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Perspective

Research on the circular economy: A critique of the field

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There is tremendous excitement about the circular economy (CE) in academia, with a vibrant interdisciplinary research community having emerged around this topic in recent years (63% of CE authors stem from the natural sciences, 37% from the social sciences, according to our analysis, further outlined below). Research output on the topic was arguably jumpstarted by the initial Ellen MacArthur Foundation (EMF) report in early 2012 (Geissdoerfer et al., 2017). Since its publication, roughly 2700 articles have been published on the topic of CE, already more than 750 in 2019 alone. Overall, the literature corpus has grown by almost 600% since the report's publication.

However, we find that scholarly work on CE has yet to translate into practice.[1] After all, the world is only 9% circular, as de Wit et al. (2018) find in their Circularity Gap Report. From our business conversations, we learn that businesses are beginning to lose interest in CE again – it's just too difficult to implement. This is upsetting to the authors of this paper since, like many scholars out there researching CE, we're very passionate about the concept.

The aim of this perspective is to outline the kind of research that we believe is needed to aid practitioners keen to embrace CE. Our point of departure is the existing CE literature, which in our opinion needs to massively change if our research community is to impact business practice. We present five critical observations regarding this literature. We acknowledge that more observations remain to be formulated, but we believe a five-note chord will prove more useful to our community than a laundry list.

These observations are based on our analysis of 160 papers on CE, published from 2006 to 2019. We built this sample via a Scopus search. For this, we first collected the 30 most cited articles on CE. Next, we selected the most recent works at the time from the top five journals in terms of number of CE publications (*Journal of Cleaner Production*; *Sustainability*; *Resources, Conservations & Recycling*; *Waste Management*; and *Journal of Industrial Ecology*). Finally, we selected 80 articles at random, using 2012 as the cut-off year, given that the EMF jumpstarted this research field, as argued above. Given the systematic approach adopted, we believe that our sample is at least largely representative of the CE literature out there. However, we do not claim to present an exhaustive and authoritative overview of the CE literature. All articles examined are listed in the supplementary materials.

Observation 1: There is a lack of empirical work on CE

Only 55% of examined articles we examined are empirical, while 45% are conceptual. An example for the latter: an article analysing 114 CE definitions to then propose the 115th definition for this term – one of the most cited CE articles in the literature (Kirchherr et al., 2017). However, practitioners don't care about the definitional nuances of CE; they want empirical work that provides evidence on how to make CE work. They are not interested in theoretical advances; rather, their priority lies in understanding how they can implement a CE in real life.

Observation 2: Much empirical work on CE is small-N research

Furthermore, we find that 61% of empirical articles examined are small-N (< 10 cases), while medium-N and large-N samples are employed by 27% and 11% respectively. A typical example of a small-N study is one that investigates possible CE strategies in the production process of leather, by conducting a qualitative case study into a leather manufacturer (Hu et al., 2011). While such studies are likely to be more relevant to practitioners than purely conceptual work, their external validity is limited. Practitioners keen to integrate CE principles want to know what works on average, not only in specific cases; quantitative large-N work is therefore needed to further aid them.

Observation 3: Most CE work is focused on manufacturing industries

In addition, we find that 95% of articles with an industry focus investigate manufacturing industries. For example, Ali et al. (2019) investigate how scrap sheet metal from the automobile industry can be used for building facades. Meanwhile, only 9% of articles focus on the service industries. This is problematic, since most GDP these days in many countries (70% in the European Union) stems from services. This effectively makes large parts of the corpus irrelevant to a large share of businesses out there. Our observation is even more surprising given that academics have maintained for many years that sharing economy business models, such as Peerby and Zipcar, are among promising circular business models.

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[1] Throughout this work, 'practice' relates to 'businesses' with businesses having been argued to be at the forefront of a CE transition.

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Observation 4: **There is significant bias in the CE literature towards more developed economies**

Of the examined articles, 95% of those with a geographical focus investigate a CE in the context of developed economies, while only 5% focus on developing economies.[2] For instance, Fratini et al. (2019) review the current level of CE implementation in Amsterdam, London, and Paris. A CE ought to be a global vision, yet scholars don't bother to study CE in less developed economies. This makes the majority of CE literature largely irrelevant to countries collectively representing 50% of the world's population. It's likely that a CE in these countries will look very different from one in a developed economy, given the vastly different policy environments, availability of and access to funding, levels of educational and professional development, as well as available infrastructure. Thus, even the best studies on CE in the developed world are of little use to practitioners in emerging economies. This needs to change in the near future.

Observation 5: **The CE literature lacks advice**

Of the articles examined, we find that 55% include recommendations. Yet, advice geared towards scholars is featured most frequently (81%); only 20% include advice to businesses, and 28% to policy-makers. Clearly, scholarly work fails to provide actionable advice to practitioners, which is exactly what many of the practitioners we interviewed were seeking.

To us, CE is an exciting concept, and as scholars we're keen to help it reach its full potential. It seems that a lot of grant funding has gone towards CE work recently. We hope that this piece will be considered by those scholars currently planning to pursue CE research. We firmly believe that these scholars can contribute substantially to the transition towards a circular economy. However, if we in the scholarly community continue with business as usual, it is also our firm conviction that the CE research community will miss out on an opportunity to shape a more circular future.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.resconrec.2019.104480.

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[2] We coded countries following the World Bank's classification by income, i.e. low, lower-middle, upper-middle, and high-income countries. In this study, we consider the prior two developing economies; the latter two developed economies.