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# Limitations of the circular economy concept in law and policy

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The circular economy (CE) concept has gained significant attention globally and nationally largely due to anticipated economic, environmental, and social benefits for sustainable development. As a result, laws and policies to advance CEs are increasingly being adopted nationally and regionally. In this perspective article we argue that a systematic approach to designing and implementing CE laws is necessary to cover the multi-level, multi-actor, and multi-sector dimensions of the CE concept. Such an approach should be built on a CE concept with clarified boundaries and scale to ensure it remains a meaningful concept and avoids perpetuating an unsustainable status quo. Moreover, a systematic approach should incorporate justice dimensions to deliver CEs that are fair, just, and inclusive. In the article we first identify five fundamental limitations to existing CE laws: (1) unclear boundaries and scale, (2) oversimplification of goals, (3) sidelining of justice dimensions, (4) reinforcement of the status quo, and (5) unintended consequences. Secondly, based on these limitations, we identify four directions for further research that can contribute to developing more effective CE laws. As there is no one-size-fits-all CE approach, any changes to existing laws and policies, or development of new ones, will require a wider evidence-base, from both the Global South and marginalized communities in the Global North, to reflect, inter alia, different practices, cultural relationships with material flows, and epistemological diversity.

## KEYWORDS

circular economy, waste law, justice, sustainable development, linear economy

## 1. Introduction

The circular economy (CE) concept prioritizes preventing waste generation and minimizing resource use or, alternatively, reusing, recycling, or recovering wastes for the purpose of sustainable development (Kirchherr et al., 2017). It is the much anticipated economic, environmental, and social benefits from transitioning to a CE that frequently lie behind the widespread interest in adopting laws and policies. Some estimates predict, for example, that a transition to a CE globally will reduce greenhouse gas emissions by 39% and resource extraction and use by 28% compared to 2019 levels (Circle Economy, 2022), while simultaneously generating USD 4.5 trillion by 2030 (Lacy and Rutqvist, 2015).

CE laws<sup>1</sup> and policies are being designed and implemented at local, national, and international levels. Examples include the Amsterdam Circular 2020–2025 Strategy in the Netherlands (Municipality of Amsterdam, 2020) and Peterborough's Circular City Roadmap in the UK (Opportunity Peterborough, 2018) at local level, and China's Circular Economy Promotion Law 2008 and South Korea's Framework Act on Resources Circulation 2016 at national level (see Dhawan and Beckmann, 2019; Lesniewska and Steenmans, 2023). Increasingly the CE concept is also referenced to promote sustainable production and consumption, for example, of plastics in the international legally binding instrument on plastics pollution currently being negotiated (UNEP, 2022).

Despite the promotion of the CE concept and its incorporation into laws and policies, a number of issues remain unresolved. The limitations, including CE's definition and objective, have been widely covered in academic literature (e.g., Kirchherr et al., 2017; Korhonen et al., 2018; Genovese and Pansera, 2021), though their description and analysis have been fragmented and inconsistently linked to law and policy (Lesniewska and Steenmans, 2023). This perspective article therefore identifies, collates, and outlines five limitations inhibiting the effectiveness of CE laws: (1) unclear boundaries and scale, (2) oversimplification of goals, (3) sidelining of justice dimensions, (4) reinforcement of the status quo, and (5) unintended consequences (sections 2–6). The article concludes with recommended areas for further research (section 7). The suggested future directions for research are not limited to legal scholarship, as the issues transcend disciplinary boundaries, necessitating greater transdisciplinary collaboration.

## 2. Unclear boundaries and scale

Definitions in laws and policies are important as they set out what is, and what is not, included in their scope. For instance, despite being used in their titles, the CE is not defined in Uruguay's Sustainable Circular Economy Rules 2017, the European Union's (EU) Circular Economy Action Plan (European Commission, 2020), or France's Anti-waste and Circular Economy Law 2020. The CE is, however, defined in some other laws<sup>2</sup>:

- Article 2 of China's Circular Economy Promotion Law 2008: "A generic term for reducing, reusing and recycling activities conducted in the process of production, circulation and consumption."
- Section 3(19) of Germany's Act to Promote Circular Economy and Safeguard the Environmentally-Compatible Management of Waste 2012 (also known as the Circular Economy Act): "The prevention and recovery of waste."

1 The term "CE laws" is used in this article to encompass both those explicitly labeled as "CE laws" (e.g., France's Anti-waste and Circular Economy Law 2020), as well as laws underpinning CE principles (e.g., China's Cleaner Production Law 2002, EU Waste Framework Directive 2008/98/EC) and laws impacting CEs (i.e., areas of law beyond the traditional environmental law focus, such as consumer protection and consumer law, that can incentivize and inhibit CE implementations) (see Lesniewska and Steenmans, 2023).

2 The definitions of China's and Germany's CE laws are based on official translations. No official translation of Mexico's CE law is yet available.

- Article 3.VIII of Mexico's General Circular Economy Law 2021: "System of production, distribution and consumption of goods and services, orientated to the redesign and reincorporation of products and services to maintain the value and useful life of the products, materials and resources associated with them as long as possible in the economy, and that the generation of waste is prevented or minimized, reincorporating it back into cyclical or biological production processes, in addition to promoting changes in production and consumption habits."

Yet, the boundaries and scale of the CE concept within the definitions adopted by these laws remain relatively vague. Clarity about a CE's boundaries and scale are important so questions can be answered such as: Is a single act of reuse, recycling, or recovery sufficient? If more than a single act is needed, how many loops constitute a CE system? What is the role of open- and closed-loops in operationalizing the CE? Does the CE concept exist on a spectrum—are some systems more circular than others (e.g., those that prioritize waste prevention vs. those that recover wastes)? Can a single organization be circular? Can there be a global CE? For the CE concept to remain meaningful, these questions need to be answered in such a way that it minimizes waste generation and resource use within both technical (non-renewable abiotic resources) and biological (renewable biotic resources) cycles (e.g., Haas et al., 2020; Navare et al., 2021).

The definition in Mexico's General Circular Economy Law addresses the scale of a CE to an extent by recognizing it is a system but does not identify any minimum requirements or boundaries in relation to what constitutes a "system". China's Circular Economy Promotion Law and Germany's Circular Economy Act neither address scale nor boundaries. Currently, a single waste recovery act could constitute a CE in China and Germany. Such vagueness about boundaries and scale is problematic as it means laws can facilitate and perpetuate the current linear economic system. Moreover, some dimensions of the global waste trade are described as circular (e.g., Yamaguchi, 2018), even though there are issues surrounding, for example, the resultant greenhouse gas emissions and the trade-offs between the costs of local waste management and exporting wastes that can limit the circularity of global waste trade. The CE concept, therefore, currently exists on intersecting spectra: a spectrum ranging from single to many acts of prevention, reuse, recycling, or recovery, as well as a spectrum ranging from local actions to international trade facilitating a CE.

## 3. Oversimplification of goals

Murray et al. (2017) argue that the CE concept can result in oversimplifying goals. Such oversimplification, and therefore inadequacy, is demonstrated in some laws and policies that focus only on a limited segment of the circle: the environment dimension. Despite economic and social dimensions being core elements of the CE's aim of sustainable development, they are often largely absent in numerous laws and policies. Although both are recognized to a limited extent in the objectives of some CE laws (e.g., health in Germany's circular Economy Act and Japan's Basic Act for Establishing a Sound-Material-Cycle Society, culture

of environmental responsibility and economic development in Mexico's Circular Economic Law), they are not reflected within the other provisions (see section 4 in relation to social dimensions; see also Lesniewska and Steenmans, 2023).

Moreover, the environmental focus is often limited by solely addressing recycling and recovery operations rather than the CE priorities of waste prevention and virgin resource use minimization. Waste management tools, such as landfill avoidance and recycling targets, may be considered “low-hanging fruit” compared to legal tools to change embedded production processes, consumption patterns, justice dimensions, and especially the wider linear economic system.

The narrowly construed meta-narratives on certain environmental goals are further exacerbated by inconsistent recognition and limited incorporation of multilevel and multi-sectoral dimensions of CE laws' design (Lesniewska and Steenmans, 2023). Global materials trade, for example, is a significant disciplinary domain that has yet to receive proportionate attention within CE law and policy research.

## 4. Sidelining justice dimensions

The CE concept's justice dimensions are nascent in academic literature (Kirchherr, 2021; Velenturf and Purnell, 2021; Ashton et al., 2022; Lesniewska and Steenmans, 2023). Whereas to date references to social dimensions in CE laws and policies often appear limited and tokenistic,<sup>3</sup> justice issues are yet to be reflected on at all (Lesniewska and Steenmans, 2023). Social references include: “Developing a [CE] is an important strategy for the economic and social development of the state” (Art. 3, China's Circular Economy Promotion Law) and “Local governments shall formulate and implement policies for a transition to a resource-circulating society ... and take account of the economic, natural, and social conditions of their jurisdictions” [Art. 5(2), South Korea's Framework Act on Resources Circulation]. Such social references remain superficial as there is rarely the necessary follow up to connect the stated intent with systemic implementation. Incorporating justice into CE research will require more focus on the distribution of impacts (benefits and losses), as well as recognition and procedural rights in law and policy design and implementation.

The sidelining of justice dimensions within the CE mutually reinforces the oversimplification of goals (section 3). The reinforcement of the status quo (section 5) is also a dominant factor explaining why CE approaches are not yet just.

## 5. Reinforcement of the status Quo

Where the CE concept is aligned with existing business-as-usual interests, it reinforces and perpetuates the status quo. Both the CE concept's unclear boundaries and scale in law

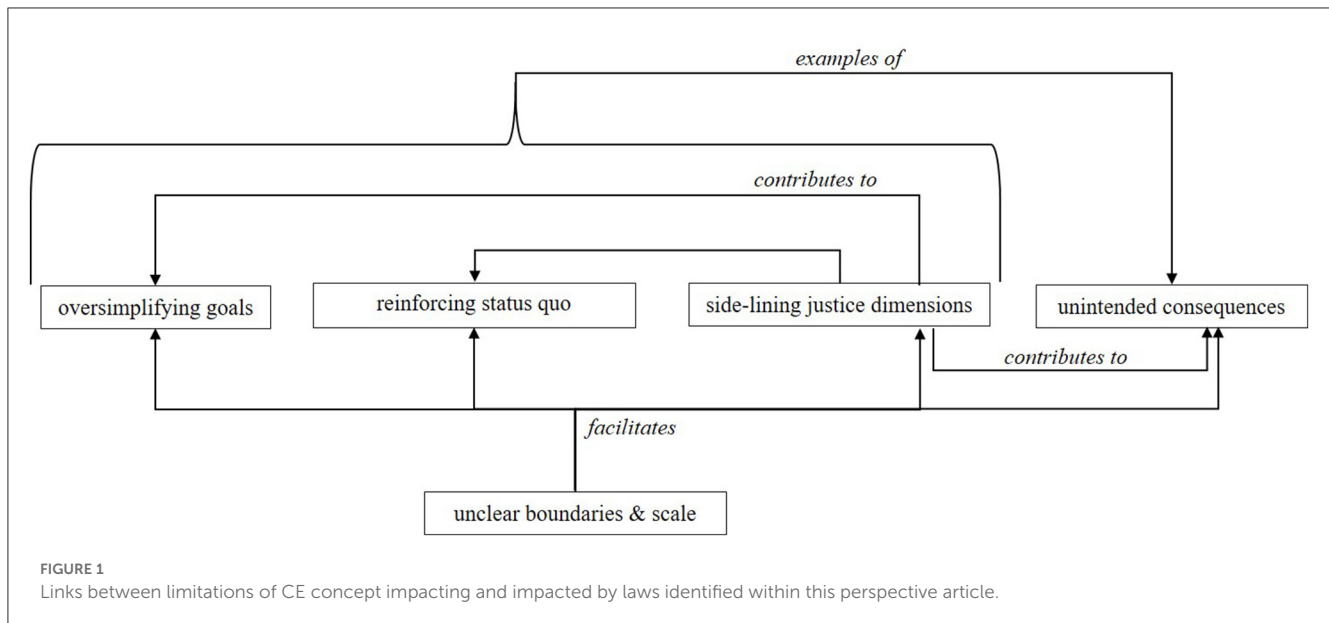
<sup>3</sup> A critical discussion is also the limited interrogation of the substance of social dimensions within CE discussions generally, not just within law and policy, but this is beyond the scope of this brief perspective paper. See Gregson et al. (2015), Lesniewska and Steenmans (2020), and Kirchherr (2021).

and policy definitions (section 2) and the oversimplification of goals focused on, inter alia, landfill diversion and recycling targets (section 3), enable the status quo to continue legitimately. Several multinational companies, for example, state that they are facilitating the transition to a CE: The Coca-Cola Company claims, for instance, that it contributes to a CE by encouraging consumers to recycle Coca-Cola bottles (The Coca-Cola Company, 2020) and Amazon states that it is investing in a CE by funding initiatives to improve recycling activities (Amazon, 2020). Yet both these (and countless other) companies rely on continued consumption that drives increases in demand for virgin raw materials (e.g., Kopnina, 2021). These companies' CE statements are, however, not incorrect, as they fall within vague CE definitions. Even though there may be some positive outcomes effected by companies pursuing such CE approaches, the changes are often limited to those that have economic drivers rather than motivated by wider sustainable development aims (e.g., Steenmans, 2018; Webster, 2021). Priorities of the CE concept (i.e., emphasis on waste prevention and minimal resource use) therefore need to be continuously and consistently implemented.

As a result of unclear boundaries of the CE definition facilitating the perpetuation of business-as-usual—thereby enabling “same-but-circular-business” models (Lesniewska and Steenmans, 2023)—there is a risk that the concept becomes a marketing tool for greenwashing (Laurenti et al., 2018; Nobre and Tavares, 2021; see Kopnina, 2019 for CE case studies and greenwashing). Greenwashing covers the practice of disseminating misleading environmental claims (e.g., Becker-Olsen and Potucek, 2013; Kopnina, 2019; European Commission, 2022). It is not a new nor unique practice to the CE concept; Westerveld first coined the term in 1986 in relation to the reuse of towels at hotels being promoted as an environmental practice, even though it was primarily a cost-saving measure (Becker-Olsen and Potucek, 2013). In response, the European Commission, for instance, has proposed a directive to empower consumers by protecting them against greenwashing (and other unfair) practices and providing better information (European Commission, 2022). Questions remain around the effectiveness of such proposals though if other limitations, including the vague CE definition, are not also resolved. Similarly, there is a risk of social washing. Social washing is akin to greenwashing in that it concerns practices of promoting the false perception that products are social responsible (e.g., Rizzi et al., 2020).

## 6. Unintended consequences

Reinforcing the linear economic system (section 5) is patently not the intended objective behind the CE concept. Yet, same-but-circular-business models will perpetuate, and even worsen, current environmental and social injustices (Lesniewska and Steenmans, 2023). For instance: re-processing of e-waste can use environmentally damaging processes (Velis, 2017); CE approaches can result in job losses, especially for informal and/or precarious workers in the Global South such as waste pickers (Velis, 2017); and there may be lock-ins to systems reliant on continued industrial scale waste generation (e.g., district heating, in which waste sources provide heating for local customers by using a heat distribution



network of pipes—Upham and Jones, 2012). Moreover, some of the legal tools adopted to promote CEs can also have unwanted effects. Extended producer responsibility (EPR), for example, is a mechanism used to support CE transitions by placing responsibility for the management of products throughout their life-cycle on the producers of products. Secondary markets for waste may be created to support EPR implementation, which again provide an incentive to continue to generate large volumes of particular waste streams. Some unintended consequences are unavoidable with trade-offs required between different effects based on life-cycle assessments (e.g., do the costs of needed infrastructure and energy neutralize the benefits of recycling?). These should be assessed in conjunction with the priorities of a CE (see also section 5).

Further, to avoid unintended consequences, more critical research is needed on the role of law and policy for enabling a CE within the Global South (as well as more widely, especially within poor, marginalized communities), as well as the impacts of measures adopted in the Global North. For example, research should consider the impact on informal income generating opportunities for marginalized peoples, the informal economy employs approximately 61% of all workers (ILO, 2018) and, moreover, it is estimated that informal waste pickers recycle more plastic waste than the entire formal plastic waste management industry combined (Cook and Velis, 2020; Velis, 2022). Such research will provide the evidence-base of CE laws impacts within different contexts. Such insight will contribute to more informed reforms to existing CE laws and policies, as well as new ones, so that their overall effectiveness can be improved.

## 7. Discussion and conclusion

There are positive initial steps to incorporating CE within the legal landscape both through explicitly labeled CE laws as well as through integrating its underpinning principles into other areas of law and policy, such as waste, eco-design, and

energy efficiency. But, as laws are being adopted, shortcomings of the concept and current implementations are increasingly being exposed. The limitations identified in our research and summarized in this perspective article—unclear boundaries and scale, oversimplification of goals, sidelining of justice issues, reinforcement of the status quo, and unintended consequences—do not exist in siloes. Figure 1 illustrates the links between them and demonstrates that unclear boundaries and scale are a foundational issue for the CE concept, as detailed in preceding sections.

Based on the limitations identified in the previous section, we recommend a particular focus going forward on CE law and policy research:

1. *Adopting a systemic approach in law and policy:* A systemic approach to designing and implementing CE laws and policies is necessary to cover the possible multi-level, multi-actor, and multi-sector dimensions of the CE concept. As a first step, further research needs to develop what a systemic approach for adopting the CE concept in law and policy entails: what theoretical, practical, and methodological approaches need to be considered in designing CE laws and policies? This will then help evaluate the appropriateness of different approaches—for example, whether to approach the CE through a stand-alone CE law or policy or like France's Anti-waste and Circular Economy Law 2020, which amends many environmental as well as non-environmental codes, such as the Consumer, Education, Public Health, Public Property, Maritime, Highway, Insurance, Housing and Construction, and Regional and Local Authorities Codes. Simultaneously, the three other areas identified below need to be investigated to provide a foundation and evidence-base for such an approach.
2. *Clarifying the boundaries of the CE concept:* Clearer boundaries and scale can ensure that the CE remains a meaningful concept that cannot be used for, inter alia, perpetuating business-as-usual and greenwashing. The questions surrounding the definition of CE could, at least in part, be addressed by adopting a heuristic,

as has been proposed for industrial symbiosis (Chertow, 2007; Lesniewska and Steenmans, 2023). Industrial symbiosis is a strategy to promote a CE, as it involves different organizations engaging in mutually beneficial transactions to reuse, recycle, or recover waste and by-products to source inputs and optimize the value of the residues of their processes (Domenech et al., 2019). The proposed heuristic for industrial symbiosis is three different entities exchanging at least two different resources, as Chertow (2007) argues this “begins to recognize complex relationships rather than linear one-way exchanges”.<sup>4</sup> A heuristic developed for the CE could require a minimum number of reuse, recycling, or recovery operations, but would not necessarily need different organizations and would also need to incorporate prioritization of minimal waste generation and resource use.

3. *Addressing justice dimensions of the CE concept*: “Bringing justice into the frame for legal and policy research is an absolute necessity if future CEs are to be sustainable, inclusive, and just” (Lesniewska and Steenmans, 2023). By purposively including justice requirements into law and policy, both substantively and procedurally, CEs will support a transformation away from an unjust status quo. Justice dimensions thus need to be equally integrated in practice: there needs to be more explicit incorporation of and engagement with discourse on the distribution of benefits and burdens, and recognition and procedural rights, of CE laws design and implementation. Mechanisms should be developed to monitor and evaluate justice dimensions of the CE, including to avoid “social washing”. Social washing is akin to greenwashing in that it concerns practices of promoting the false perception that products are social responsible (e.g., Rizzi et al., 2020).<sup>5</sup>
4. *Examining CE laws and policies’ impacts, particularly within the Global South and marginalized communities in the Global North*: To avoid unintended negative impacts of adopted laws and policies, there needs to be a broader evidence-base to inform CE transitions. There is no one-size-fits-all approach for CE approaches and instead dialogue needs to be facilitated on, among other things, different experiences, epistemological diversity, and cultural relationships with material flows. Critical research on CE laws needs to specifically focus on the Global South, which has been absent compared to the availability of research on the Global North on CE law and policy (Schroeder et al., 2019; Muchangos, 2022; Lesniewska and Steenmans, 2023). There are numerous countries in the Global South who have implemented CE laws, as well as others that are intending to develop CE legal frameworks—e.g., China, Mexico, Uruguay (see above), and Rwanda (Ministry of Environment of Rwanda, 2019). Learning lessons from these countries, as well as

marginalized communities in the Global North, can also inform an understanding of laws impacts at all scales from the micro to the meso.

Focusing on these four recommended areas will ensure that the CE concept continues to be interrogated. Resultant changes to CE approaches may then facilitate meaningful and effective CE laws and policies to be developed and designed. Our suggested future directions for research are not limited to legal scholarship, as the issues raised in this perspective article concerning the limitations of the CE concept in law and policy transcend disciplinary boundaries. To realize a systemic just and sustainable CE transition, significant transdisciplinary collaboration is needed urgently if the Earth’s planetary boundaries (see Rockström et al., 2009; Steffen et al., 2015) necessary for human life are not to be breached.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Author contributions

FL and KS contributed equally to the intellectual development of the main ideas of this manuscript. KS led on the writing and FL reviewed and significantly edited. Both authors contributed to the article and approved the submitted version.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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<sup>4</sup> Industrial symbiosis can, however, not in and of itself realize a CE, as it can be limited in scope and lock into continuing materials flows rather than changing consumption patterns.

<sup>5</sup> See also related terms of “bluwashing”, “corporate hypocrisy”, or “corporate social responsibility-washing” (e.g., Pope and Wæraas, 2016; Seele and Gatti, 2017; Sailer et al., 2022).

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