Circular Economy Business Model in Cambodia: Drivers, Barriers and Impacts

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Abstract: The notion of the circular economy has garnered noteworthy interest as a viable substitute for the conventional linear economic framework. This paper investigates the emergence of circular economy business models in Cambodia, focusing on the drivers that are shaping this transition, the barriers that businesses encounter, and the potential impacts of circular economy initiatives on the Cambodian economy and society. By examining the Cambodian context, this study seeks to shed light on the opportunities and barriers associated with the adoption of circular economy practices in a least developed country setting. Even though Cambodia has made strides toward development, Gaudemar (2016) noted that it is improbable for the country to "graduate" from its Least Developed Country (LDC) classification until 2025 or later. Furthermore, the findings of this research can contribute to the gap in the literature related to policy interventions and strategic decision-making aimed at promoting sustainable economic development and environmental stewardship in Cambodia.

Keywords: Circular economy, Drivers, Challenges, Impact

1. Introduction

The traditional linear economic model, characterized by the take-make-dispose approach as pointed out by Jorgensen and Pedersen (2017), has led to resource depletion, environmental degradation, and social inequalities, particularly in developing countries such as Cambodia. In response to these challenges, the concept of the circular economy has emerged as a promising framework for achieving sustainable development by promoting the regenerative and efficient use of resources. As Cambodia continues to experience rapid economic growth and industrialization, there is a mounting requirement to transition towards more sustainable and resource-efficient business models. Industries, academics, and legislators recognize the circular economy as a promising strategy for collaboratively enhancing value chain sustainability and competitiveness because of its capacity to disentangle economic growth from resource consumption and waste production (Bressanelli, 2022). A production and consumption paradigm known as the "circular economy" emphasizes “sharing, leasing, reusing, repairing, refurbishing, and recycling current materials and products for as long as feasible” (European Parliament News, 2023). Through this approach, the “goods' life cycle is extended and waste is minimized to the bare least. Recycling ensures that resources from products that are nearing the end of their useful lives are kept within the economy” whenever possible. These could be regularly used in a prolific way, creating even additional value. This “deviates from the traditional, sequential economic take-make-consume-throw-away process” allowing the idea to hinge on a profusion of inexpensive, effortlessly available resources and an “energy paradigm (European Parliament News, 2023).

2. Circularity vs Sustainability

Primitive man survived with whatever resources were accessible and may possibly be utilized as, or converted into, lodging, provisions, foods, or equipment. Stahel (2020) identified that as “circular economy based on scarcity, as expressed in an old New England maxim: *use it up, wear it out, make it do or do without”*. The author opined that circularity was a requirement for most as only the affluent and influential resided in relative contentment and that this condition can still be found in less developed populations. The circular economy's reuse and repair strategies, however, have persisted throughout this time, silently and unnoticeably, across society. According to Stahel (2016), reducing the use of inputs for industrial production gave rise to the Circular Economy (CE) concept in the 1970s, however it turns out that circular economy may be applied to any resource. With the start of the 1973 oil price shock, the circular economy began to gain traction in the early 1970s. In 1976, Stahel and Ready delivered a study to the European Communities Commission in Brussels that examined an “economy in loops” and “its effects on society”. The "axiom of the smallest loop" was named after this

research, which demonstrated the “economic superiority of reusing objects over recycling materials”, (Awan et al., 2020).

According to Andrews (2015), the integration of circular economy into sustainability is a component of the holistic picture that circular economy delivers. This creates a parallel between the two concepts, with sustainability serving as the foundation and circular economy as the actual application. It is vital to take note that circular economy has been around long before sustainable businesses began stemming from Sustainable Development Goals (SDG). The Brundtland Commission explored sustainable development as a solution to environmental issues in their report in 1987. The concept of sustainable development received major international recognition for the first time at the 1972 United Nations Conference on the Human Environment in Stockholm, Sweden (United Nations, 2024). The idea that growth and the environment, which were once seen to be two different concerns, could be managed in a way that would benefit both was embraced by the international community, even though the phrase was not used specifically. Following the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, the focus shifted to sustainable development. In 2015, the UN established the Sustainable Development Goals (SDGs), which emphasize interconnectedness and balance environmental, social, and economic sustainability. The SDGs are to "end poverty, protect the environment, and ensure peace and prosperity by 2030" (Hajian and Jangchi Kashani, 2021).

3. The History of Circular Economy and the Onset of Circular Economy Business Models

The history of circular economy is depicted by Tuladhar et al., (2022) as shown in Figure 1.

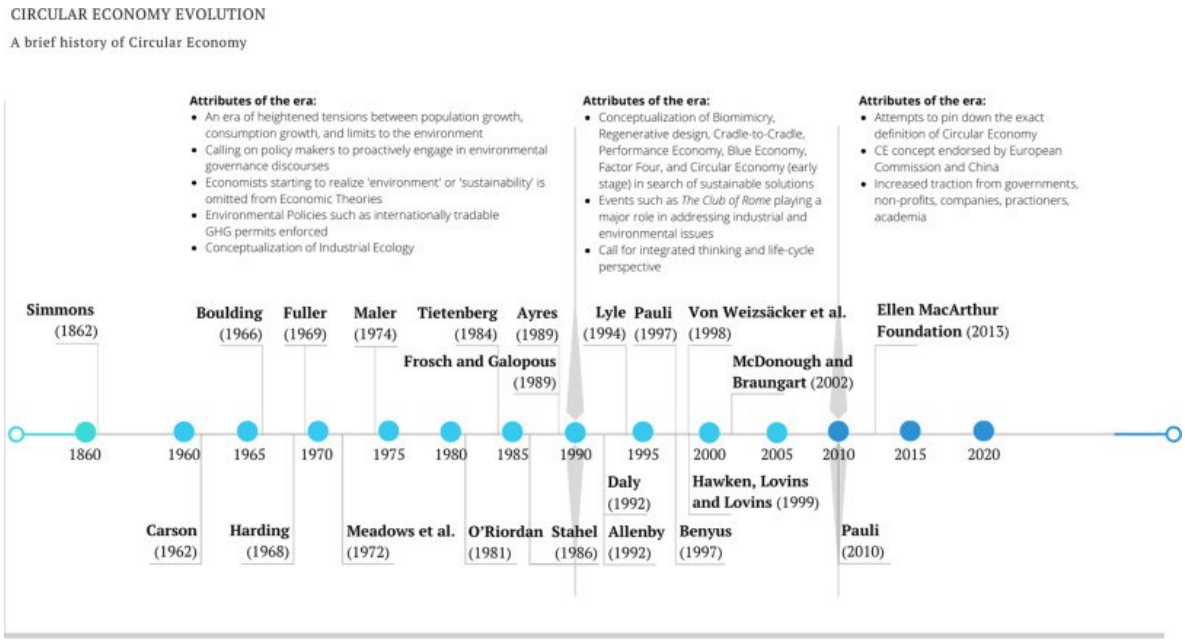

Figure 1: History of Circular Economy. Source: Circular Economy Evolution, (Tuladhar et al., 2022)

While environmental literature began to flourish in the 1960s, the first indications of circular economy may be found in the 1860s, when Simmonds proposed the necessity of symbiotic practices, those that benefit the environment and the economy equally in 1862, as mentioned in Thuladhar et al., (2022). The evolution of circular economy story over time is shown in the part that follows. Since 1860s till 1989, there were increasing tensions between population growth and increasing limits to the environment which resulted in policy makers to engage proactively in environmental governance discourses (Tuladhar et al., 2022). During this period, economists comprehended the omission of 1) environment and 2) sustainability from Economic Theories which subsequently resulted in the introduction of internationally tradable GHG permits and the conceptualization of Industrial Ecology by Frosch in1992.

In the next two decades, the world saw the conceptualization of 1) Biomimicry, 2) Regeneration Design, 3) Cradle to Cradle, 4) Performance Economy, 5) Blue Economy and 6) Factor Four, summarized in Table 1.

Table 1: Conceptualization of Environmental Governance

Theorist	Concept	Description
Benyus (1997)	Biomimicry	Drawing comparisons between companies and the natural ecosystem and offering "ten lessons" for an environmentally conscious business, society, or economy to learn from nature in order to find solutions to issues or just to breathe new life into existing goods and procedures
Lyle (1994)	Regeneration Design	Prioritizing the selection of materials, designing products for ease of disassembly, and applying systems thinking are essential to maximizing environmental efficiency prior to, during, and post-product usage.
McDonough and Braungart (1998)	Cradle-to-Cradle	Complies completely with nature, no harmful elements are produced, therefore laws are not necessary.
Stahel, 1986 theory mentioned as a solid building block of the CE by Sillanpää and Ncibi (2019)	Performance Economy	A method that "builds spiral-loops that minimizes the flow of matter and energy, and environmental degradation without impeding economic growth or the advancement of social and technical sciences"
Gunter Pauli (2010)	Blue Economy	Creative approaches that result in zero waste and claim that the formation of industry clusters, where the trash from one is used as an input for another, is the solution
von Weizacker (1997)	Factor Four	Provided examples of how our economies' resource productivity may rise fourfold, allowing us to live twice as well with half as much resources.

Source: History and evolution of the circular economy and circular economy business models (Tuladhar et al., 2022)

Subsequent decade witnessed the efforts to pin down the exact definition of Circular Economy (Kirchherr et al., 2017) which was endorsed by the European Commission and China resulting in increased traction for governments, non-profits, corporations, practioners and academia (Tuladhar et al., 2022).

4. Drivers

4.1 Government Initiatives

Cambodia, which is home to about 16 million people, lacks industrial diversification in terms of electronics and enhanced production and is mostly dependent on the garment sector. According to The World Bank (2023), Cambodia's GDP is expected to expand by 3.0%; yet, prominent ecological challenges and societal disparity are still present (BTI, 2022). USAID (2022) reported that deforestation, pollution, and environment corrosion are among the environmental problems that Cambodia faces. Between 2001 and the present, 2.6 million hectares of forest cover have been lost due to severe deforestation throughout the previous 20 years with logging and agricultural growth being the primary causes of deforestation (Pauly et al., 2022). Pheakdey et al. (2022) highlighted the significant issue of waste management, as landfilling and burial at disposal sites pose environmental dangers such as greenhouse gas emissions. Due to its reliance on resource extraction and export-oriented industries such as the textile industry, Cambodia's economy produces a lot of pollution and waste, primarily “Municipal Solid Waste” but also industrial, construction, and demolition waste (UNDP, 2022).

Given the situation, the circular economy holds great promise for addressing resource depletion, environmental degradation, and waste generation for a wide range of stakeholders, including businesses, governments, and society at large (Crome et al., 2023). An increase in the consumption of materials and energy has resulted from Cambodia's expanding population and economy. Like in other nations, this has led to new difficulties in managing waste, energy, the environment, and natural resources sustainably. The Circular Economy Strategy and Action Plan, in the words of H.E. Say Samal, Minister of the Environment and Chair of the National Council for Sustainable Development, "aim to create a win-win solution to the present challenges". The Strategy aims to close the loop of the entire value chain and preserve the value of resources for as long as feasible, as opposed to just extracting, using, and discarding them (UNDP, 2021).

"The circular economy has the ability to provide new economic values, a variety of job opportunities, and beneficial social and environmental change. It may direct the course of sustainable development for nations of all income levels, including Cambodia” said UNDP Cambodia Resident Representative Nick Beresford while the Swedish ambassador to Cambodia, H.E. Björn Häggmark, underlined further that in order to advance the idea of

a circular economy, the government must take the initiative, and all other stakeholders namely households, people, and others must also actively participate (UNDP, 2021).

Acknowledging the crucial role played by the business sector in expediting the shift towards a circular economy, a private sector platform was developed alongside the new plan to facilitate the exchange of information regarding feasible policies and initiatives. One of the most important first steps in developing a circular economy is the sharing of best business practices. According to H.E. Mikami Masahiro, Japan's Extraordinary and Plenipotentiary Ambassador to the Kingdom of Cambodia, "this knowledge will enable other industry players to use and replicate best circular economy measures and accelerate the industry-wide transitions", (UNDP, 2021).

Another initiative is the Circular Strategy on Environment 2023 – 2028 focusing on framework for Policy, Administration and Extension for a Clean, Green and Sustainable Cambodia as depicted in Figure 2. The Royal Government of Cambodia (RGC), through the 7th Legislature of the National Assembly, produced the Circular Strategy on Environment 2023-2028 in compliance with the Pentagon Strategy, Phase 1 - 2023-2028 (MOE, 2023). This strategy outlines the RGC's commitment to its mission in the environment to satisfy the economic needs in order to achieve sustainable development goals. Under this initiative, priority programs must be implemented in light of climate change as environmental and natural resource management, particularly in the areas of “land, water, minerals, and forestry”, continues to develop while simultaneously address the new issues brought on by climate change.

Figure 2: Circular Strategy on Environment 2023 – 2028. Source: Ministry of Environment, Royal Government of Cambodia

The two relevant programs that drive circularity under this initiative are presented in Table 2.

Table 2: Strategy and Programs Summary

Strategy 1 (Clean) Angle 1: Controlling Pollution **Priority 1: Improving the implementation and monitoring of solid waste, liquid, and hazardous waste management systems**
Create sub-decrees regarding the management of single-use plastics and plastic waste, the management of hazardous wastes, paint lead levels, electrical and electronic equipment types, reports on pollution releases and transfers into the environment, and other pertinent legal instruments;
Encourage the application of the 4R Principle (Refuse, Reduce, Reuse, and Recycle) in order to encourage a circular economy and solid waste management, especially with regard to plastic trash;
Promote the conversion of plants and agricultural products into packaging materials as an alternative to plastic;
Distribute legal documents to the public, especially the owners of pollution sources, about the management of solid, liquid, plastic, and hazardous wastes; bolster the application of laws pertaining to the handling of plastic, liquid, solid, and hazardous wastes; bolster the knowledge of Ministry and Provincial Department of Environment representatives regarding the handling of hazardous, liquid, and solid wastes;
Strengthen the ability of officials from the Ministry of Environment, Municipal or Provincial Department of Environment on the management and disposal of solid, liquid, plastic, and hazardous wastes;
Coordinate, cooperate, and mobilize support to encourage environmentally friendly schools, pagodas, and other religious institutions, legal entities, and individuals who have participated in the environmentally friendly activities.

Strategy 1 (Clean) Angle 1: Controlling Pollution **Priority 3: Promoting the implementation of waste management policy linked to the implementation of decentralization and deconcentrating policy and Safe Village, Commune-Sangkat policy** Examine and compile information regarding the kinds and intensities of risks and consequences associated with hazardous materials, hazardous waste, radioactive waste, and medical waste that are dumped into the environment; Publish information about the dangers and consequences associated with hazardous materials, hazardous wastes, radioactive wastes, and medical wastes;
Encourage the Department of Environment and Sub-National Administration to get training, information, and teaching on solid waste management techniques; collaborate to track and assess the 2020–2030 urban solid waste management policy's implementation;

Source: Ministry of Environment, Royal Government of Cambodia Website

4.2 Corporate Social Responsibilities (CSR)

Another key driver to circularity is the corporate social responsibility (CSR) that drive companies to embrace circular business models. Companies, Business Associations and Chambers of Commerce often synergize to educate small and medium businesses on circularity and sustainability measures. The Global Circular Fashion Forum's (GCFF) for example, initiated the "Circular Fashion Partnership Cambodia," that intends to assist countries that produce textiles in hastening and increasing the recycling of post-industrial textiles waste. Through this partnership, another event titled the "Textile Waste Opportunities for Circular Textiles, Garments, and Footwear in Cambodia" an initiative by GFA and GIZ, aims to establish circular systems in Cambodia. The initiative will support a pilot project focusing on sorting and recycling textile waste, diverting it from landfills and incineration. The event attracted representatives from manufacturers, brands, recyclers, and government officials (Khmer Times, 2023).

Similarly, the glass bottle return initiative, launched by HEINEKEN Cambodia, is a strong endorsement of the brewer's “Brew A Better Cambodia” aim, which lays out specific, bold goals to increase circularity and decarbonize the whole value chain by 2040, as well as its production by 2030. Since packaging plays a significant role in the brewer's whole value chain footprint, expediting returnable packaging is essential to fulfilling these long-term obligations. Since the food and beverage and hospitality sectors account for the majority of the market for glass bottle sales for brewers, collaborating with them is also a deliberate move (Anon, 2023).

In the same way, the first 4P's store abroad opened in Phnom Penh, Cambodia, in July 2021. In response to Cambodia's waste dilemma, the pizza restaurant adopted the daring idea of zero-waste. By following the 5Rs—reduce, reuse, repurpose, and recycle—they started the movement from the ground up and turned the food scraps from the restaurant into a brand-new zero-waste pizza. They created meaningful pieces of art out of the broken plates and used leftover lime peels to make tea that produces no trash. All garbage, from inside and outdoors, is moved to the recycling room for segregation and recycling (Pizza 4P’s, n.d.). During a panel discussion that took place in April 2024, the Sustainability Specialist of the company shared that food shells are powdered and mixed to animal feed as they are great source of calcium and further reiterated that much of their 5Rs are integrated into the company’s operations and are integral part of their business. The company firmly believes that they can confidently advance towards a waste-free future if they analyzed every action carefully and with resolve.

Likewise, a joint venture between the Siam City Cement Company (SCCC) of Thailand and the Chip Mong Group of Cambodia, called Chip Mong Insee Cement Corporation established the business unit Chip Mong Ecocycle in 2019 to offer sustainable industrial waste management solutions through cement kiln co processing for the first time in Cambodia. Through partnerships and collaborations to provide new technology for sustainable industrial waste management through circularity, Chip Mong Ecocycle is leading the charge for transformation in Cambodian industrial waste management (H&M Foundation, 2021). Although circular business models in Cambodia have proven to be a success, the number of such businesses are still relatively small in comparison to the majority of traditional business models both formal and informal in the country.

5. Barriers

The two main sectors of the waste economy in Cambodia are the solid waste management sector and the notional recyclable waste management industry. In some nations, state-owned or major corporations either entirely or partially "manage" the recycling trash systems. By contrast, Cambodia's garbage system is an authentic “grassroots recycling economy” that operates independently of the state until 2019 and adheres to its own laws and paths. Throughout the world, the so-called "informal" (recyclable) waste economies have been

progressively organized and commercialized during the last 20 years (Eitel, 2022). Meanwhile, waste reclaimers are still able to continue collecting recyclables in neighboring nations like Thailand and Vietnam, but the government provides financial and technical support to the industry in addition to capacity-building programs and incentives (Sasaki et al. 2014, Chua 2016, Jellinek 1993, Nguyen 2019 as cited in Eitel, 2022). Thus, Phnom Penh's recycling economy is unique, but its distinctiveness is threatened by heated political debates over formalizing the industry.

Given that Cambodia was engulfed in a genocide until the late 1970s, understanding circularity in the nation requires awareness of the surrounding context and the ability to connect to the intricacy of the culture and recent history of the nation. Despite the rapid growth and government initiatives, Cambodia lax enforcement and societal readiness are the immediate barriers to transformation from traditional business models to circularity.

According to Ghosh (2019), the adoption of circular economy has been restricted to industrialized countries with improved waste management techniques, technological advantages, wider access to resources, and requisite skills while emerging economies continue to lag in adopting circular practices due to the enormous complexity of this approach (Diaz, 2017). A recent study indicated that just 8.6–9.1% of the world's economies were circular in 2019–2020, underscoring the stark delay in the adoption of circular practices (Kirchherr and van Santen, 2019). Other barriers explored in multiple studies based on industries and size of enterprise are summarized in Table 3.

Table 3: Barriers to Circular Economy

Industry	**Barriers**	**Researcher**
Agriculture	Absence of knowledge and awareness, as well as lack of government assistance	Kumar et al. (2021)
Coffee	Localized perspective, absence of uniformity, and consistency of governmental directives	van Keulen and Kirchherr (2021)
Textile Market	Low consumer demand	Huang et al. (2021)
Global Textile	High production and sales costs for circular goods	Hartley et al. (2022)
Electronics and Electrical Equipment	1) Producer reluctance & cultural issues 2) Weak waste regulation, a lack of transparency throughout the production chain, and a lack of CE standards	1) Cole et al. (2019) 2) Rizos and Bryhn (2022)
Automotive	1) Absence of knowledge and experience with CE, 2) Ineffective environmental legislation, ownership difficulties, and a lack of government assistance	1) Agyemang et al. (2019) 2) Kayikci et al. (2021)
Furniture	Insufficient funds and unpredictability in the economy	Silvius et al. (2021)
Scale of Enterprise	**Barriers**	**Researcher**
	Insufficient expertise and significant expenses associated with adhering to rules and regulations	García-Quevedo et al. (2020); Mishra et al. (2022)
	Poor profitability, a lack of cooperation and awareness among stakeholders, and management's reluctance to change	Mangla et al. (2018)
	Inability to distinguish between profit-sharing and responsibility models, as well as ownership concerns	Tura et al. (2019)

Micro, Small and Medium Scale Industries	Lack of harmonization of the laws, lack of government enforcement and collaboration, and lack of uniformity	Stumpf et al. (2021
	Insufficient customer awareness and businesses' reluctance	Kirchherr et al. (2018)
	Age factor: older people reluctant to use products made of recycled materials as opposed to younger people	Neves and Marques (2022)
	Technical and economic impediments are connected to regulatory restrictions.	Bening et al. (2021)

Source: Circular economy adoption barriers in built environment- a case of emerging economy (Mhatre et al.,2023)

The barriers and the low percentage of circularity adaptation globally are indicative why it is even more challenging to foster circular business models in least developed economy such as Cambodia. As ideal as it seems, this requires enormous effort in terms of regulatory and socio-economic aspects. Chen et al. (2020) inferred that promoting environment-oriented development such as circular economy can be financially taxing for local governments, as it requires significant financial outlay and slows GDP growth. The author further indicated that transitioning from economy-oriented development to circular economy requires sacrificing economic growth, affecting early-stage local economic growth.

6. Impact

Despite the barriers, countries around the world including Cambodia have not ruled out the impact the circular economy has on environmental preservation. The positive impact of circular business models has proven to be effective in the garment industry. Under the International Finance Corporations' Cambodia Improvement Program, eleven suppliers that "operate cut-and-sew and garment-washing" businesses put resource efficiency measures in place in 2019 and 2020. These efforts reduced electricity and water use by 18% and 29%, respectively. This action supports the nation's climate goals while also increasing productivity. Producers implemented resource-efficiency initiatives over 22 months, reducing energy usage by 29%, water usage by 44%, and greenhouse gas emissions by 25%, with 60% of recommendations implemented, considering the epidemic (IFC Org, 2022). Similarly, the UNDP published the 'Handbook for Implementing Circular Economy Practices in Hotels and Restaurants' that offers Cambodian hotels and restaurants helpful advice on how to change their operations to become more sustainable (UNDP Org, 2021). Initiative such as this is crucial for Cambodia as the Minister of Tourism predicted that there would be about 28 million tourists by 2030, a fourfold increase from 2020 (IPS Commercial, 2020).

7. Conclusion

As Cambodia transitions towards a circular economy, the 'private sector will play a central role in achieving this change' (UNPD Org, 2021). Similarly, regional and world organizations support will expedite the transition through infrastructure provision and capacity building. The Economic Research Institute for ASEAN and East Asia (ERIA) Capacity Building Program and Policy Design Department organized a two-day training on Circular Economy Introduction for Cambodian officials, realizing the importance of strong and rigorous policymaking. In order to ensure the successful implementation of circular economy priorities and agenda under the ASEAN Framework on Circular Economy, the workshop's objectives were to assist Cambodian policymakers in mainstreaming circularity in routine work processes, comprehending circular economy concepts, identifying potential economic activities or sectors, establishing enablers, and putting in place suitable monitoring and evaluation mechanisms

In conclusion, the circular economy is neither a panacea for prosperity, sustainability, or employment. Businesses and governments need to make sure that these initiatives are taking us in the right direction and not toward a circular future that is even less sustainable by carefully assessing the expected and actual impact of these measures. Making the changes necessary to use the planet's resources sustainably can be accomplished through circularity. However, chasing circularity as a goal unto itself deceives us and might even have unfavorable effects. We need targets to make sure we stay inside the safe operating space and don't go beyond

the planet's capacity to maintain society, as well as metrics to help us stay focused on the impacts we seek. To maximize the benefits of circularity and assist society in realizing its advantages, industries and governments alike must adopt it carefully and thoughtfully. From a resource stance, recycling is only valuable if the resources required for "recovery and recycling are less than those needed for extraction and disposal", (Moss, 2019). There have even been suggestions that, if not executed with caution, the circular economy could lead to the depletion of resources. Maybe society shouldn't aim for zero waste in the end and should instead determine the ideal reprocessing rate for each material and understand the complete impact of circularity on businesses, countries, and even individuals' sustainability efforts. This requires further study and impact-based metrics to accurately measure the impact of circular activities on resources and the environment.

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