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An introduction to Circular Economy and Sustainable Development: A systematic literature review

Wael Brinsi¹

Abstract

Over the last few years, the concepts of Circular Economy and Sustainable Development have gained increasing attention from decision-makers and researchers in industrialized countries while dealing with the issues of environmental deterioration, population growth, depletion of natural resources, and climate change. However, despite the wide literature, few studies have been accomplished so far with regard to the distinctions between both concepts retain ambiguity. With this concern, the aim of this study is to contribute to conceptual clarity by exploring the concepts and synthesizing the similarities and differences relationships between them. First, we will define the concepts and provide a better understanding of the benefits of CE and how it differs from the "Linear" Economy in terms of long-term impacts. Second, we will carry out a systematic analysis that addresses the gap of the superficial and unorganized relationships between CE and SD through the studies and papers on this specific issue. In order to accomplish it, an extensive literature review and snowballing approaches have been used for this study.

Keywords: Circular Economy, Sustainable Development, Linear Economy, Economic growth, Environmental degradation, Social well-being

JEL Codes: F63, F64

1. Introduction

Over the last few years, the concepts of Circular Economy and Sustainable Development have gained increasing attention from decision-makers and researchers in industrialized countries while dealing with the issues of environmental deterioration, the population growth, depletion of the natural resources and climate change.

The purpose of this paper is to address these two concerns. One of the objectives is to provide an overview about the CE concept as it is presented in the literature, which will allow those who

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wish to work in this sector in developing a more precise definition of CE. This study also aims to provide an overview of the CE concept as it is identified in the literature, in order to help actors who want to work in this sector have a clearer description of CE. The concept of circular economy has recently become a more widely discussed strategy for overcoming the current linearity of lifecycles in order to move toward a more sustainable economic model. However, the literature review on CE is limited, and both conceptual discussions and the development of actual implementation strategies are still in their early stages (Suarez-Eiroa, 2019).

2. Theoretical background

The adoption of more sustainable and cleaner manufacturing systems necessitates changes in how businesses operate. Improvements in product design, as well as equipment and production processes, introduction of new technologies, product changes, and internal and external waste management, are examples of such changes (OECD, 2019). The shift to a circular economy within society may entail new infrastructures, consumption models, and service access based on the collaborative and sharing economies. Changes in consumer behavior are also a result of the emergence of new sustainable products and business strategies.

Indeed, the 3R principles are part of the Circular Economy (CE) model: The reduce principle means the reduction of inputs and the use of the raw materials, energy and waste generated. The Reuse principle refers to the use of the products or components in another stage of production rather than disposal of them, this principle leads to the utilization of fewer resources, energy, and labor than is required to manufacture new products from virgin material. The recycling principle aims to convert waste objects into reusable materials to prevent waste of potentially useful materials, minimize the consumption of virgin raw materials.

The emergence of the CE is seen as the way to tackle the environmental deterioration and natural resource depletion and lead an eco-industrial development (Patrizia Ghisellini, 2015). Unlike the linear model, the CE aims for a closed-loop and replaces the inefficient linear model "take, make and dispose" to "make-use-reuse-remake-recycle" which is threatening the economic stability as well as the environmental sustainability (Purva Mhatre, 2020).

2.1. How can standards and auditing facilitate the transition to a circular economy model?

To adopt a circular economy model: raw materials, processes... it's a whole production scheme to rethink. It may be relevant to identify priorities and move forward gradually. We present the four key stages of the transition and explain how audit and certification are a pragmatic way to implement a circular economy circular economy model.

STEP 1: IDENTIFY CIRCULAR OPPORTUNITIES IN THE PRODUCTION CHAIN

Current production systems are essentially linear: they consume materials and make the products go through products through phases of transformation, manufacturing distribution and consumption. These products are then discarded, or sometimes recycled. To move from a linear production chain to a closed-loop model, companies need to understand their raw material flows and suppliers to identify suppliers to identify opportunities for reuse where possible reuse opportunities where possible and ensure that they are industry best practices for responsible sourcing. The complexity of modern supply chains is one of the main challenges.

STEP 2: ENSURE EFFICIENT USE OF EFFICIENT USE OF RESOURCES

The efficient use of resources - for example metals and minerals or energy and water - is an integral part of the circular economy model, as it is what reduces emissions and other waste. The ultimate goal is to close the loop of the supply chain by using and reusing resources to their fullest potential. To use resources efficiently, one must first understand their current consumption. Management systems such as ISO 50001 (energy) or ISO 14001 (environment) and water footprint assessment methods such as ISO 14046 can be used to assess, understand and monitor resource use with a view to systematically sourcing renewable energy and closing the water and energy supply chain. Greenhouse gas emission inventories and other approaches to identify and measure or assess key emission streams also help define best practices for energy and resource efficiency.

Steps 1 and 2 provide companies with all the foundations to manage environmental impacts and achieve their traditional sustainability goals through the changes they choose to implement. Steps 3 and 4 provide a more innovative and in-depth approach that will allow companies to rethink their production processes and fully adopt a circular economy model.

STEP 3: INTRODUCE RADICAL INNOVATION IN THE SUPPLY CHAIN AND IN THE

PRODUCTION PROCESS: The circular economy model requires a complete break from linear thinking. For some companies, this may appear to be a major hurdle, but organizations that

radically rethink their procurement or usual production processes open the field to a multitude of new opportunities. The chemical industry is a good example. Renewable raw materials, partly from waste, are used as inputs in chemical processes instead of traditional fossil fuels. Similarly, bio products are being used to create biodegradable plastic that is used to collect bio-waste.

STEP 4: DESIGN NEW PRODUCTS AND PRODUCTION SYSTEMS THAT ADOPT THE CIRCULAR ECONOMY MODEL

Rethinking the relationship between resources, product design and supply chains helps companies to develop closed-loop production systems designed for multiple life cycles. Environmental management (ISO 14001) and standards can help companies identify the need for new products, for example by assessing stakeholder needs. They can also provide a framework for companies to continually evaluate and continuously improve the environmental impact of any new product. Integrating the principles of the circular economy into the design and development of new products, including products, including and supply chain, can improve raw material acquisition, disassembly design, durability and repair and even product take-back programs.

2.2. The factors of emergence of CE projects

Four elements characterize a conventional business model: the value proposition, relationships along the supply chain, relationships with consumers, revenues and costs. But the economic model alone cannot meet the expectations of all stakeholders; it requires a broader vision to integrate social and environmental benefits. In current models, the environment is not taken into account as an absolute value but as an instrument for creating economic value. The development of CE depends on three factors: 1. the ability of companies to generate profits - which depends on product design, business model, choice of materials and supply chain configuration; 2. resource dependence and scarcity; 3. the contribution of CE to reducing environmental impacts.

As the three factors are linked, CE requires concomitant actions by public authorities and industry to make CE attractive and to meet the expectations of the different stakeholders involved in the process. The two case studies carried out show that there is a significant environmental benefit to implementing a CE logic compared to the linear model. But the margins are very tight. This requires support and incentives from governments to encourage value chains to transform.

The transition to CE creates demands for new organizational forms in inter-firm collaborations, and even stimulates the emergence of new institutions that promote sustainable development. Knowledge between market actors, academic actors, and industry support functions must evolve continuously to drive policy change and ensure reflexivity, a factor in modern governance. A very strong collaboration can help capture information related to flows, at a time when data and knowledge are becoming a key success factor in managerial practices. Manufacturers will need to understand how this information flows throughout the supply chain and engage new forms of collaboration.

The circular economy calls for a renewed approach to the company's ecosystem and its network of inter-organizational collaborations. Inter-organizational collaboration defines a partnership logic characterized by strategic, intentional relationships between independent companies that share compatible goals, strive for mutual benefits and recognize each other at a high level of interdependence. It is through collaboration that actors will find ways to foster the emergence of circular economy projects. The notion of collaboration in circular economy approaches induces the sharing of information, the synchronization of decisions and the alignment of incentives with two essential objectives: to increase the overall profit of the whole chain, by contributing in particular to the creation of new activities (reverse logistic) and by sharing the benefits obtained among the members. CE could be a form of inter-organizational and inter-sectoral environmental and sustainable management. The actors outside the traditional supply chain will participate in the creation of a specific governance that goes beyond the relationship between principals and suppliers.

Our research shows the benefits of CE at different levels. If the literature defines three triggering factors, we propose to group the economic benefits and the need to face material scarcity on the same axis that aims at improving the competitiveness of companies. The reduction of environmental impacts is not a sufficient motivation to trigger CE projects. However, our research reveals the ability of pivotal companies to combine competitive benefits with the maximization of social and environmental benefits by collaborating with external actors (government agencies, academic actors, associations); it is they who are more specifically mobilized by the search for environmental and social benefits (e.g., responsible innovation, job creation). The transition to a circular economy model requires understanding and controlling all the raw material flows and materials and all processes used in production. For example, producing and selling a t-shirt in a circular economy model involves responsible sourcing of the cotton and chemicals used, responsible chemicals used, responsible working

conditions in the in the factory that makes them, control of the energy used in manufacturing, transportation and distribution, and a process of as well as a process of collection, decomposition and recycling of the t-shirt after use. To be credible, each of these processes must be defined, implemented, audited and verified.

2.3. Impetus of the Implementation CE

Unarguably, the adoption of CE delivers a wide range of benefits and procures a better harmony and balance between three pillars economy, environment, and society (PatriziaGhisellini, 2016).

The following are the main issues that have arisen as a result of the linear economy in recent decades: Increasing pollution of the atmosphere and soil, scarcity and pollution of water, huge amounts of communal and waste material, increasing consumption of energy, destabilization of ecosystems, rising CO₂ concentration in the atmosphere, rising prices as a result of natural resourcedepletion, fluctuating on the markets, as well as continuing to rise pollution of the atmosphere andsoil, scarcity and pollution of water, steadily rising amounts of communal and waste material, growing demand for energy (Lee B., 2012).

The concept of the CE evolves in a similar way to sustainable development but at a quicker (Cutaia,2020). (Neal Millar, 2019) Emphasizes that the concept of SD has been criticized for being imprecise and vague, leading to a loss of impetus. (JA, 2006) Highlighted that the SD does not seekto provide a clear alternative to current development practices. Rather than establishing explicit criteria and methods, it has presented a basic adjustment to include social and environmental issuesin established models.

3. Conclusion

First, we describe the Circular Economy as a regenerative system in which resource input and waste, emission, and energy leakage are reduced by slowing, closing, and narrowing material andenergy loops, as defined by significant literature. Long-term design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling are all options. Second, we define sustainability as the harmonious coexistence of economic growth, social inclusion, and environmental resilience forthe benefit of present and future generations.

We discovered that the Circular Economy is a hot issue that is generating a lot of research. While the issue has European roots, much of the recent boom has come from Chinese authors following the adoption of regulatory controls in their nation. Scholars from China and Europe,

in particular, have taken up this topic, and the number of publications has exploded. This could be due to a rise in interest from businesses and policymakers in these areas.

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