



Circular Economy: A Sustainable Approach

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ABSTRACT

The circular economy approach, which is based on resource recycling, is the main topic of this essay. It is an alternative to the current linear economy, which is founded on the "take-make-dispose" approach and is unsustainable for economic growth because of the world's limited resources. In particular, this study established a circular economy model for sustainable development that incorporates trash as a useful resource for future production within the framework of endogenous economic growth. The accumulation of waste stock, waste dynamics in closed-loop systems, and economic growth path are highlighted in the article. Reusing resources without causing environmental degradation is one way that recycling economic activities support economic development. This research tangentially supports our sustainable development model with empirical data. It is well known that the extraction of materials and the creation of garbage are two ways that humans strain the environment. One potential strategy to enhance resource utilization is the circular economy. Public, business, and civic groups, as well as an increasing number of academic institutions, are embracing the circular economy, which is marketed as a technology-driven concept that may improve the economy and lessen



environmental stress. Meanwhile, there have been worries raised regarding some purported circular economy practices that are promoted as "sustainable" but actually harm society and the environment. The literature on systems ecology that contributed to the definition of the circular economy and sustainable development framework is briefly reviewed. A framework for discussing the circular economy is provided by an analysis of the values and principles found in the core literature on sustainable development.

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INTRODUCTION

Businesses can now more effectively adopt circular economy strategies because to recent advancements in sustainability. Through the creation of restorative industrial systems and a focus on product reuse and repair, the circular economy (CE) extracts useful materials from waste streams. Alhawari et al. claim that "a structural shift in sustainability initiatives has resulted from the growing recognition of CE for the management of natural resources." According to Geissdoerfer et al., there are numerous connections between sustainability and CE, ranging from conditional to trade-offs. Businesses are investing eco-friendly initiatives as a result of the rise of sustainability, environmentalism, and global environmental preservation. Over the past ten years, the field of CE has expanded quickly. It includes recycling, reducing, and reusing materials in systems of production and consumption.

Because of this, the CE has become a viable model for material reuse enterprises. In a changing world, organizations like the McKinsey Global Institute and the Ellen MacArthur Foundation see it as a means of separating economic growth from the usage of virgin materials. By 2030, the U.S. corporate sector might increase GDP by USD 4.5 trillion through the implementation of a CE. A process of innovation and change is part of the CE business model. A small firm needs a strategically oriented and well-balanced portfolio of goods and services that capture value, take advantage of synergies, and facilitate the shift to the CE business model in order to prosper. The difficulties in putting circular business models into practice have received a lot of attention, but research has examined how these difficulties vary depending on the type of company model. Accordingly, it should be noted that CE has also significantly changed the relationship between operational and economic sustainability. The economic



model for sustainability and CE is becoming more and more important, and both industry and academia are paying more attention to it.

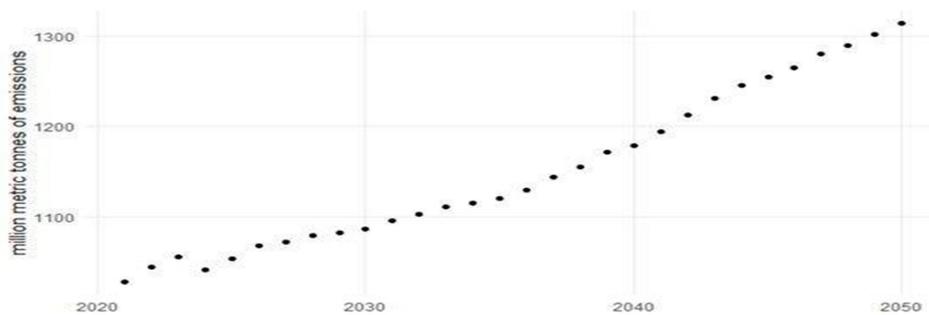
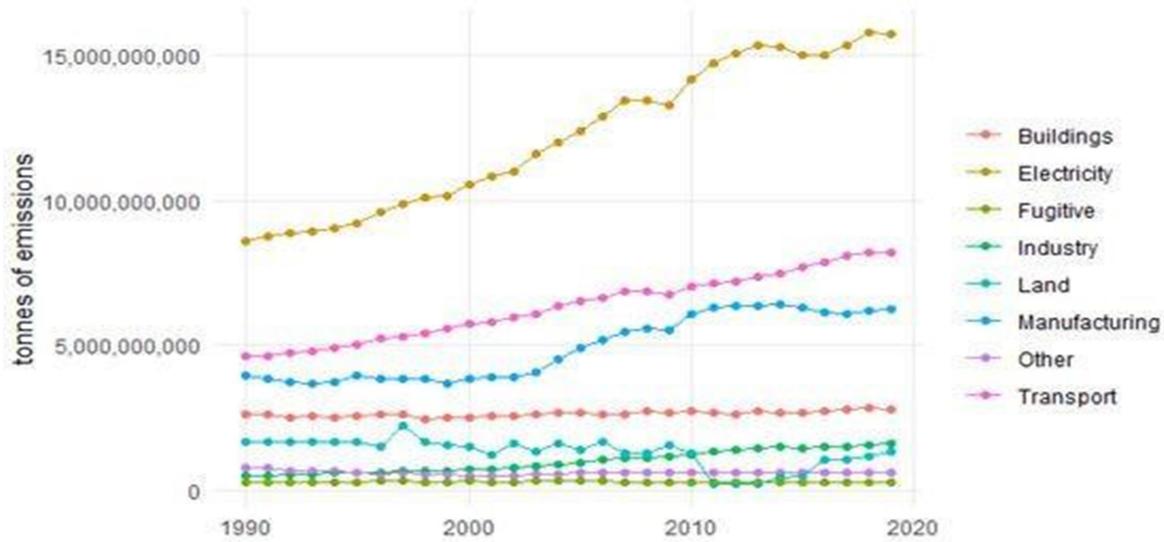
Scholars and practitioners are still interested in the circular economy (CE) concept. More than 13,000 documents with the term "circular economy" were found by a Scopus search in late 2021; 7800 of those documents (almost 60%) were published in 2020 or 2021. The private sector, ranging from big companies to start-ups, is experimenting with the idea. At the same time, a number of extensive CE policy initiatives have been started. Even though the world is presently just 8.6 percent circular, according to the most recent Circularity Gap Report, a wide coalition of stakeholders appears dedicated to promoting the CE transition. As circular economy gains popularity, its conception may become muddled and fragmented due to the various actors' interpretations and applications of it. In Fact, discovered 95 distinct Circular economy definitions through a comprehensive examination. The possibility of a consensual conception of circular economy has been the subject of numerous academic endeavors. Since the publication on study has, however, methodically examined whether or not such a consensus has been formed. The goal of the new study is to close this gap. Kirhherr state that "it is challenging to acquire knowledge about the circular economy if scholar A views the 'how-to' of circular economy as recycling, whereas scholar B views the 'how-to' as reducing, reusing, and recycling." Consequently, a notion that has several disjointed and frequently disputed interpretations may encounter conceptual impasse and ultimately come to an end. Examples include the ideas of corporate social responsibility (CSR), social entrepreneurship, "smartness," "smart cities," and even sustainability itself. It can be argued that these ideas have all been somewhat hampered by conceptual contestation and the ambiguity that has resulted from it.

CIRCULAR ECONOMY IN SUSTAINABLE MANUFACTURING

With almost 20% of global greenhouse gas emissions, the industrial sector has been the third largest contributor to environmental degradation. The desire for a higher standard of living and the social effects of manufacturing operations are well acknowledged on a global scale. A study indicated that the industrial cycle's production and consumption sides are negatively impacted by the massive depletion of non-renewable resources, as well as the discharge of hazardous gasses and acidic chemicals, had a big detrimental impact on the environment. Even though direct emissions from "chemical reactions, and from leaks from industrial ... equipment" are mostly to blame for the degradation, indirect out flows also play a major role because they are in charge of the energy supply needed to operate the factories as



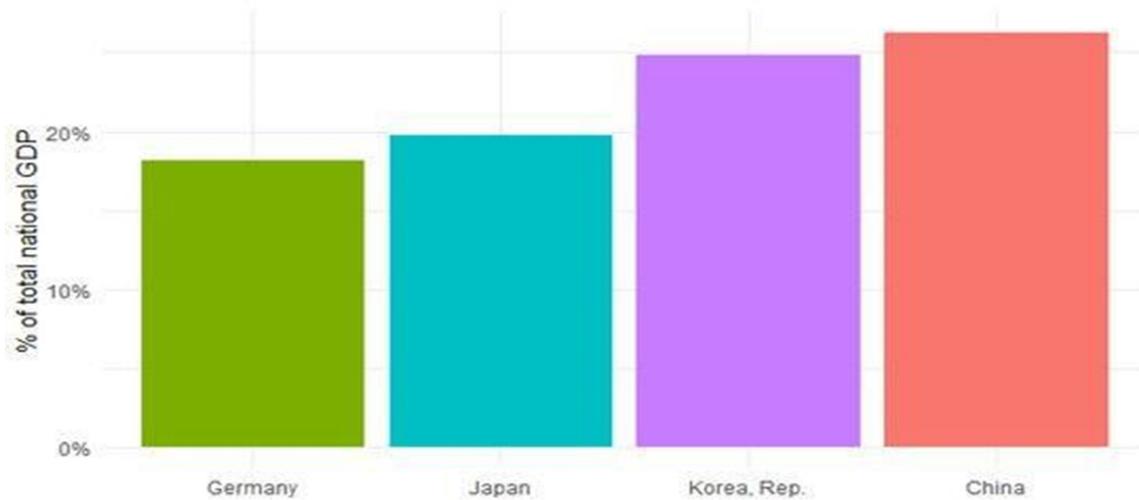
well as the additional waste generated as a result of mass consumption. Therefore, among the most harmful elements are manufacturing procedures and the industrial supply chain, where prompt industrial and policy action is essential.



Most emission-reducing technologies, such as hazardous pollution capture and storage, are still in the early phases of implementation, despite the fact that the majority of industrial operations and the manufacturing of goods from raw materials depend on fossil fuels for energy. For example, manufacturing-related environmental degradation accounts for around 20% of all deterioration in the United States and is expected to rise significantly by about 28% by 2050 due to the country's continuous pattern of rapid economic growth. There is a continuing push for the industry to take the lead in deep decarbonization and deployment to clean energy. The manufacturing industry has a significant impact on the economy and society in addition to the environmental issues. About 12 million people were employed in the US manufacturing sector in 2019, and it accounted for almost 11% of the country's total economic output in 2020. It is clear that sustainable manufacturing



encompasses more than just environmentally friendly production methods given the industry's steady growth in terms of value and incoming investments, as well as its substantial contribution to societal well-being through steady labor expansion and overall economic development at the national and international levels. The fact that more than 70% of the biggest companies in the world now mention sustainability in their yearly reports on managerial and environmental, social, and governance (ESG) accomplishments as a crucial component for cost reduction and profitability growth and a key competitive factor in the current market, clearly demonstrates the corporate initiatives.



In order to explore the theoretical and practical underpinnings of sustainable manufacturing, which goes beyond the straightforward production of "goods with minimum use of energy and natural resources, maximum profit," this article will look at the "economic and social dimensions" that are connected to corporate responsibility and the human-factor-based standards of equity and equality. This viewpoint post attempts to inform the industry, policymakers, and other stakeholders on the wider breadth of sustainable manufacturing in the current context, in addition to showcasing the most recent sustainable manufacturing methods. These practices should be considered for future innovative research and initiatives in the industry and academia. An overview of recent research and an examination of prominent firm cases on sustainable manufacturing initiatives and terminology form the basis of the research methodology.

The research includes official documents on sustainable policies from countries and international organizations published between 2010 and 2022, as well as the most recent studies and pieces from scientific and commercial journals and internet platforms. The examples under evaluation are fresh, creative, sustainable ventures started by international players in important industries like retail, textiles, food and beverage, information technology, pharmaceuticals, and medical. These goals are reflected in the companies' corporate business and ESG reports, as well as in management's official statements made public via digital media. A comprehensive examination of the findings and claims was conducted using the concept of sustainable manufacturing for a circular economy.

ROLE OF CIRCULAR ECONOMY IN REDUCING GREENHOUSE GAS EMISSION

Globally, the circular economy has gained widespread acceptance as a comprehensive and sustainable development model. It is an industrial and economic model that takes into account the most effective use of natural resources. Only 9% of the 96 billion tonnes of raw materials that were extracted and used worldwide in 2019 were recycled. Due to the Scarcity of natural resources, production using novel materials drawn from nature and their subsequent disposal results in significant waste and adverse outcomes. Additionally, it is not practicable from a commercial standpoint. Therefore, a thorough analysis of the circular economy in waste management necessitates the recovery of energy and the reclamation of valuable materials from current waste treatment methods. By reducing energy and resource waste, the circular economy has been emphasized as a mitigation strategy that is becoming more and more significant and can contribute to human well-being. There are a number of advantages to recovering energy and materials from municipal solid waste (MSW), such as lowering the need for primary material extraction, producing renewable energy locally, and reducing the amount of MSW that ends up in landfills, which lowers greenhouse gas emissions by lowering methane emissions.

A road map for the global energy sector, net-zero transitions for the oil and gas industry, zero





emissions for the global transport sector, and a pathway to decarbonize the shipping sector are just a few examples of the comprehensive roadmaps and transition pathways that the major GHG emitting sectors have established in an effort to achieve net zero emissions. The European Union (EU) has set waste targets as part of their shift to a circular economy, while the United Nations Environment Programme (UNEP) has set regional and global waste management goals for sustainable development (United Nations Environment Programme, 2015, United Nations Environment Programme, 2017, United Nations Environment Programme, 2018, United Nations Environment Programme, 2019).

For net zero transitions to proceed more quickly, a worldwide evaluation is required to accurately determine the waste sector's potential for carbon neutrality as well as realistic goals. This analysis attempts to close these gaps by evaluating lifecycle GHG emissions from worldwide MSW management industry for 2023, 2030, and 2050 utilizing reflective inventory data for MSW treatment systems associated with national income levels. Critical factors impacting GHG emissions and the potential for carbon neutrality in the MSW management sector are identified through an analysis of the global and regional management targets established by the EU and UNEP.

A DRIVER OF SUSTAINABILITY IN BUSINESS MANAGEMENT

The circular economy influences more environmentally friendly businesses in a number of industries. Studies on sustainable businesses are a prominent topic. While the actual consequences of circular economy practices on businesses are not always evident in some locations, this influence is more apparent and perceived as a fundamental issue in others. Nevertheless, even while many of these practices have been in place for a while, many of the behaviors that cause circularity or enhanced circularity might not have been identified as such and might have been referred to by various names.

Strategic planning, cost control, circular supply chain management, quality control, environmental control, process control, logistics and reverse logistics, service management, and research and development are just a few of the business and organizational areas where the circular economy can spur more sustainable practices. These activities can be one area directly influencing another in a single way, or they might involve reciprocal, multi directional changes between the previously stated domains and others. Alternately, they might initiate a chain of events whereby region A influences region B,

which influences region C, which influences region A. Additionally, a single iteration of this circle may employ more than three agents.

By employing its key tenets to obtain a competitive edge, the circular economy helps businesses reduce their environmental impact and boost their bottom line. This leads to increased resource efficiency and more sustainable economic growth. According to Fonseca, the circular economy is regarded as a strategic and pertinent issues for businesses profitability and value creation in the current climate. Managers may then wish to use strategic planning to support more environmentally friendly options.



Adopting the concepts and practices of the circular economy is important for cost management because it enables businesses to repurpose items that are nearing the end of one of their life cycles into resources for the development of new or different products. This minimizes waste and reduces the demand for virgin material inputs. Furthermore, a lack of resources has a detrimental effect on a company's ability to create and capture value by raising prices and making them more volatile. All stakeholders in the company's network may need to make various types of investments in order to transition from linear to circular business models in a way that is both efficient and sustainable.

By cooperating along the supply chain and interacting with customers, businesses can extend the economic life of products and try to recoup the value of those products over the course of their life cycle. This is known as the circular economy. Because value recovery is a possibility, the establishment of circular supply chains offers favorable prospects. In terms of supply chain management, the circular economy offers ways to incorporate its key ideas into the existing management paradigm. Establishing



and coordinating organizational activities both within and between business divisions to stop, delay, or restrict the flow of commodities and energy is the essence of circular supply chain management. When going circular, there is still an inherent need for quality in products and processes. Businesses require a shift in policy that enables them to save the environment while advancing business models that ensure the caliber of production and manufacturing and enable them to maintain their competitiveness. Additionally, they must continue their differentiation and customer-focused tactics. However, the shift from a linear to a circular economy introduces previously unheard-of issues with process and product quality.

Businesses must manage the possibility that consumers will perceive products made with recovered input materials as being of lower quality. As a result, businesses create quality management procedures to safeguard their brand.

CONCLUSION

In order to ensure that all communities benefit fairly, an inclusive circular economy seeks to eradicate waste and pollution, recycle resources and products at their best value, and restore natural systems. We have maintained that, in part, by encouraging society to reconsider how it creates, uses, and disposes of materials, circular approaches tackle the underlying causes of pollution, biodiversity loss, and climate change. The circular economy can enhance human growth and well-being on a global scale by emphasizing social fairness, decent labor, and sustainable livelihoods.

Implementing circular economy initiatives that emphasize waste reduction, resource efficiency, and closed-loop systems is necessary to attain sustainable development. These initiatives aim to reduce waste, promote resource efficiency, and mitigate their adverse environmental impacts. Businesses can set waste reduction targets and develop strategies to reach them by focusing on sustainable consumption patterns, material substitution, and product redesign. Policies and incentives such as landfill fees, pay-as-you-throw schemes, and extended producer responsibility programs can also encourage garbage reduction. Investing in waste management infrastructure, such as recycling facilities, composting sites, and waste-to-energy plants, is another approach to contribute to trash reduction. To achieve resource efficiency, businesses might establish objectives and plans focused on improving industrial processes, energy efficiency, and material use. Along the value chain, efficiency and resource utilization can be maximized by utilizing cutting-edge technologies like blockchain, artificial intelligence, and the internet of things. It is possible to guarantee that suppliers and partners embrace sustainable resource use



practices by creating sustainable procurement policies and procedure. Green public procurement, eco-labelling, and resource taxes are a few examples of laws and incentives that can promote resource efficiency.

Lastly, closed-loop systems can be set up to encourage the recycling, remanufacturing, refurbishing, and reuse of items and materials. Recovering and reusing resources and goods can be made possible by the implementation of infrastructure and reverse logistics systems. It is also possible to create new business models, such product-as-a-service and sharing platforms, that put the provision of services ahead of ownership. It is also essential to spend money on research and development to increase the scalability and efficiency of closed-loop systems. All things considered, companies, governments, non-governmental organizations, and consumers must work together to create a circular economy. To guarantee the success of these projects, specific goals must be set, infrastructure and innovation must be funded, and public awareness and education must be encouraged. We can build a more resilient, sustainable, and affluent future for everybody if we embrace the ideas of the circular economy.

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