

Challenges and Opportunities in Implementing Circular Economy Strategies: A Focus on the 2030 Agenda

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Abstract. *The pressing need to tackle environmental degradation, climate change and the depletion of resources has elevated the concept of circular economy (CE) as a key element in sustainable development approaches. In contrast to the traditional linear model characterized by "take-make-dispose," the circular economy seeks to reimagine production and consumption frameworks to enhance resource efficiency, reduce waste, and foster long-term environmental sustainability.*

This paper explores the challenges and opportunities of implementing circular economy strategies in alignment with the 2030 Agenda for Sustainable Development. While CE is recognized as a transformative approach to sustainability, barriers such as regulatory fragmentation, financial limitations, and lack of standardized frameworks persist. The role of economic diplomacy is analyzed as a potential facilitator for international cooperation, policy alignment, and investment mobilization. Through a qualitative methodological approach, including case studies and policy analysis, the paper identifies key drivers and obstacles in the transition to a circular economy. Findings highlight the need for stronger multilateral collaboration and targeted policy interventions to accelerate the adoption of CE principles across industries.

The primary goal of the circular economy is to establish a stable pathway to prosperity for the whole society by fostering economic growth that protects the environment, ensuring sustainability for future generations. As we move towards 2050, the success will hinge on the capacity to implement both existing and emerging technologies at scale, alongside a range of geopolitical, social, economic, and regulatory influences. Thus, the circular economy becomes a strategic tool for integrating sustainability objectives into international economic policies.

Keywords: circular economy, economic diplomacy, Agenda for Sustainable Development, international cooperation, sustainability, policy alignment.

Introduction

Switching from a traditional linear model to a circular paradigm can foster economic growth and support sustainable development in the European Union. The traditional linear economic model of "take-make-dispose" has been used for many years but due to increasing environmental challenges, including waste generation, pollution, and resource depletion, there is a pressing need for change. In response to these issues, the circular economy has gained significant attention, even among smaller countries that are still grappling with their national strategies and legislation, because it is a new way of doing things, thinking about the Planet but also about the consumers and producers. This new concept aims to redefine growth by promoting principles like sharing, reusing, repairing, and recycling existing materials and resources. By extending the life cycle of products, the circular economy helps to protect the environment, reduce dependence on raw materials, create new jobs, and save consumers money (European Commission, 2020). The United Nations' Sustainable Development Goals (SDGs), outlined in the 2030 Agenda, are deeply connected to the principles of the circular economy and that's why prioritizing CE in our national strategies could be one of the most effective ways to build a better world by 2030. This paper seeks to explore the opportunities and challenges linked to the implementation of the circular economy across different

sectors, as well as to examine how economic diplomacy can aid in the global embrace of circular economy principles. The primary aims of the research are: (1) to identify key obstacles that impede the effective implementation of circular economy strategies in alignment with the 2030 Agenda, (2) to investigate the role and effectiveness of economic diplomacy in fostering international collaboration, facilitating policy harmonization, and promoting investment frameworks that support the transition to circular economy, with a strong focus on trade agreements, multilateral partnerships, and sustainability standards, and (3) to propose concrete policy recommendations to enhance regulatory consistency, private sector engagement and technological innovation in CE transitions. By tackling these topics, this research enhances the understanding of the interaction among economic, political, and environmental elements in the transition to a sustainable world.

One of the greatest challenges modern societies faces is the limited availability of resources. Despite acknowledging this, the situation is exacerbated by the large amount of waste produced. Globally, waste generation is on the rise. In the European Union, individuals and businesses generate almost 5 billion tons of waste per capita annually. This not only impacts the environment, biodiversity, and public health but also incurs significant management costs, highlighting in the same time the inefficient use of the Earth's finite resources. The global population consumes more than 100 billion tons of materials each year, with over 90% of all extracted and utilized materials ultimately going to waste. This underscores the urgent need for a shift toward a circular economy, which offers a comprehensive framework for achieving the SDGs by fostering sustainable practices across industries, promoting resource efficiency, and reducing environmental impacts (EIB, 2023).

The purpose of this paper is to examine the real potential of the circular economy to stimulate sustainable development while addressing key global challenges, and to highlight the critical role of economic diplomacy in facilitating the transition to green technologies, investments in sustainable infrastructure, and the establishment of international partnerships. All these factors are crucial for a global shift toward a sustainable development model and the best combination will lead us to a new, better world. This research aims to analyze the challenges and opportunities associated with the implementation of circular economy strategies in the context of the 2030 Agenda. Throughout the study, I will identify and exemplify the existing barriers, as well as the innovative solutions that have been implemented across different economic sectors. In order to identify the key drivers of the transition to sustainable economic models, it is necessary to understand the role and position of each actor, both state and non-state, in the global debate.

Analyzing from a scientific point of view, the study also adopts an interdisciplinary approach by combining public policy analysis, case studies and quantitative methods to outline a comprehensive overview of the circular economy and how it can truly contribute to achieving the SDGs. The results of the study will integrate perfectly into the mainstream of knowledge, not only by providing a robust theoretical and applied framework, relevant to all policymakers, academia and the private sector, but also by developing new relevant, effective and scalable strategies, which will bring us even closer to this transformative concept and its successful implementation.

The 2030 Agenda was created out of the current crisis and wants to mark the world's biggest challenges including all the conflicts, poverty and climate change. Achieving all the SDGs has become a must for every country and it takes so much details, planning and actions. It is also essential and crucial to cooperate with the principal actors in the international scene even though we talk about business or diplomatic spheres, the sustainability leadership must redress the gaps and find the best solutions to implement circular economy, to promote sustainability and sustainable growth (European Parliament, 2023). Diplomacy can be easily named the heart of global action towards the 2030 agenda and it can help to promote awareness, improve the market factors and regulatory

environment, grow international partnerships and underline opportunities. A great deal can be accomplished by leveraging the opportunities offered through sustainable investment, international trade, public-private partnerships, soft power, cross-border education, artificial intelligence, and digital transformation. Diplomatic instruments hold significant potential, particularly in fostering peace and prosperity for both people and the planet. Moreover, their importance extends to all 17 goals and the central of all these objectives is the idea of a global partnership. Therefore, it is essential to align diplomatic approaches with sustainable development; this is not merely an optional task but a critical necessity because various forms of diplomacy—including economic, digital, sport, cultural, corporate, soft power, climate, as well as multilateral and bilateral diplomacy—can contribute to the monumental global initiative aimed to achieve the commendable targets outlined by the SDG Agenda (Patricia Kenneth-Divine, 2023). We have seen what it means to not find a common path to follow and to act unilaterally, thinking only about your own wealth as a country.

Reaching the EU climate-neutrality objective in 2050 is very ambitious, especially for the Member States from Central-Eastern Europe. All the states will face challenges of transformational changes, but a good preparation of their administrative capacity will be a consistent support. The aim of this article is to analyze Romania's decision-making process for the implementation of the European Green Deal Strategy, reflected in its administrative capacity. For achieving this goal, an interesting model of analysis was elaborated, which takes into consideration three levels and dimensions: strategic (with executive and legislative dimensions), administrative (national and regional dimensions) and outcomes (assessed from a well-being lens and public opinions surveys). The model will be applied at the European and national levels (Romania), using qualitative research strategies and methods. Following the adoption of the 2030 Agenda for Sustainable Development in 2015, Romania has constantly advanced its commitment to the comprehensive and responsible implementation of the Agenda and its 17 The Sustainable Development Goals (SDGs) by strengthening the institutional framework for sustainable development. In 2017, the Romanian Government established the Department for Sustainable Development (DSD) as part of its operational framework, primarily focused on the implementation of the 2030 Agenda and its 17 SDGs. The adaptation of the 2030 Agenda to our national particularities is fully expressed in Romania's Sustainable Development Strategy 2030, which was approved in 2018 and Romania's Circular Economy Strategy, adopted in September 2022. Working on the circular economy means working on the majority of SDGs.

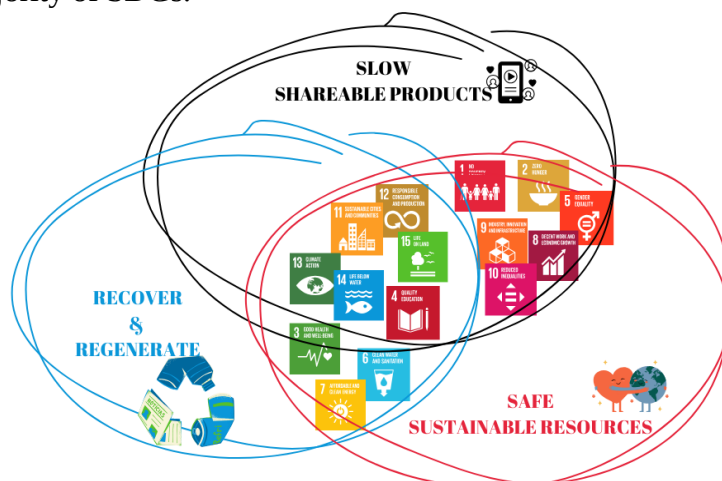


Figure 1. The way circular economy supports 15 of the 17 SDGs

Source: Author's own creation.

There's more to consider. By working with the 15 Sustainable Development Goals included in Figure 1, we directly support the application of the circular economy principles, which, in turn, promotes the use of resources in a sustainable way, aiming to significantly reduce waste. In this context, SDG 16 and SDG 17, which aim to promote peace, justice and strong institutions, as well as global partnerships for sustainable development, are essential in their proper implementation, supporting collaboration and effective governance, two fundamental aspects when we bring into discussion the effective implementation of the circular economy at large scale. Companies and governmental bodies are coming to understand that the circular economy serves as the perfect tool for sustainable design. It addresses the challenge of how to 'decouple'—severing the connection between resource consumption, environmental harm, waste, pollution, and emissions, while also fostering the improved quality of life we aspire to achieve for all individuals. Businesses also gain from it because it minimizes risks, opens up fresh revenue and service possibilities, and enhances brand reputation. By fostering local, regenerative, and circular production, we cultivate more profound and robust connections among suppliers, producers, and customers. It's important for us to switch from the current approach by 'selling more' and make it cheaper to the sustainable way of doing things. It is important to value the new way of making things – sustainable.

Literature review

Introduction to the Circular Economy Concept

The Circular Economy (CE) is an approach that represents a shift from the linear economy model, which has ecological and economic limitations, toward a model that rejects the take-make-dispose approach. A paradigm grounded in industrial ecology and ecological economics, the circular economy emphasizes resource efficiency, waste reduction, and continuous use of materials through closed-loop systems. As such, Walter Stahel and Michael Braungart heavily influenced the principles of the CE, as well as other concepts such as "Cradle to Cradle" (2002), as these principles emphasize the value of designing out waste and pollution, keeping products and materials in use and regenerating natural systems for a more sustainable environment. The circular economy serves to create long-term economic, social, and ecological value with the utility and value of resources maintained for as long as possible unlike a linear economy which focuses on maximizing short-term output. This model shift is occurring because more and more people recognize that our current consumption patterns are unsustainable and that we urgently need to reduce our dependency on finite resources while also reducing climate change and promoting sustainable growth.

Initially focusing on its theoretical foundations to provide everyone with an important basis in understanding the concept, especially in the field of industrial ecology and sustainable design (Pearce & Turner, 1990), and later on the concept itself and the ways to introduce it in as many sectors as possible, in order to provide the support and innovation that was needed. With the beginning of the 2000s, the focus gradually shifted to the practical implementation of circular principles and the development of business models capable of implementing all these new concepts, so as to generate the most significant economic growth and successfully replace current trends. The establishment of the Ellen MacArthur Foundation in 2010 played a crucial role in promoting the idea, providing comprehensive reports and frameworks that influenced both academic research and policy development. More recent studies have broadened the focus of circular economy research to examine its effects in different sectors, such as manufacturing, agriculture, and urban development. Subsequently, the implementation of circular principles in these areas has shown promise in minimizing waste, reducing carbon emissions and generating

new economic prospects, providing everyone with a tangible framework for the transition to a green economy (Ellen MacArthur Foundation 2024). Additionally, researchers investigated how incorporating digital technologies, including blockchain and the Internet of Things (IoT), can improve circular practices such as monitoring resource flows and optimizing product lifecycle management (Geissdoerfer et al., 2017). An increasing amount of literature points to a significant link between the implementation of circular strategies and the achievement of the Sustainable Development Goals; however, there are still gaps in understanding the long-term economic effects and scalability of these approaches.

According to the written articles and existing literature, the circular economy is gaining increasing importance worldwide. The need for a stronger regulatory framework is frequently highlighted and brought into discussions. To enhance the resilience of the EU and facilitate the green and digital transitions, it is essential to address sectoral vulnerabilities and adapt existing policies to a new economic model. A key document supporting the innovative vision of the circular economy in relation to the 2030 Agenda is the Strategic Foresight Report, published by the European Commission. This report provides a detailed analysis of all relevant aspects of the green and digital economy. The close relationship between these two areas can create the right framework for sustainable development, focused on future growth and the well-being of the global population. The foresight report encourages reflection on optimal strategies and pathways to achieve the objectives of the 2030 Agenda and, ultimately, the green transition by 2050. Although the steps may seem small in the current global context (e.g., Russia-Ukraine tensions, US-EU relations), they must remain consistent and dynamic to achieve climate neutrality and reduce environmental degradation.

Even though we have some examples of actions in this regard, there are still some gaps in the specialized literature. Although there are numerous studies that analyze the circular economy from an economic and technological perspective, there are no studies that directly correlate the achievement of the Sustainable Development Goals with circular strategies. This would be useful to truly see the importance of the circular economy and how it can generate economic growth in a sustainable way. Most of the research conducted to date focuses heavily on isolated case studies, without allowing the creation of a clear and broad picture of all the differences and similarities between industries when it comes to the adoption of circular principles and strategies. Another gap that needs to be identified and analyzed extensively is the effectiveness of the policies adopted to date. Numerous support policies have been implemented at national and international level, but few have been detailed so that we understand their effectiveness. Thus, to reduce this gap, I decided to discuss several case studies, providing good examples to follow both from the EU and beyond. Obviously, strategies and policies need to be adapted according to the country, its specialization or the standard of living, but in order to understand the real efficiency of this economy we need details, supported by quantitative analyses. Thus, this research aims to contribute to reducing and filling these gaps through an interdisciplinary approach, highlighting and supporting how circular strategies can be integrated into economic policies and practices to support the objectives of the 2030 Agenda.

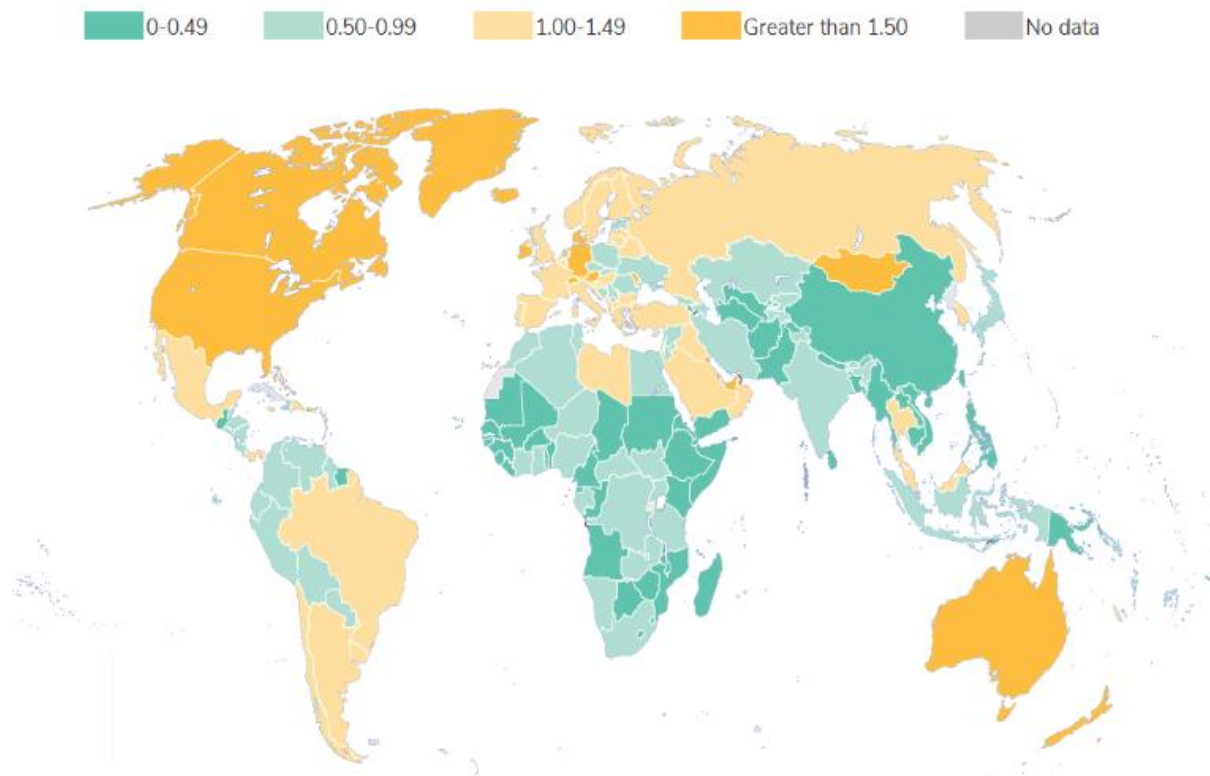


Figure 2. Annual municipal solid waste generated per capita (kilograms/capita/day)

Source: <https://datatopics.worldbank.org/what-a-waste>

Global waste generation is expected to hit 2.59 billion tons annually by 2030, increasing further to 3.40 billion tons by 2050. While minimal growth in waste production is expected for high-income nations due to the separation of material consumption from GDP growth, low-income countries are projected to experience a starkly different trajectory. These nations are forecasted to see their waste levels more than triple by 2050, driven by fast economic and population expansion. Furthermore, the most significant increases on a per capita basis are predicted to occur in low- and middle-income regions, highlighting the strong correlation between escalating economic activity, population growth, and waste generation in developing areas (World Bank Group, 2022).

The Role of Circular Economy in Sustainable Development

The circular economy is gaining recognition as an essential approach to accomplishing the Sustainable Development Goals (SDGs), especially those focused on responsible consumption and production (SDG 12), climate action (SDG 13), and sustainable cities and communities (SDG 11). By integrating circular economy (CE) practices, we can mitigate environmental impacts, improve resource efficiency, and promote inclusive economic growth. A study conducted by Kirchherr et al. (2018) highlights that the circular economy is providing such a holistic framework, which is capable of significantly decoupling economic growth from resource consumption, managing to align economic activities with sustainability principles. For example, reusing and recycling materials can significantly reduce the population's need for raw material extraction, thus mitigating the negative environmental consequences of mining and deforestation. And not only that. Knowing

that there is a capacity to reuse products and materials, which offer the same expectations and satisfy the needs of every consumer, people are perceiving the circular economy with a different point of view and understand that we are not only talking about high costs and hard implementation. In addition, companies and organizations are increasingly adopting circular business models, including product-as-a-service platforms, remanufacturing and sharing to reduce waste and increase profitability, giving the employees and the people they come into contact with a sustainable answer to everything we are witnessing today. Even though we have all these examples and the circular economy is widely endorsed for its potential to drive sustainable development, its implementation is still facing significant challenges, particularly in transitioning industries heavily reliant on traditional linear practices. Businesses and policy-makers identify cultural obstacles as the primary barriers to a circular economy, highlighting insufficient consumer interest and awareness, along with a cautious company culture. These challenges stem from market barriers, which are further exacerbated by the absence of collaborative governmental actions aimed at facilitating the shift towards a circular economy. Despite all of these, the number of employers in this field is growing day by day, as the importance of the circular economy is spreading.

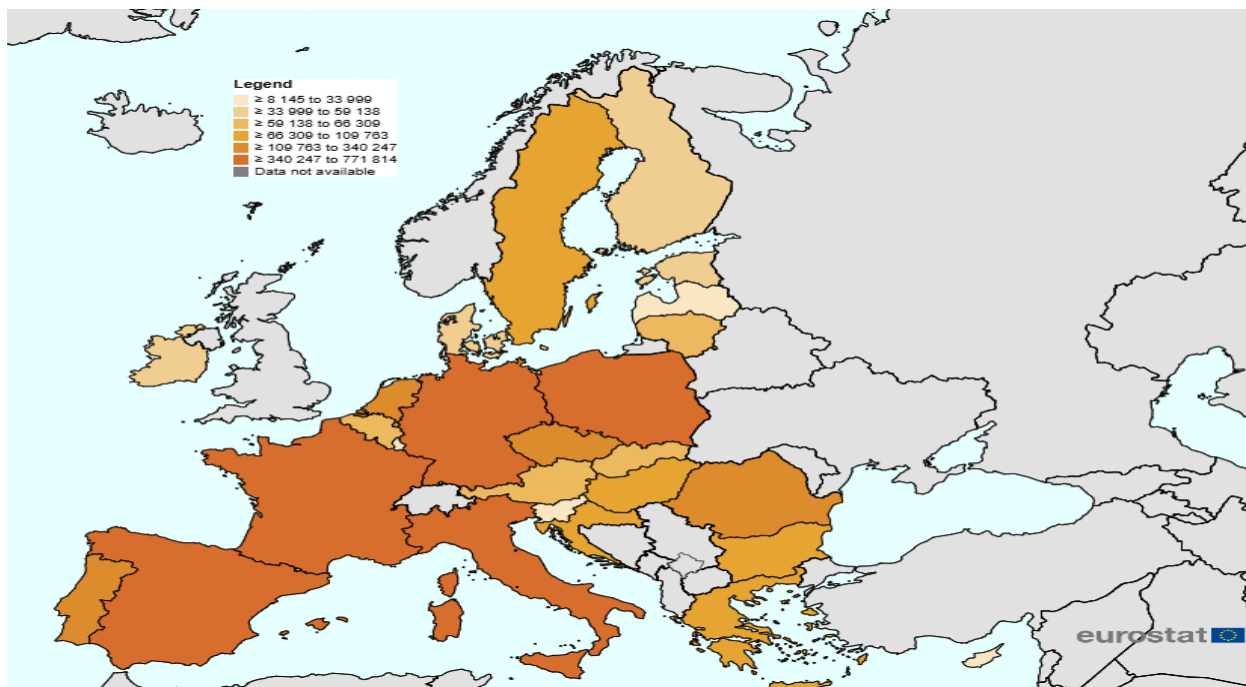


Figure 3. Persons employed in circular economy sectors

Source: https://ec.europa.eu/eurostat/databrowser/view/cei_cie011/default/table?lang=en

Romania is not among the top 3 countries with the most employees in this field, but observing the distribution, it ranks immediately after Poland, occupying the 6th place in the EU. As previously mentioned, Romania has set national plans that it closely follows to ensure that our country enjoys sustainable development, improving the standard of living for its citizens.

Economic Diplomacy and Circular Economy

The advancement of circular economy goals is significantly supported by economic diplomacy, which facilitates international collaboration, thereby aligning regulatory frameworks and attracting

increasing investment in sustainable technologies. As nations increasingly recognize the economic and environmental benefits of the circular economy, economic diplomacy is becoming a vital tool for supporting circular practices on a global scale. For example, the European Union has integrated circular economy objectives into its trade and environmental agreements, with the aim of setting global standards for sustainable production and waste management. By creating initiatives like the European Green Deal, the EU aims to strengthen international cooperation on circular economy policies, promoting the adoption of circular practices beyond its own borders. In addition, economic diplomacy also includes efforts to involve multinational corporations and investors in promoting green investments and sustainable business models, and their presence in this framework is increasingly important. Recent research highlights the significant potential of diplomatic initiatives in facilitating the global transition to a circular economy by building strategic alliances, sharing knowledge, and aligning national policies with international sustainability goals (Ranta et al., 2018).

Methodology

The methodology used in the research on the role of economic diplomacy in achieving the goals of the 2030 Agenda for Sustainable Development must be rigorous and should allow for a detailed analysis of cause-effect relationships, policy impacts, and the evaluation of the effectiveness of different diplomacy strategies and practices.

To start this research, I made a strong literature analysis, exploring and synthesizing relevant documents, such as international treaties, reports of international organizations, government policies, case studies and existing academic literature. These have provided me a solid understanding of the existing context, policies and diplomatic practices in the field of sustainable development, economic diplomacy and the circular economy. The case studies and the best practices used have served as an in-depth investigation of how specific countries or regions have used economic diplomacy to support the 2030 Agenda goals. I've managed to analyze specific policies and diplomatic initiatives (as we have seen in Amsterdam, Sweden, India, Japan) but also their impact on sustainable development in different contexts and cultures.

The analysis of trade policies, investment treaties, regional cooperation agreements and other relevant diplomatic instruments helped in assessing how they support or obstruct progress towards the goals of the 2030 Agenda for Sustainable Development. All this was supported by relevant quantitative data and statistics, which helped to assess the impact of diplomatic policies and practices on issues such as economic growth, poverty, inequality and environmental protection. The appropriate combination of these research methods, both quantitative and qualitative, provided me with a comprehensive understanding of the role of economic diplomacy in achieving the goals of the 2030 Agenda for Sustainable Development.

The number of articles written on this topic has been an important point of support in writing this paper. All the information could be collected much more easily and the numerous references helped me to develop strong ideas and principles that I used in my own research. I primarily used a qualitative methodology, but I also incorporated some indicators and data to strengthen the analysis and support the arguments presented.

Results and discussions

The circular economy offers solutions to reduce, regenerate, and redistribute the consumption of vital materials and resources of the planet. To achieve the ambitious goals of the circular economy, we need a shared vision and strong ambition.

By applying the following principles, business leaders and policymakers can develop a unified focus.

- **Reduce:** shifting focus from efficiency to sufficiency, resilience, and adaptability. Nature has its limits, and the economy is intertwined with it. Consequently, we must impose restrictions on material consumption and emphasize transforming material usage into societal advantages. This necessitates that a circular economy advocates for a cultural transformation that values immaterial approaches to meeting needs, while also investing in health, education, wellbeing, and quality employment, rather than the material accumulation that characterizes the dominant economic model in numerous regions globally (CGR, 2023).

- **Reuse:** transitioning from extraction to regeneration. Annually, approximately 25% of all materials utilized by the global economy originate from regenerative sources. The planet's ability to regenerate is a precious gift, and it is imperative that we honor and bolster this capacity for the benefit of future generations. Numerous regenerative solutions are already available today, demonstrating that humanity can shift from being net-negative to net-positive in relation to Earth's life support system (CGR, 2023).

- **Redistribute:** from accumulation to distribution. Presently, the world possesses sufficient wealth and resources to ensure a decent quality of life for every individual on the planet. The key challenge lies in effectively distributing access to these materials among a growing population, which necessitates redistribution, varied lifestyles, improved technologies, and social innovations. Transitioning from ownership and accumulation to models that promote equitable resource distribution can lead us toward a system that guarantees high living standards for everyone (CGR, 2023).

The following SWOT analysis will help us gain a deeper insight into the opportunities and obstacles related to the implementation of a circular economy. This analytical framework outlines the strengths, weaknesses, opportunities, and threats involved in shifting to a circular model, providing an overview of its impacts on economic, social, and environmental systems.

Table 1. SWOT Analysis of the Circular Economy

SWOT analysis	Details
Strengths	- minimises waste and pollution through recycling and reuse; - promotes efficient resource utilisation and reduces dependency on finite materials; - innovates in design, production, and supply chains; - opens new markets for remanufactured products and services; - enhances job creation in sectors like repair, recycling, and renewable energy; - foster local production and strengthens supply chain resilience.
Weaknesses	- high costs; - complex implementation; - low awareness and engagement among key stakeholders; - inconsistent policies and regulatory frameworks; - regulatory and legislative barriers.

SWOT analysis	Details
Opportunities	- advances in AI, blockchain, and IoT to optimise resource management; - opportunities for international collaborations and agreements; - increasing demand for sustainable products and services; - convergence (e.g., SDGs, Paris Agreement).
Threats	- resistance to change from stakeholders in the traditional linear economy stakeholders; - economic instability; - insufficient regenerative capacity for existing consumption patterns; - technological impediments in underdeveloped areas; - global disparities in resources and financial capabilities.

Source: Author's own research.

Challenges and Barriers to Circular Economy Implementation

While the circular economy presents us the significant potential for development and exploitation, its large-scale implementation faces more and more challenges. A main obstacle is the lack of standardized definitions and indicators related to circularity, which complicates the ability of companies and policymakers to measure progress and set clear targets. In many nations, current regulatory frameworks are still aligned with the linear economy and often do not provide enough incentives for companies to make them adopt circular and sustainable methods. For example, tax structures might prefer virgin materials over recycled alternatives due to their lower costs and fewer regulatory constraints. In addition, the substantial upfront investments required to transition to circular business models can be a significant obstacle, especially for small and medium-sized enterprises (SMEs). In addition, the deep-rooted linear mindset among consumers and industries, influenced by years of single-use culture and mass production, poses a cultural challenge to the adoption of circular practices. Finally, the lack of infrastructure for waste management, recycling and remanufacturing in many regions, especially in developing countries, poses a significant challenge. Studies suggest that overcoming these barriers will require coordinated efforts across multiple stakeholders, including governments, businesses, and civil society, to create enabling environments that support circular innovations and investments (Ghisellini et al., 2016).

Case Studies of Successful Circular Economy Implementation

Circular Economy in the European Union: A Pioneer in Policy and Implementation

The European Union (EU) has taken a prominent role on the global stage by embracing and advocating for circular economy practices. The launch of the EU Circular Economy Action Plan in 2015, followed by its revised version under the European Green Deal in 2020, has led the EU to establish ambitious objectives for transitioning to a sustainable and resource-efficient economy (European Commission, 2023). This policy framework includes directives focused on waste reduction, improving recycling rates, and promoting eco-design principles. A notable success is Sweden, which serves as a model for recycling efficiency. As of 2023, Sweden boasts a remarkable 99% recycling rate for household waste, with a substantial amount transformed into energy via sophisticated waste-to-energy plants (Swedish Environmental Protection Agency, 2023). This accomplishment can be attributed to robust government initiatives, public awareness efforts, and incentives encouraging industries to embrace circular practices. In a similar vein, the Netherlands has positioned itself as a leader in circular construction. A good example is Amsterdam that has implemented a circular strategy for urban development where there are incorporated many

principles of modular construction and also resource recovery. As a result, in 2022, all the public infrastructure projects were using at least 50% recycled materials, revealing the scalability of CE in urban planning (City of Amsterdam, 2022). These examples highlight how strong policy frameworks and government-led initiatives can foster the widespread implementation of circular practices across various sectors.

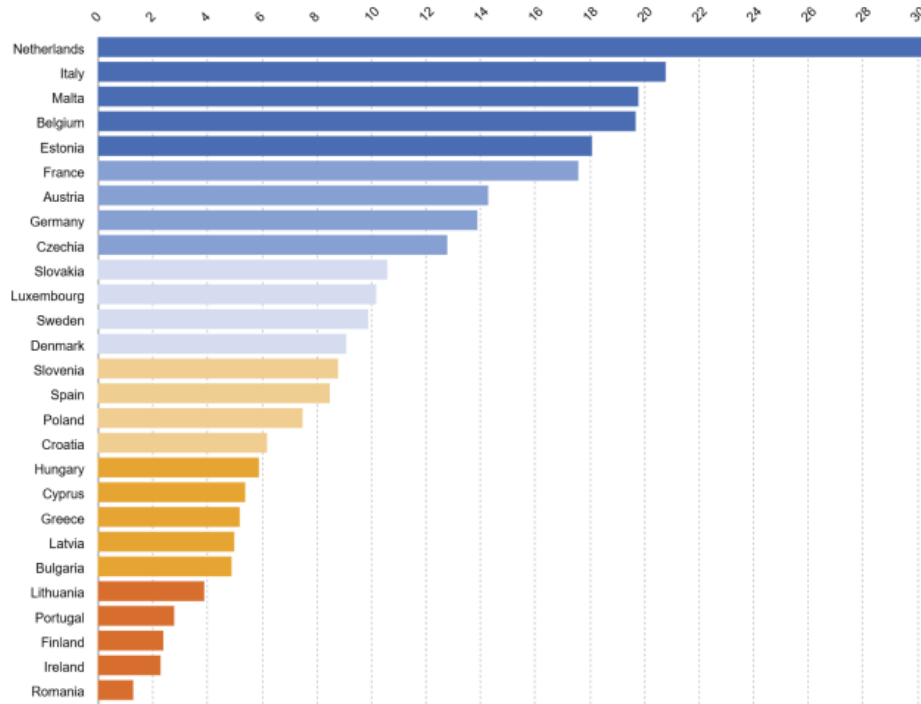


Figure 4. Circular material use rate in EU, 2023

Source: https://ec.europa.eu/eurostat/databrowser/view/cei_srm030/default/table?lang=en.

The Netherlands emerges as the leading country in terms of circular material use rate, which significantly surpasses all other member states. This highlights the country's robust dedication to recycling, resource efficiency, and the effective implementation of circular economy principles. Italy, Malta, and Belgium follow closely behind, showcasing impressive circular material use rates and appearing to possess well-established systems for recycling and incorporation of secondary raw materials into their economies. In contrast, countries such as France, Austria, Germany, and Czechia display moderate circular material use rates, indicating notable advancements but still having issues and a specific need for improvement compared to the top performers. At the bottom of the rankings, Romania, Ireland, Finland, and Portugal reveal some of the lowest circular material use rates within the EU.

Regarding the latter, the shift from a linear economic model to a circular one is a long-term and complex endeavor, and Romania is merely at the beginning of this path. It is essential to recognize during this transition that the development of social and economic capital cannot be dissociated from the effects of human activities on the natural environment. In order to protect natural ecosystems, minimize the loss of valuable ecosystem services, and restrict pollutant emissions, the advancement of socio-economic systems within the circular economy must prioritize the structure and productive potential of natural capital. To address the challenges of moving towards a circular economy, Romania requires a strategic direction and a long-term vision.

Although Romania has achieved certain economic advancements in the last ten years, its economic growth remains closely linked to waste production. Additionally, the country's waste management system is notably underdeveloped, with landfill disposal, often taking place illegally, remains the primary way of waste management. According to data from the Circular Economy Monitoring Framework, Romania is among the EU countries that exhibit the least favorable results in terms of resource productivity, the ratio of waste generation to GDP, waste treatment practices, and the integration of recycled materials into the economy. A clear gap exists between Northern and Western European nations, which lead the rankings, and Eastern and Southern European countries, which generally fall behind. This gap may reflect differences in economic development, the implementation of policies, and the public's awareness of the circular economy. Nations that perform in these areas could serve as examples or partners for sharing best practices.

Circular Economy in Asia: Balancing Growth and Sustainability

As a rapidly industrializing region, Asia offers both unique challenges and opportunities for the implementation of the circular economy, with Japan being one of the early pioneers of circular economy principles, formalizing this concept through the Basic Act on Establishing a Sound Material-Cycle Society, which was adopted in 2000. Japan's strategy focuses on minimizing waste through a priority approach: reduce, reuse, and recycle (Japanese Ministry of Environment, 2023). A notable example of industrial symbiosis in the country is the "Eco-Town" initiative, in which waste generated by one industry is used as a resource by another. For example, in Kawasaki Eco-Town, steel slag produced during steelmaking is reused for cement production, exemplifying a closed-loop model of industrial resource management (Japanese Ministry of Environment, 2023). In China, the circular economy plays a key role in national development strategies, highlighted in particular by the Circular Economy Promotion Law established in 2008. The focus on circular economy principles has increased in the 5-year plans, which has led to substantial progress in waste management and resource efficiency. As a good example, here we can talk about Shenzhen which has implemented intelligent waste management systems, where it combines IoT technologies with public participation to achieve recycling rates of over 70%. These cases show how CE contributes to harmonizing economic growth with environmental sustainability, especially in contexts of rapid urbanization (Song Yiran, 2017).

Circular Economy in the Manufacturing Sector

A key focus area for circular economy research and application has been the manufacturing sector and it is being studied extensively. To minimize waste and extend product life cycles, circular business models have been adopted by leading companies like Philips, IKEA and BMW. Philips offers "lighting-as-a-service", allowing many customers to pay for light instead of buying equipment (Philips, 2023). This company is designing durable, repairable and upgradable products to cut waste and keep customers happy. In 2021, the "Circular Hub" was launched by IKEA and the return, recycling, or resale of used furniture is allowed for customers, thus promoting reuse, and reducing landfill contributions.

Many companies in the automotive sector, with BMW being an important example, are increasingly making important strides to integrate multiple aspects of circularity throughout their varied supply chains. Launched in 2022, BMW's "Circular Cars" initiative concentrates on the design of vehicles that use solely recycled materials, while also guaranteeing that the components are easily dismantled so they can be reused when the product reaches the end of its life cycle (BMW Group, 2022). Since 2018, BMW has importantly reduced production waste by 35% while actively

adopting circular economy principles and these actions have effectively set an outstanding benchmark for companies striving for sustainable manufacturing.

Circular Economy in Emerging Economies: Overcoming Infrastructure Gaps

Emerging economies are facing limited infrastructure and weak regulatory frameworks, while developed countries benefit from a different system and manage to successfully implement CE global practices. Nations such as India and South Africa have succeeded through innovative practices to highlight the multiple possibilities of circular approach in environments where resources are indeed limited. In India, companies such as Recykal and Hasiru Dala Innovations have introduced digital platforms that improve waste collection and recycling processes, linking informal waste collectors to formal sectors, thus managing to increase recycling rates, while also generating economic opportunities for underserved communities. Also, another impressive case is that of South Africa, which has taken the lead in implementing extended producer responsibility (EPR) programs to address e-waste management (South African Waste Information Centre, 2023). This encourages companies to recover end-of-life products for recycling, thus minimizing waste and encouraging resource recovery. All these individual actions have the role of influencing the global decision and creating a wider opening for recyclable products. Like the motto of one of the companies, "Waste is Never a Local Phenomenon", good practices must be highlighted globally to create a new trend and connect consumers with the new way of consumption and production.

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Circular Economy in Agriculture: Reducing Waste and Enhancing Efficiency

The agricultural industry has the capacity to provide substantial insights into the implementation of circular practices, particularly in reducing food waste and increasing resource efficiency. To emphasize this, it is necessary to look at the situation in Denmark as a whole, where food production and waste management systems have adopted circular principles, and feed is now derived from by-products of breweries, with organic waste being converted into biogas and supporting the generation of renewable energy (International Energy Agency, 2023). Thus, through sustainable practice, it has been possible to create circular models that not only improve people's quality of life, but also propagate the phenomenon in the most complex industries. These methods not only reduce waste, but also generate additional income for farmers and food producers, thus providing a much more convenient alternative. Both for the producer and for the consumer, exploiting the balance between them for the benefit of the Planet.

In Kenya, the emergence of innovative startups such as Twiga Foods, uses the principles of the circular economy to address food waste, linking farmers to urban markets, thus reducing post-harvest losses. This strategy not only improves food security, but also decreases waste, showing how circular economy practices can effectively address both environmental and social issues in the agricultural industry (Twiga Foods, 2023). Twiga's services are transforming African retail by empowering suppliers, improving supply chains and providing consumers with better access to fresh food and more.

Table 2. Summary of Key CE Policies in Different Regions

Region	Policy Name	Policy Focus	Year of implementation	Goals
European Union	Circular Economy Action Plan (CEAP)	Waste management, resource efficiency	2015, updated in 2020	Transition to a sustainable economy, reduce waste
China	Circular Economy Promotion Law	Recycling, waste management, eco-design	2009	Improve resource efficiency and reduce environmental impact
United States	Save Our Seas Act	Plastic Waste Reduction, Marine Litter	2018	Reduce plastic waste, enhance recycling infrastructure
Japan	Basic Act on Establishing a Sound Material-Cycle Society	Resource circulation, recycling	2000	Promote recycling, minimise waste
India	Draught national resource efficiency policy	Resource efficiency, sustainable materials	2019	Improve resource use efficiency and support sustainable growth
Australia	National Waste Policy	Waste reduction, recycling, plastic waste	2018, updated in 2019	Encourage recycling, reduce plastic use

Source: Author's own research.

Conclusion

Around the world, a diverse array of stakeholders—including businesses, research institutions, and governments—are promoting various strategies aimed at improving waste management solutions within the circular economy. This includes the adoption of innovative technologies, effective management practices, and practical applications. It is evident that no single organization can tackle all the challenges on its own; therefore, understanding and integrating these approaches while focusing on the most impactful areas is crucial. Embracing a circular economy can help preserve high levels of value in resources and products while minimizing waste production. By emphasizing the 3Rs (reduce, reuse, and redistribute) in governmental policies and initiatives, and by encouraging collaborations between the public and private sectors, we can enhance the use of natural resources and make considerable progress toward sustainability.

I believe that the results of this study provide a significant contribution to the specialized literature by analyzing circular economy strategies across sectors and regions. Thus, the study brings added value not only by identifying the barriers and opportunities encountered but also by offering solutions applicable in various economic and geographical contexts. The development of effective public policies and sustainable strategies, both in the public and private sectors, will provide an analytical framework and support the implementation of the circular economy on a large scale. Relying on case studies, effective or not, and on the available empirical data, we can increase the implementation of the circular economy, integrating the results into the global debate.

Obviously, the research also has certain limitations. Being a subject that has gained importance in the last years, most of the information regarding the effective implementation of circular strategies is not yet public. Public data is not updated to date (2023-2024), and identifying them is often difficult, as official sources do not have sufficient information. Another limitation of

the paper is the generalizability of the conclusions, making it extremely difficult to identify the applicability of the results. These may vary depending on the sector, industry, region, economy, political system. It is important that each good or bad practice is adapted to national needs and restructured to fit the characteristics of the country. Being a constantly changing field, policies and regulations in the circular economy can influence the efficiency of the proposed strategies, requiring a constant study of the market. Despite all the limitations mentioned, the present study provides a solid basis for future research and can contribute to the development of innovative solutions to facilitate the transition to a sustainable economic model.

Environmental diplomacy provides the framework for institutional cooperation among nations. Combating climate change is imperative for the future of Europe and the world because it can have devastating effects on economies, including the loss of agricultural production, destruction of infrastructure, and increased costs for adaptation and reconstruction. Establishing a fair and sustainable economy from a climate perspective is an increasingly shared goal among nations and is frequently discussed. However, these goals can only be realized through international cooperation, including bilateral and multilateral collaborations. Unilateralism is not a viable solution in such cases, and a strictly national approach cannot yield significant benefits. The number of actors in world affairs has increased enormously, the types of actors have changed significantly, interactions between them have become more complex, and the international public policy agenda has evolved in response to changing circumstances, leading to an ever-greater need for adaptation and collaboration.

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