to use (e.g., second-hand), and prolonging their life through maintenance, repair, and design-enhancing durability.

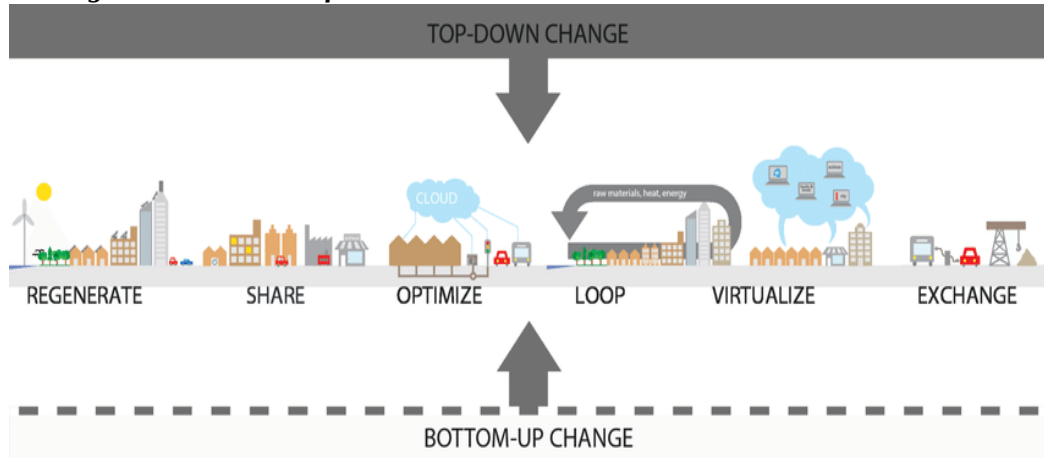
➤ **Optimize** - Optimize actions are focused on increasing the performance/efficiency of a product and removing waste in the production process and in the supply chain. They may also be related to leveraging big data, automation, remote sensing, and steering. What is important is that optimization does not require changing the product or the technology.

➤ **Loop** - Loop actions aim at keeping components and materials in closed loops. The higher priority is given to inner loops.

➤ **Virtualize** - Virtualize actions assume to deliver particular utility virtually instead of materially.

➤ **Exchange** - Exchange actions are focused on replacing old materials with advanced non-renewable materials and/or with applying new technologies (e.g., 3D printing). It may also be related to choosing new products and services (Ellen MacArthur Foundation, 2015).

Figure 1: ReSOLVE framework



Current economy follows the linear „take-make-use-dispose“ model. Raw materials are extracted and transported for manufacturing and turned into products. Products are then transported to consumers, used, and later discarded and eventually replaced by a newer model, causing enormous material and energy waste. The model is based on large amounts of easily accessible resources.

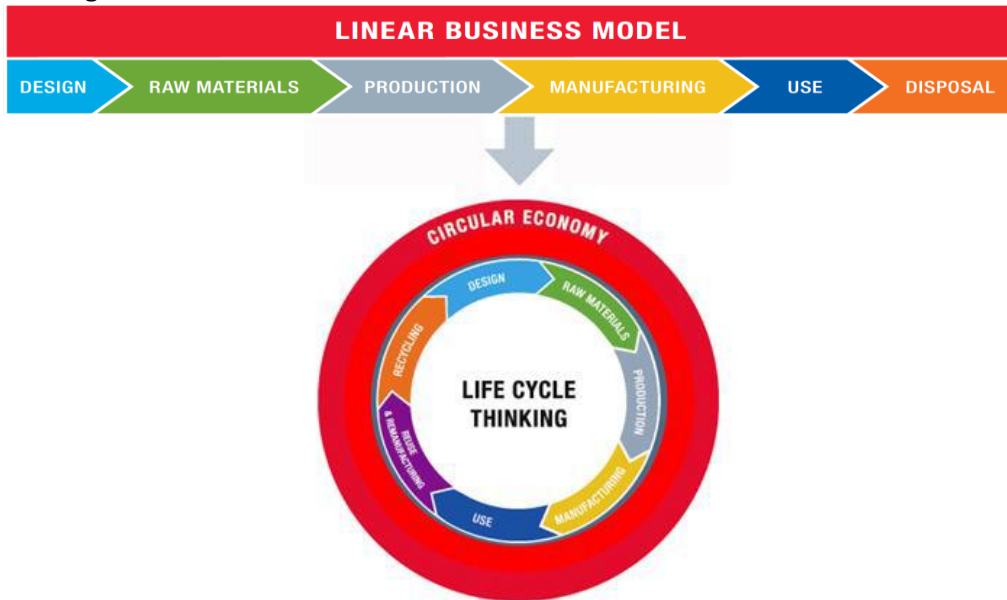
The green economy is based on renewable energy, bio-food, and the use of biodegradable materials.

Bioproducts have become a fashion, a symbol of health and a good intention. However, these products are usually affordable only for a small group of people, as their prices are too high. In actual fact, not all „green“ products are green. Most of them need to be transported long distances, so their carbon footprint is rather high. Also, some biodegradable ingredients are not grown sustainably, so their impact on the environment is rather debatable. For instance, the massive palm oil use in several industries during the recent years is not as environmentally friendly as it looks at first. Palm oil is biodegradable, however, the increased palm tree plantations are the detriment of the rain forest. According to Gunter Pauli, also renewable energy coming from solar and wind power plants are heavy tax burdens as they are dependent on subsidies. A new system, smarter and effective, is needed; a system, which would enable to supply healthy food, products and services to the majority of people in an affordable way (Pauli, G., 2010).

The green economy is connected with recycling. According to the Oxford dictionaries, „to recycle“ is the process of converting (waste) into a material by reusing it again or by returning material to a prior stage in a cyclic process. Recycling itself decreases the use of raw materials. All in all, it only slows down the natural resources' collapse; it does not prevent it. Recovering raw materials from products by recycling only

is not effective enough due to a high loss of value and energy. However, efficient recycling can be used for the transition period from the linear to the circular system.

Figure 2: Linear vs. Circular business model



Source: <http://www.worldsteel.org/steel-by-topic/life-cycle-assessment/Life-cycle-thinking-in-the-circular-economy.html>

To think circular means to pay attention to the product design at first, so that products are easy to dismantle, rebuild or refurbish and thus easily reused or recycled if needed. Conditionally, the price of these „re-activities“ needs to be competitive and, therefore, encouraging to abandon the current practices of buying a new product as the cheapest option.

In addition to the technical side the biological side also needs to be addressed. It concerns not only food and food waste but also the biochemical feedstock that can be extracted from the food waste and to be used as a renewable resource, which can substitute certain chemicals. It includes, for instance, the production of biofuels, renewable bioenergy, value-added biochemicals or plastics produced from renewable sugar sources of bio-feedstocks.

In a circular economy model, a consumer becomes just a user, not necessarily the owner of the goods. The shift from ownership into a service-oriented world is the key. Customers seek for a quality service, which is provided by the use of a product. For

instance, customers are interested in getting illumination; they do not necessarily want to purchase a bulb and a lamp.

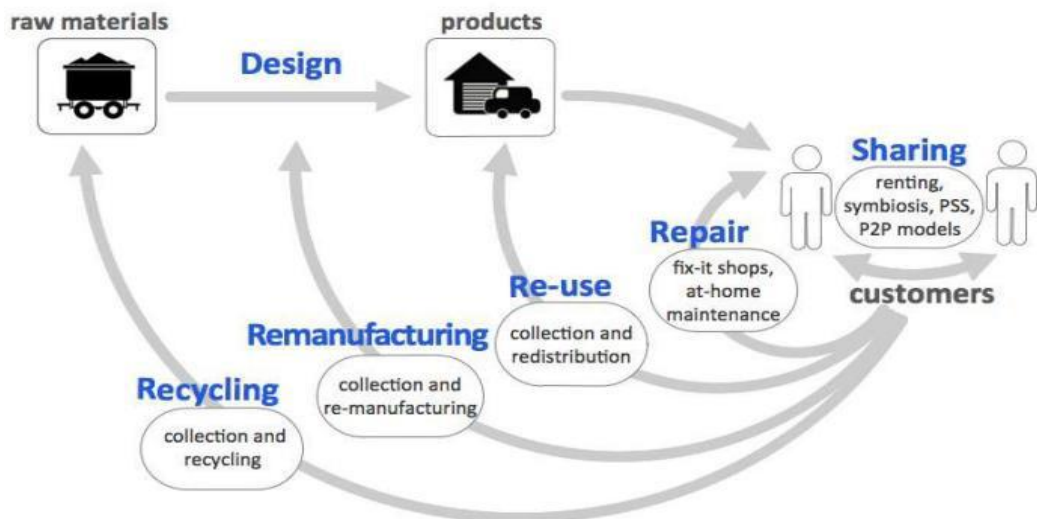
In the circular economy, the resources are allocated in an offered product or service, so its purpose and also the economic benefits are maximized. Then, the manufacturer turns into a service provider and there is an impetus to develop durable, long-lasting and easily repaired bulbs, in order to decrease their costs. At the same time, customers can benefit from high-quality products and services.

The change in manufacturer thinking will boost the innovative and creative product design, producing products that could be repaired, reused, remanufactured or repurposed. It is not anymore about a quantity, it is about a quality, the quality that lasts. The same could be applied to vehicles. Most of the time cars are not in use. We do not need a car, we need to get from place X to place Y, and so we can ask for mileage purchase instead (Kline, R.B., 2016). In general, selling products as services lets the manufacturers preserve resources embodied in the goods and subsequently secure the future own material (resource) supply.

The benefits of the circular economy are to:

- ✓ secure the future resources,
- ✓ to accelerate the regional employment of all qualification scales, and last but not least,
- ✓ to increase the living system resilience and to reduce the greenhouse gas emissions, particularly CO₂ by using renewable energy (Growth Within., 2015).

Figure 3: Technical cycle in a circular economy



Source: www.innovationseeds.eu/ImagePub.aspx?id=242392

Some authors (Van Renswoude, K., et al., 2015) identify similar ways of circular value creation, pertaining to the short cycle, where products and services are maintained, repaired and adjusted, to the long cycle which extends the lifetime of existing products and processes, to cascades based on creating new combinations of resources and material components and purchasing upcycled waste streams, to pure circles in which resources and materials are 100% reused, to dematerialized services offered instead of physical products and to production on demand.

Other studies identified four normative requirements for business models for sustainable innovation, grounded in wider concepts such as sustainable development (Boons, F., Lüdeke-Freund, F., 2013, pp.9-19):

1) Value proposition reflecting the balance of economic, ecological and social needs.

2) Supply chain engaging suppliers into sustainable supply chain management (materials cycles).

3) Customer interface, motivating customers to take responsibility for their consumption.

4) Financial model, mainly reflecting an appropriate distribution of economic costs and benefits among actors involved in the business model.

Boons and Lüdeke-Freund (Boons, F., Lüdeke-Freund, F., 2013, p.13.) also noticed that comparable conceptual notions of sustainable business models did not exist. Mentink (Mentink, B., 2014). used a similar approach to the business model as Frankenberger et al. (Frankenberger, K., et.al., 2013, pp.249-273), and outlined the changes of business model components needed for developing a more circular service model, such as:

- Value propositions (what?) - products should become fully reused or recycled, which requires reverse logistics systems, or firms should turn towards product-service system (PSS) and sell performance related to serviced products;

- Activities, processes, resources and capabilities (how?) - products have to be made in specific processes, with recycled materials and specific resources, which may require not only specific capabilities but also creating reverse logistics systems and maintaining relationships with other companies and customers to assure closing of material loops;

- Revenue models (why?) - selling product-based services charged according to their use;

- Customers or customer interfaces (who?) - selling „circular“ products or services may require prior changes of customer habits or, if this is not possible, even changes of customers.

Laubscher and Marinelli (Laubscher, M., Marinelli, T., 2014, pp.17-20) identified **six key areas** for integration of the circular economy principles with the business model:

1) **Sales model**-a shift from selling volumes of products towards selling services and retrieving products after first life from customers.

2) Product design/material composition-the change concerns the way products are designed and engineered to maximize high quality reuse of product, its components and materials.

3) IT/data management - in order to enable resource optimization a key competence is required, which is the ability to keep track of products, components and material data.

4) Supply loops - turning towards the maximization of the recovery of own assets where profitable and to maximization of the use of recycled materials/used components in order to gain additional value from product, component and material flows.

5) Strategic sourcing for own operations - building trusted partnerships and long-term relationships with suppliers and customers, including co-creation.

6) HR/incentives - a shift needs adequate culture adaptation and development of capabilities, enhanced by training programs and rewards.

One of the most important components of circular business models is the reversed supply-chain logistics. A comprehensive review on this subject has been done by Govindan, Soleimani and Kannan (Govindan, K., et.al., 2014, pp.603-626).

3. Conclusion

Today there is a growing recognition that traditional business models, built on the presumption of unlimited and cheap natural resources, must be reworked for 21st century realities. In the face of the global socio-economic and environmental challenges, governments and companies around the world are looking for alternative approaches to the current „take-make-waste“ economic model in order to drive future growth. This has led to the emerging debate about circular economy, which has been presented over the last years as one of the most promising alternatives. Through closing the materials loops, this economic model decouples growth from consumption of resources which are becoming scarce.

By adopting the CE principles in their businesses, companies can create multiple values and gain a competitive advantage. Closed loop supply chains can generate additional revenues by targeting new markets with an increasing demand (e.g. refurbished and remanufactured products) while reducing production costs through circular supplies (e.g. renewable energy) and resources recovery from discarded products. Beside the economic benefits, there are many intangible benefits arising from the adoption of more circular approach, such as improved green corporate image and enhanced customer differentiation and value through service-based model and closer collaboration. Therefore, companies embracing circular - thinking are building a sustainable competitive advantage.

In order to unleash the real benefits of a circular economy, strategic decisions have to be made by the strategic management, as adopting circularity in business requires a

fundamental rethink of the current industrial processes and implies the implementation of circular business model. In this regard, companies need fearless leadership that embraces and rewards the circular economy, a leadership that encourages not only consumers to alter their consumption from owning to using, but also stakeholders to co-design, co-create and co-own.

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