CIRCULAR ECONOMY: A NECESSARY APPROACH FOR LONG-TERM SUSTAINABLE ECONOMIC DEVELOPMENT

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Abstract

The evolution of humanity has been intricately tied to the availability of natural resources, which have supported survival and development throughout history. However, overexploitation of these resources, coupled with population growth, has led to their depletion, reaching a critical threshold that requires urgent solutions to prevent total exhaustion. The most viable solution lies in transitioning from the traditional linear economic model, which is predominant in current systems, to a circular economy model, where resources are reintegrated into the economic cycle after use, thereby reducing excessive consumption and minimizing waste. The shift towards a circular economy is a multifaceted and complex process that extends beyond redirecting industrial sectors. Historically, psycho-social aspects of consumer behavior have been largely overlooked in this transition. A comprehensive approach that integrates an understanding of the psychological and social drivers of daily consumption is essential for success. In light of this, the present paper explores the linear and circular economic models, emphasizing the social challenges that may arise during the shift and underscoring the importance of implementing best practices to engage consumers in the transition.

Keywords: Circular Economy; Linear Economy; individual consumption; resource depletion.

1. INTRODUCTION

Human evolution has been intricately linked to the exploration and utilization of natural resources from its earliest stages. The availability of these resources has played a critical role in shaping the emergence, survival, and development of human communities, serving diverse purposes across different historical periods. From the basic exploitation of resources by prehistoric hunter-gatherer societies and early agricultural communities to their sophisticated use in modern industrial and technological advancements, natural resources have consistently been central to human existence and progress. Consequently, the survival and advancement of the human species throughout its evolutionary history have been fundamentally dependent on the accessibility of resources within the surrounding natural environment (Morseletto, 2023; Ali et al., 2021; Xu & Zhao, 2023).

Conversely, humanity's exploitative activities have profoundly impacted the natural environment throughout history. From the Agricultural Revolution to the Industrial and Post-Industrial Eras, interactions between human societies and natural ecosystems have led to significant transformations on both local and global scales. Anthropogenic modifications aimed at promoting economic development and enhancing human quality of life have frequently resulted in adverse ecological consequences. These impacts pose critical challenges for the future of the ecosphere, including humanity, which remains an integral component of this interconnected system (Sariatli, 2017; Hendry et al., 2017; Li et al., 2023).

The excessive exploitation of natural resources, large-scale deforestation, the expansion of intensive agriculture, and rapid urbanization have left profound and often irreversible impacts on natural ecosystems, with far-reaching consequences at both local and global scales. These activities have resulted in the destruction of natural habitats in numerous regions, negatively affecting species that depend on these environments and diminishing ecosystems' capacity to perform critical functions. These functions include biogeochemical cycling, oxygen production, carbon dioxide sequestration, the remineralization of organic

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matter (including the breakdown of pollutants in water, soil, and air), and the recycling of nutrients for reintegration into natural cycles. Such ecosystem functions are fundamental for the survival and sustainable development of human communities (Hoque, 2023; Reader et al., 2022; Myers et al., 2013; Tripathi & Tripathi, 2023).

The degradation of natural ecosystems exerts profound and multifaceted effects on human quality of life, influencing not only economic well-being but also broader aspects of social satisfaction and global public health (Barker & Fisher, 2019).

In this context, existing data on the environmental impacts of economic development underscore the urgent need to reform the prevailing economic paradigm, which prioritizes continuous economic growth while often overlooking the associated negative consequences (Sariatli, 2017; Chennak et al., 2023).

Environmental degradation and the depletion of non-renewable resources have become increasingly critical issues over time, capturing the attention of researchers and policymakers and prompting efforts to investigate and develop solutions. A key factor identified is the widespread adoption of a linear economic model, particularly since the Industrial Revolution. This model involves the extraction of natural resources, their transformation through industrial processes, and the disposal of resulting waste into the environment. Driven by consumerism and characterized by the accumulation of waste, this approach has led to the large-scale exploitation of natural resources without accounting for their regeneration potential or the long-term environmental consequences (Aggeri, 2021; Lampert, 2019).

These considerations highlight the urgent need to transition toward a more environmentally sustainable economic model. In this context, the circular economy has emerged as a promising solution, designed to close production and consumption loops, alleviate pressure on natural resources, and minimize environmental impacts. Many experts view this model as better aligned with achieving a sustainable economic future, wherein human needs are met without inflicting significant harm on the natural environment. Furthermore, by addressing the limitations of the existing linear model, the circular economy holds the potential to ensure a safer and healthier future for generations to come (Morseletto, 2023; Rashid & Malik, 2023).

However, the transition to a predominantly circular economy faces significant challenges, primarily due to the profound behavioral changes required from a population deeply entrenched in traditional consumerist practices. Existing research and policy efforts aimed at implementing the circular economy at a societal level have often overlooked the critical socio-cultural dimension, which plays a pivotal role in facilitating such changes. Currently, substantial knowledge gaps remain regarding how the complex, long-term challenges and transformations associated with this shift impact citizens' daily lives and social dynamics, as well as the degree to which individuals are willing to embrace these changes (Greene et al., 2024; Bhatnagar et al., 2024).

2. RESEARCH METHODOLOGY

This study aims to analyze the linear and circular economic models, with a particular emphasis on the challenges associated with transitioning to the circular model. An integrative perspective was adopted, encompassing aspects of economic production, environmental impact, and the socio-cultural dimensions of daily consumption.

The research examines each economic model - linear and circular - separately, highlighting the historical contexts in which they emerged, along with their respective advantages and disadvantages. Special attention is given to the social factors that impede the cultural shift required in consumption practices, emphasizing the importance of implementing best practices to motivate and support consumers in adapting to the demands of the circular economy.

Additionally, the study seeks to advocate for the circular economy as a viable and practical solution to pressing issues related to natural resource management and environmental degradation.

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To achieve these objectives, a qualitative research methodology was employed, involving the analysis of existing studies on the circular economy and the challenges associated with its implementation. Qualitative analysis is particularly valuable for understanding the context and exploring complex contemporary issues. It facilitates the development of new theoretical and practical insights tailored to the unique characteristics of the problems under investigation (Beloto, 2018; Onwuegbuzie & Leech, 2012).

3. THE LINEAR ECONOMY MODEL

The linear economy operates on the "take-make-dispose" principle (Elisha, 2020), encompassing the extraction of natural resources, their transformation into consumer goods, and the subsequent disposal of waste into the environment. This model has become dominant in societies with substantial industrial components and is widely recognized as the traditional economic paradigm (Sariatli, 2017).

The widespread adoption of the linear economy is largely attributable to its significant advantages. The most notable feature of this model is its simplicity and the ease with which it can be implemented. The clearly defined structure - comprising extraction, processing, and disposal - renders this model relatively straightforward to manage. This linear approach facilitates efficient planning and execution of economic production and development strategies, contributing to its enduring prevalence (Purwanto & Prasetio, 2021; Devčić, 2022).

Although the linear economic model that manifested in various forms throughout history, it is most closely associated with the industrial era, characterized by the emergence of linear industrial processes. During this period, substantial advancements in production technologies in Western countries stimulated increased consumption of goods and services, which, in turn, fueled the growth and concentration of producers in these regions. As a result, the demand for natural resources and labor increased significantly to support the functioning and growth of this emerging economic model. With abundant access to resources, primarily sourced from less developed countries, and rising labor costs, producers adopted business models that prioritized intensive material usage while minimizing reliance on human labor. (Sariatli, 2017; Selvan & Ramakrishna, 2022)

Profit motives were instrumental in driving the expansion and widespread adoption of the linear economic model. To maximize sales and increase profits, producers employed aggressive marketing strategies that effectively shaped consumer preferences and fostered a culture of consumerism. This shift encouraged a mindset centered on the short-term gratification of desires, often blurring the distinction between immediate wants and genuine needs. To sustain continuous sales, many producers moved away from manufacturing durable and easily repairable products. Instead, they emphasized items with shorter lifespans that were expensive and challenging to repair, coupled with frequent product updates designed to replace previous models. The widespread availability and affordability of diverse consumer goods contributed to the gradual normalization and entrenchment of the linear economic model as the traditional standard (Morseletto, 2023; Devčić, 2022; Özkan & Yücel, 2020).

Evaluating the environmental impact of the linear economy presents significant challenges, as not all waste is quantified or directed to landfills. A portion of waste is improperly disposed of directly into the environment, incorrectly sorted, broken, or stored for prolonged periods in private residences. Furthermore, the distinction between waste and resources is a socially constructed concept; an item may be perceived as one or the other depending on the context. This subjectivity affects evaluators' decisions on what constitutes waste for inclusion in assessments and influences the environmental policies formulated by governments (Morseletto, 2023; Zhang et al., 2024).

The combination of global population growth and rising living standards has solidified the linear economy as the prevailing model, substantially amplifying anthropogenic pressure on renewable and non-renewable resources as well as on natural ecosystems (Morseletto, 2023; Rashid & Malik, 2023; Jørgensen & Pedersen, 2018).

Although the linear economy remains prevalent, its appeal is waning due to increasing awareness of its environmental and public health implications. Within academic and policy-making circles, it is progressively

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regarded as an obsolete model associated with negative outcomes. Consequently, it is frequently advocated for reduction or full replacement by a more sustainable model that better aligns with the evolving socio-economic landscape (Geissdoerfer et al., 2017; Sariatli, 2017).

4. THE CIRCULAR ECONOMY MODEL

In recent decades, it has become increasingly evident that the linear economy is unsustainable in the long term, as it inevitably results in resource depletion and the accumulation of waste detrimental to both the environment and public health. Within this context, a fundamental transformation of economic systems is imperative to ensure sustainable socio-economic development (Roleders et al., 2022).

The circular economy model emerged as a response to the limitations of the linear economy, advocating for an economic framework that minimizes resource consumption and reintegrates materials back into the economic cycle. Initially, solutions were framed around the 3R strategies: reduce, reuse, and recycle. Over time, additional concepts were introduced, expanding these strategies with terms such as remanufacture, recover, redesign, and others, giving rise to models like the 6R or 10R frameworks. Furthermore, alternative approaches, such as product maintenance and sharing, were proposed as replacements for individual ownership (Morseletto, 2023; Jawahir & Bradley, 2016; Kirchherr, 2017).

This approach has been present throughout history. Even in the early, rudimentary economies of prehistoric times, our ancestors engaged in recycling and reusing materials, such as hunting remnants or tools. As technology advanced, new methods of recycling and reuse emerged, including the smelting of metals and the repurposing of construction materials like bricks, stone blocks, and wood. In this way, materials originally sourced from natural resources remained within the economic cycle for longer, helping to reduce costs and minimize environmental impact (Morseletto, 2023; Hendry et al., 2017).

Initially, the practice of recycling and reusing resources was driven by the limited availability of materials and a lack of knowledge about large-scale resource exploitation. Over time, this practice evolved into a culture centered on resource conservation, an understanding of environmental needs, and the importance of maintaining a harmonious relationship between the environment and human communities (Morseletto, 2023).

The modern concept of the circular economy emerged in the latter half of the 20th century, with its definition evolving over time through contributions from various researchers and professionals in the ecological and environmental fields (Andrade et al., 2021; Winans et al., 2017).

The circular economy model introduces a new approach to the production of goods, focusing on preserving added value for a longer period than traditional products through strategies such as recycling and waste reduction. The core principles of the circular economy foster innovation and reduce externalities, encouraging the development of durable products with modular designs and extended life cycles. By reintroducing recycled products into the economic cycle as reusable resources, the model generates additional economic value by reducing costs and limiting the exploitation of natural resources. This is particularly important as the limitations of the classical linear model become more apparent, especially concerning resource supply (Sariatli, 2017; Rashid & Malik, 2023; Jawahir & Bradley, 2016).

Within the circular economy framework, the concept of a performance economy has emerged, where businesses provide services rather than consumer products, promoting shared use of products. Additionally, biomimicry advocates for the design of production systems that emulate natural processes. Industrial ecology, blue economy, and natural capitalism all support closed-loop industrial processes, where products can be recycled or waste repurposed as resources in other industrial sectors. Fundamentally, the circular economy aims to enhance economic efficiency and extend resource availability, offering a viable response to humanity's ever-growing needs (Morseletto, 2023; Youssef, 2023; Winans et al., 2017).

5. CHALLENGES OF THE TRANSITION TO A CIRCULAR ECONOMY

The adoption of the circular economy faces significant challenges, including the lack of practical solutions tailored to various industrial sectors and the absence of a well-defined legal framework at both national and

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international levels. Additionally, there is a notable lack of institutions dedicated to overseeing its implementation, compounded by insufficient funding for programs facilitating the transition to this model. Public awareness remains limited, with social marketing campaigns struggling to reach and engage a broader audience. Recycling, in particular, remains unpopular, and in some regions, it is almost nonexistent.

Another critical issue is the potential transfer of lifecycle control and management from public authorities or municipalities to private companies. This shift may lead to elevated costs, reduced competitiveness of products, or even the absence of certain products. Furthermore, it raises concerns about the emergence of cartel-like organizations that could exert disproportionate influence over socio-political and economic landscapes (Greene et al., 2024; Camacho-Otero et al., 2018; Jourdain & Lamah, 2024).

Despite widespread academic and governmental agreement in developed countries on the urgent need to adopt circular economy policies, societal and economic trends appear to contradict this objective. Rapid economic growth in certain regions has driven extensive construction of transportation and housing infrastructure, intensifying the exploitation of non-renewable resources. Concurrently, many companies continue to produce goods that are designed to fail or become obsolete quickly from a moral standpoint, perpetuating consumption-driven behaviors.

Recycling and repair practices remain underutilized, with a prevailing societal tendency to replace worn-out goods rather than recycle or repair them. This pattern undermines the principles of the circular economy and perpetuates reliance on the traditional linear model (Matyushok et al., 2021; Fambo & Ge, 2024; van Allen et al., 2022; Mihajlović & Đorđević, 2022; Šálková et al., 2024; Duarte et al., 2024).

To date, efforts to transition toward a circular economy have primarily concentrated on production systems and legislative frameworks, often overlooking the significant transformations required at the individual, family, and community levels. Although prominent models, such as the McArthur Foundation model, place the individual at the center of the circular economy, they fail to adequately address the intricate behavioral and social adjustments individuals must make.

For an extended period, the challenge of adopting a circular economy at the individual level has been predominantly viewed through the lens of insufficient public awareness about the need for such changes. However, this narrow perspective does not fully capture the complexity of the socio-cultural shifts required to support a circular economy effectively (Greene et al., 2024; Kondala et al., 2024).

The phenomenon of consumption is highly complex, deeply intertwined with consumers' daily behaviors, which are shaped by their socio-economic context. Most individuals develop a personal consumption culture rooted in routine practices and preferences, making it difficult to address solely through educational efforts about sustainable consumption. The goal of cultivating a new type of consumer, adapted to emerging demands and technologies, remains challenging and distant. Consequently, implementing the circular economy represents a long-term objective for countries aiming to achieve this transition.

To date, the adoption of lifestyle changes required by the circular economy has been predominantly framed as a matter of individual acceptance, expected to be resolved gradually through informational campaigns alongside shifts in market offerings. However, this approach has proven limited, as it fails to consider individuals' genuine needs and the widespread resistance to significant changes in consumption habits and daily routines. In many cases, circular strategies and policies are designed from an overly technocratic perspective, neglecting the social, cultural, and emotional dimensions that profoundly influence individual choices.

Thus, while the modern circular economy model theoretically places individuals at its core, practical implementation often falls short. The transition to circular policies is frequently perceived as involving high short-term costs, even though it promises clear long-term benefits, including financial savings, environmental protection, and improved public health. Currently, the linear economic model, characterized by the convenience of abundant, inexpensive products that are easily discarded, aligns more closely with consumer expectations. This model offers immediate gratification, with consumers enjoying easy access to new products without concerns about maintenance, repair, or the long-term environmental impact (Tiensuu, 2024; Padilla Rivera et al., 2020; Marchesi et al., 2020; Sutcliffe, 2022).

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A potential solution to address the challenges of transitioning to a circular economy involves the promotion of circular consumption practices, encompassing activities such as sharing, repairing, and recycling. Adopting a practices-based framework provides a more holistic approach by addressing the socio-cultural determinants of consumerism rather than focusing exclusively on individual choices.

Local and central governments can facilitate this shift by engaging diverse stakeholders, including educational institutions, urban social networks, community organizations, and employers, to promote and support these practices. The large-scale implementation of circular consumption practices offers two significant advantages. Firstly, it fosters behavioral shifts toward more sustainable lifestyles, counteracting the prevailing tendencies of overconsumption in modern society. Secondly, it enhances the understanding of the barriers individuals face in adopting such changes, particularly within the context of their everyday lives (Geerken et al., 2022; Benavente & Panchaud, 2008; Greene et al., 2024).

Current governmental efforts to implement the circular economy often rely on high taxation strategies, aimed at generating revenue to support the transition. However, this approach has encountered significant political and public opposition, highlighting the need for alternative solutions that consider the concerns of the business community.

Governments should explore strategies that include offering financial incentives, such as subsidies, grants, or tax breaks, to industries and service sectors that adopt circular economy practices. These measures can make the transition more appealing and economically viable. While taxation may play a role in driving change, it should not serve as the sole mechanism for promoting the circular economy.

The transition to a circular economy also faces resistance from political factions and interest groups that represent stakeholders adversely affected by the shift. Challenges include reduced profitability for producers and service providers, potential business closures, and job losses. Moreover, for many workers, retraining for employment in new roles aligned with the circular economy is often difficult.

To address these challenges, policymakers must actively engage with the business community, integrating their concerns into a comprehensive strategy. A collaborative approach involving academic, political, and business stakeholders is essential to developing policies that advance the circular economy while ensuring its feasibility and attractiveness to business owners and employees. Such an approach can mitigate opposition and foster a smoother transition to sustainable economic practices (Vence & López, 2021; Millios, 2021; Popkova & Bogoviz, 2020; Sinha, 2021).

6. CONCLUSIONS

The limited availability of natural resources has become a topic of intense debate in both academic and political circles in recent decades. The increasing recognition of the accelerated depletion of these resources has raised significant concerns regarding the sustainability of future socio-economic development. This awareness underscores the urgent need to rethink current patterns of resource utilization.

While human evolution has historically been - and remains - anchored in the exploitation of natural resources, the demands of a rapidly growing global population are placing unprecedented pressure on their availability. Consequently, there is a pressing need to transition toward a lifestyle that emphasizes reduced dependency on finite natural resources and promotes sustainable consumption practices. This shift is critical for ensuring the long-term viability of human societies and their economic systems.

Throughout history, human societies have oscillated between periods of excessive resource consumption and times of restraint, where resource reuse and repurposing were more common. In the current context, there is an urgent need to focus on solutions that reduce the consumption of finite natural resources and promote the reuse of materials and the use of renewable resources at the societal level.

At present, the prevailing economic model follows a linear "take-use-dispose" approach, which inevitably leads to the depletion of available resources and the accumulation of waste in the environment. This model contributes to the degradation of natural ecosystems, undermining the vital ecosystem services they provide, which are crucial for the survival and optimal functioning of human communities. Transitioning away from

this model is essential to prevent further harm to the environment and ensure the sustainability of human life on Earth.

In this context, the circular economy model has emerged as a potential solution, advocating for strategies that aim to close production cycles as much as possible through the adoption of the*R-strategies: repair, reuse, and recycling. While the circular economy model does have its limitations, it offers viable long-term solutions to various societal challenges. However, cultural aspects of daily life, entrenched consumer behavior, and the difficulty in altering production methods continue to perpetuate the dominance of the linear economic model.

The key advantage of the linear model lies in its ability to mass-produce cheap, easily replaceable products, which often obscures the long-term environmental and social costs. Within this framework, consumers are drawn to the convenience and accessibility of products, allowing them to consume freely without significant concern for the consequences of their actions or the effort involved in saving, repairing, or recycling. This consumer culture, driven by instant gratification and a disposable mentality, represents a significant obstacle to the adoption of circular economy principles at the societal level.

To effectively promote the circular economy model within society, a fundamental shift in the mindset and lifestyle of the population is essential. This transformation will not occur spontaneously, nor can it be achieved through simple promotional campaigns or awareness initiatives alone. A comprehensive and integrative approach is required, one that not only addresses the technical aspects of production but also deeply considers the psychological and sociological dimensions of consumption. Without this multifaceted approach, a widespread transition to the circular economy remains unattainable.

The focus should be on the development of best practices that engage human communities through educational and administrative infrastructure, as well as through collaboration with employers. Additionally, the business environment must be actively involved in the process, with particular attention given to their concerns, challenges, and needs during the transition to a circular economy. By ensuring that both individuals and businesses are supported in adapting to these changes, a more inclusive and sustainable economic model can be realized.

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