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Environmental Sustainability in Companies: The Circular Economy

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Abstract: *It is increasingly essential to raise awareness and to understand the Circular Economy and the 17 Sustainable Development Goals of the United Nations 2030 Agenda for Sustainable Development at the individual and organizational levels of society. The scope of this article comprises the main concepts derived from sustainable development, such as a Circular Economy model, based on the 2030 Agenda; covers the way they are applied and presented to society, focusing on different types of eco-innovation to promote competitiveness; covers the impact of the Coronavirus pandemic on the goals set by governments; and presents the case of the application of the model in the city of Porto, making it a city that moves towards the Circular Economy.*

Keywords: *2030 Agenda for Sustainable Development; Circular Economy; Environmental Sustainability; Eco-innovation and its types; Review of the 2030 Agenda post Covid-19.*

I. Introduction

The Circular Economy, as opposed to the linear economy, can be understood as a strategic paradigm of solutions at various levels of a society, contributing to a healthier overall system. From a macro perspective, it is essential to achieve at least 12 of the 17 Sustainable Development Goals (SDGs) proposed at the General Assembly of the United Nations (UN) [1].

Approved by a set of Governments and Citizens on September 25, 2015, this is a resilient economic model with different global challenges such as climate change, pollution from waste disposal, poverty and promoting prosperity and population wellbeing by 2030. One of the most prominent points of this proposal is the commitment between different social actors: citizens, educational mechanisms, businesses and the government.

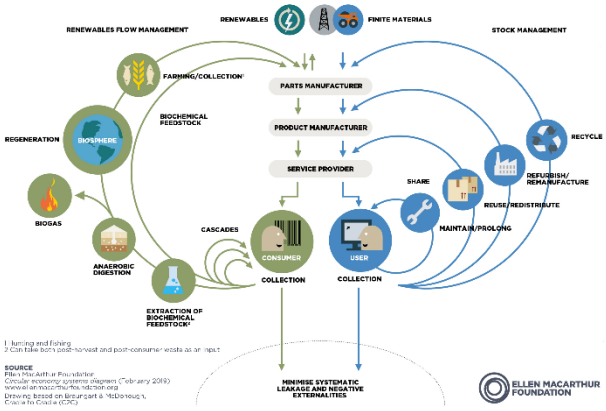
Figure 1 shows the 17 Sustainable Development Goals and Figure 2 shows the Circular Economy System Diagram.

Figure 01. 17 Sustainable Development Goals of the UN 2030 Agenda

Source: UN (2015).

In a general way, the Circular Economy is based on 3 fundamental factors: redesigning processes and products, optimizing the use of resources, and making use of digital technologies. "A circular economy seeks to rebuild capital, whether this is financial, manufactured, human, social or natural. This ensures enhanced flows of goods and services. The system diagram illustrates the continuous flow of technical and biological materials through the 'value circle'" [2].

Figure 02: Circular Economy System Diagram



Source: Ellen MacArthur Foundation (2022).

II. Universal circular economy policy goals

Being aware of this potential to be achieved by the Circular Economy, the Ellen MacArthur Foundation suggests five universal joint and interconnected policy goals for a large-scale transition. This resilient, distributed, diverse and inclusive economic model aims to: 1) stimulate design for the circular economy; 2) manage resources to preserve value; 3) make the economics work; 4) invest in innovation, infrastructure, and skills; and 5) collaborate for system change, as highlighted in Figure 3.

Figure 03: Five Universal Policy Goals for the Circular Economy.

Source: Ellen MacArthur Foundation (2022).

1. Stimulate design for the circular economy

Design relates specifically to the processes of creating, designing and using products and processes. It is at this stage, for example, that we see the value of this creation throughout the process, what its "lifespan" is or what remains are wasted throughout its creation and use process. How is this product reinserted into a circular economy, having cycles of multiple uses? From a business point of view, it is based on sustainable policies adopted by the entity that customers can generate a more lasting and beneficial relationship for all those involved in the consumption chain.

Achieving this goal involves extending the lifespan of a product or process, supporting its reuse, repair, or recycling; from tax incentives; and from the provision of incentive policies for the industry and commerce.

The creation of standards is inherently collaborative, bringing together technical committees of experts from industry, academia and civil society organisations, as well as policymakers. International standards and the establishment of equivalency among regulatory agencies and private sector standard-setting bodies are both important means by which to help create common understanding and international compatibility, while avoiding fragmentation which can leave organisations caught between standards. Standards can provide guidance on a wide range of areas including: organisational management for a circular economy; material and nutrient inputs; secondary raw materials; refurbished or remanufactured goods; and the design of goods and services. When such standards are developed and agreed, they can be referred to in national legislation, used in public procurement requirements or programmatic policy schemes, and incorporated in free trade agreements [3].

2. Manage resources to preserve value

Once a design process, the circular business model, and the design of this product/service have been defined, it is essential to manage the resources needed to maintain an infrastructure of goods and materials in productive use. In practice, some ways to do this are: making available the alternative of repairing and remanufacturing goods; inserting recycled products in the productive process; taxing directly or indirectly products that do not use materials whose extraction respects the basic sustainable principles of the Circular Economy.

3. Make the economics work

If we are talking about the proposal of an economic model that breaks with the prevailing economic policy - programmed for and by the linear economy - it is necessary to create conditions so that organizations feel encouraged to change. Once private actors begin to have incentives to change the way they make their investments, this culture is also passed on to their customers. Currently, we do not take into account all the social and environmental costs of the pollution created, degradation of natural raw materials, and the health of the workers directly responsible for its treatment. The current fiscal system makes both public and private purchases consider operational costs and short-term actions to the detriment of long-term ones.

An alternative to encourage the transition to a circular economy would be to incorporate in the final prices the value of the social and environmental impacts caused during the production of those items or services. In this way, those who migrate to new business models would have a greater expansion, while traditional economic structures would gradually be replaced in a compulsory way.

4. Invest in innovation, infrastructure and skills

Areas of research and innovation (R&I) and physical and digital infrastructure need an investment that only public authorities can provide. And often the encouragement of public authorities serves as a catalyst for the private sector's call to action. "Several of today's well-known technological breakthroughs including the internet, GPS, touchscreen displays, electric car batteries, and solar panels were funded by the state." [4].

To effectively bring this goal to reality, it is necessary to take some educational measures to train and familiarize more capable citizens and professionals within this new economic model, provide financial support, and help with the physical and digital infrastructures.

5. Collaborate for system change

As stated earlier, the holistic model of the Circular Economy involves the collaboration of different sectors in order to change the system. It

is necessary to mobilize the public and private sectors and also civil society. Local, national and international collaborations must be encouraged so that the systemic transition happens - and because we are dealing with complex cultural concepts and configurations, this collaborative system needs to be flexible to new insights and feedback.

> For example, through value chain collaboration and feedback, designers and producers can develop their understanding of design-for-subsequent uses, recycling r composting, and material selection, and adapt their practices accordingly. Meanwhile, refurbishers or recyclers can strengthen their understanding of material and design specifications so as to create valuable secondary material streams. [5].

III. Eco-innovation and the European scenario

In addition to the post-pandemic scenario to be addressed in chapter 4 of this article, the world is suffering from climate change, biodiversity loss, and the consumption of natural resources. It is due to these concerns that the European Union has accelerated transformations with the attribution of financial incentives, removal of economic and regulatory obstacles, public contracts to promote ecology, ecological labelling of products, and industrial standards, among others. All efforts have been directed to the awareness and applicability of the eco-innovation. Among the seventeen goals for 2030, most of the SDGs demonstrate environmental concern and the use of technology. That is, the need to use technological innovation to reduce impacts on the environment is recognized. It is from the importance of these factors that Measuring Eco-innovation (MEI) defines eco-innovation as

> the production, assimilation or exploitation of a product, production process, service or management or business methods that is novel to the firm and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other negative impacts of resources use (including energy use) compared to relevant alternatives [6].

The MEI defines four typologies of eco-innovations to be adopted by the business sector:

a) **environmental technologies** - the technological resources used in the productive process reduce the impact of the use of natural resources, making an appropriate treatment of these residues;
b) **organisational innovations** – it concerns the introduction of environmental management systems in order to reduce impacts and prevent risks, accidents, and violations of environmental legislation;
c) **product and service innovation** - from their origin and conception already offer environmental benefits;
d) **green system innovations** - promoters of behaviour change among consumers by using processes that are more environmentally friendly than those most commonly used.

In this sense and within this context, it is understood that there are three types of eco-innovative agents:

1. The **strategic eco-innovators**, active agents that develop eco-innovations for sale of equipment and services;
2. The **strategic eco-adopters**, who intentionally adopt innovative eco elements;
3. and **passive eco-innovators**, who end up implementing innovations (product, process, or organizational) without a specific strategy regarding the environmental impacts.

It is necessary that companies consider eco-innovation as an opportunity to reduce costs, to reinforce a positive image with customers and growth possibilities through the favourable context created by the different social actors.

According to the European Commission, "evidence shows that well designed environmental legislation can act as a driver for innovation. Results from companies that comply with such legislation show that their overall costs have decreased significantly." [7].

Some barriers to the eco-innovation movement include: an imbalance between market prices and environmental costs and benefits; rigid (and linear) economic structures; limited knowledge about markets; infrastructural and behavioural blockages; and harmful incentives or subsidies. According to the survey conducted by the European Commission

> Uncertainty of market demand and return on investment are two of the main obstacles, while high energy and material prices, new standards and regulations, and access to knowledge are the main drivers of eco-innovation.

Within this reality, the European Commission has committed to embed eco-innovation in the European community through 7 actions - which put into practice the 5 universal objectives for the adoption of the Circular Economy, mentioned above:

1. using environmental policy and legislation as a factor for promoting eco-innovation
2. support for demonstration projects and partnerships to bring promising, smart and ambitious operational technologies to market that have been poorly deployed
3. development of new standards for the promotion of eco-innovation
4. mobilization of financial instruments and support services for SMEs
5. promotion of international cooperation
6. support for the development of emerging skills and job creation and related training programs to meet the needs of the labour market
7. promotion of eco-innovation through the European Innovation Partnerships provided for the Innovation Union.

IV. The Circular Economy scenario in Portugal

If the Circular Economy is examined according to the local perspective, it is necessary to remember that, according to the environmental association ZERO and the Global Footprint Network (GFN), on May 7, 2022, Portugal entered an ecological deficit. In other words, in May, resources that should only be used from January 1, 2023 onwards, were already spent. Zero adds that "Portugal has been, for many years, unable to provide the natural resources needed for the activities developed (production and consumption). The most worrying thing is that the Portuguese "environmental debt" has been increasing" [8].

To end these practices that cause damage to the adoption of a Circular Economy, it is necessary that the Portuguese population, as well as the world population, has an intensive access to education for sustainable consumption. Campaigns to raise awareness must be promoted at a micro and macro level - from practices at home and in public and private companies, both nationally and internationally. The starting point for reversing this situation is to raise public awareness about the damage caused to our planet, to people's health and to societies' economies.

Aware of this and based on the Agenda 2030, the Portuguese government created the Action Plan for Circular Economy in Portugal, approved through Council of Ministers Resolution No. 190-A/2017, November 23, which seeks to introduce three levels of action to be worked on in the coming years:

> National cross-disciplinary actions, which consolidate some of the actions of various governmental areas for this

transition; sectoral agendas, especially for more resource-intensive and export-oriented sectors; and regional agendas, which should be adapted to the socio-economic specificities of each region [9].

Porto an example of a circular city by 2030

Specifically in the Porto region, in 2017, the Business Council for Sustainable Development (BCSD), in close partnership with LIPOR, launched a *Roadmap for Porto's Circular Economy*. Its goal is to transform Porto into a "circular city" by 2030 from guidelines of a long-term process.

It is not "overnight" that the culture and practices of a society are transformed. This complex process, as mentioned above, involves different sectors and requires cooperation and co-creation of all social actors. For the Circular Porto in 2030, 4 main notions [10], with their respective lines of action, have been outlined:

1. Promote sustainable production and consumption;
2. Ensure the availability of natural resources and environmental balance;
3. Create and maintain shared infrastructure that brings together and rehabilitates buildings and creates circular guidelines for new construction;
4. Undertake innovative solutions to transform waste into resources.

To achieve these goals, Porto is working on different European projects. One of the examples is CityLoops, an initiative that brings tools and actions such as the analysis of biowaste in the city; circular models for the tourism and society segments; expansion of the selective collection of organic waste and the expansion in the food donation network, among others.

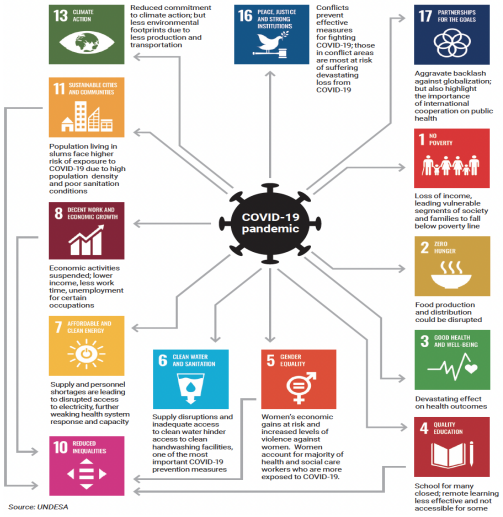
CityLoops is a project led by ICLEI - Local Governments for Sustainability, financed by the "Programa Horizonte 2020" (H2020 - Grant Agreement 821033) and it is being implemented in seven cities (Apeldoorn, Bodø, Høje-Taastrup, Mikkeli, Porto, Roskilde and Seville) with the aim of closing the flow cycles and increasing the circularity of materials in urban areas [11].

V. COVID-19 scenario, the 2030 agenda review and the role of the Circular Economy

According to the Ellen MacArthur Foundation's report *The circular economy: a transformative covid 19 recovery strategy*, "Covid-19 triggered the most severe economic recession since the Great Depression in the 1930s, with GDP declines of more than 20% and a surge in unemployment in many countries." [12].

The devastating pandemic brought socio-economic consequences that exposed the need for a more resilient economic model than the linear one, which holds in itself a number of attractive solutions for the different actors involved in it. Therefore, it was necessary to look beyond the pandemic and revise the post-Covid-19 goals, as shown in Figure 4.

Figure 04: Post-COVID-19 revision of the 2030 Agenda 17 Sustainable Development Goals



Source: UN DESA (2022).

Especially at the beginning of the pandemic, many global chains, such as that of medical equipment, found some solutions in the circular principles: repair, reuse, remanufacturing potential, among others. The United Nations has called on entities to take three main actions:

1. Follow health, safety, and economic comfort guidelines for employees who need to work physically with social distancing or in an exceptional teleworking regime;
2. Provide financial and technical support to governments with a COVID-19 Solidarity Response Fund;
3. Rethinking facilities and individual business plans to cope with the needs of this crisis.

It is inevitable that the crisis caused by COVID-19 will have profound negative impacts within the sustainable development prospects of the 2030 Agenda for Sustainable Development and the Paris Agreement on Climate Change. It is therefore vital that countries stick to their individual sustainable development goals and climate commitments. In this way, we can be propelled into a more inclusive, sustainable and resilient future.

VI. Conclusion

To ensure smart, sustainable and inclusive growth, the starting point is to raise awareness of the different social actors about the importance of adopting a multisystem circular economy model. The challenge for all citizens is to gather proposals, projects and actions that promote sustainable consumption and production - now, post-pandemic, even more than ever.

According to the United Nations, assertive action is required, and COVID-19 can be an opportunity for all actors - governments, businesses, employers' and workers' organizations, civil society organizations, communities, and individuals - to act together in search of new ways to achieve the common good.

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