

Circular disruption: Concepts, enablers and ways ahead

1 | INTRODUCTION

Scholars—including those outside of the sustainability research community—who have not heard about the circular economy (CE) concept up until now must have been on a spaceship different to the ‘spaceship earth’ that Boulding (1966) has described. Indeed, CE may be one of the most discussed phenomena in the academy in recent years with contributions spanning from disciplines such as chemistry (Keijer et al., 2019), and engineering (Allwood, 2014; Reuter et al., 2019), to human geography (Hobson, 2020) and the business sciences (De Angelis et al., 2018; Urbinati et al., 2017). This scholarly momentum is mirrored among practitioners with both policymakers and businesses undertaking various at-scale initiatives towards CE all around the world (EMF, 2014; McDowall et al., 2017; Milios, 2021), with the hope being that CE may be a most promising pathway towards sustainability (Geissdoerfer et al., 2017; Kirchherr et al., 2017). Despite this significant attention and efforts undertaken, the worldwide circularity rate is at a mere 8.6%, with even alleged frontrunner countries such as the Netherlands reaching a circularity rate that is only at 24.5% (Circle Economy, 2020, 2021; Haas et al., 2015).

There are many reasons that may explain why the world is not more circular today—and why it may have been a lot more circular hundreds of years ago than it is today (Bauwens, 2021; Haas et al., 2015). Indeed, sustainability and transitions scholars frequently sketch the unsustainable transition that has occurred ever since the Industrial Revolution (Markard et al., 2021) and how any attempts regarding circular economy and sustainability transitions—that would take decades to implement in any case—face vested interests even if mature technologies are available for a turn (Köhler et al., 2019; Rotmans & Kemp, 2000).

One possibly less fundamental, albeit still relevant reason regarding the lack of progress regarding reaching circular economy and sustainability may also be the focus of (much of) the CE literature. Indeed, we observe that many scholars tend to study in particular barriers to the circular economy with a vast literature having developed around this (see, e.g., Del Vecchio et al., 2022; Govindan & Hasanagic, 2018; Hartley et al., 2021; Kirchherr et al., 2018; van Keulen & Kirchherr, 2021), although some recent works have also shifted more towards enablers of a CE—ranging from public policies conducive to CE (Hartley et al., 2020; Klein et al., 2021; Milios, 2021) to the potential of selected strategies including business experimentation for CE (Aminoff & Pihlajamaa, 2020; Konietzko et al., 2020).

The idea of this special issue at hand is to further shift the scholarly discourse from a conversation on why circular economy does not work to a conversation on how circular economy may work. We propose the term ‘circular disruption’ as a possible focal point for scholars to unite behind. However, the notion of ‘circular disruption’ does not only attempt to shift scholarly focus by coining a new term, but to also respond to calls in the literature that further theorizing regarding CE is needed (Blomsma & Brennan, 2017; Korhonen et al., 2018; Skene, 2018). Indeed, the attempt this special issue undertakes is to also develop the notion of circular disruption into a process theory that can guide scholarly analysis, as well as initiatives undertaken by practitioners.

Circular disruption, in our point of view, is about tearing apart the economic and societal nodes that constitute the everyday life. It is meant to provoke thinking on how radical change may fundamentally upend the existing socio-technical system and replace it with a more sustainable model—not in the next decades, but, ideally, rather today and tomorrow. It is thus all about there being a need for reaching a tipping point towards sustainability in the short term. The circular disruption concept rests on the belief that a network of engaged stakeholders is needed to advance the circular economy—businesses, policymakers, civil society, communities and more. The concept does not envision a specific circular future—this is work scholars such as Bauwens et al. (2020), Calisto Friant et al. (2020) and Lowe and Genovese (2022) have undertaken. Rather, it is about launching the journey; it aims to facilitate imagination regarding the very next step needed towards more CE out there.

Overall, this special issue gathers a set of nine papers that was developed from the initial versions presented or designed at the workshop ‘Business models and circular disruption’, held in Utrecht, the Netherlands, on 13 December 2019. The workshop brought together leading circular economy scholars from Europe to discuss the core question: What is needed to launch a circular disruption? Upon conceptualizing the notion of circular disruption, this core question was further broken down into three subthemes: (1) Who are the leading actors in a circular disruption? Are they start-ups, policymakers, social movements? (2) What are the main barriers impeding a circular disruption? And (3) which policies and additional enablers are needed to jumpstart a circular disruption and forge the way ahead? Based on the rich insights from all participants, the event led to thought-provoking discussions on topics such as how digitalization can facilitate circular disruption, what are the disruptive potentials of different circular innovations and how multiple barriers to circular disruption can be tackled simultaneously.

The remainder of this editorial introduces the nine articles that constitute this special issue on circular disruption that we are honoured to publish in *Business Strategy and the Environment*. We conclude with an outlook regarding the potential way ahead for this notion.

2 | TOWARDS CIRCULAR DISRUPTION

We continue by outlining the papers of this special issue. In the first paper of this special issue, Bauwens et al. (2022) further develop the concept of circular disruption. Drawing on thinking from management science, in particular concepts by Foster (1986) and Gunderson and Holling (2002), as well as the sustainability and transitions literature, in particular Hekkert et al. (2007), this work develops not only a specific definition for circular disruption but also a process theory and framework on this notion. The idea is to provide an analytical tool for scholars as well as practitioners to understand where a particular industry stands regarding CE—and what may be done to advance CE in this industry. The paper highlights that a variety of stakeholders are needed to move towards a circular disruption, whereas the role of policymakers and businesses are particularly highlighted.

The second paper of this special issue builds on Bauwens et al. (2022). In this paper, Reike et al. (2022) introduce the notion of missions, inspired by Mazzucato (2016, 2018, 2021) as a possibly central component to circular disruption. The research is mainly centred on the idea that government must align societal stakeholders, in particular businesses, on a common circular disruption mission, and then orchestrate the journey towards this mission. Just as Bauwens et al. (2022), the work highlights the need of government-business-civil society/community alliances to advance sustainability and systemic change. This systemic change including guidance provided on it is also the starting point for the research work conducted by Blomsma (2022). The contribution of this third paper is to explain how companies translate such guidance on CE into specific actions for circular business model innovation.

Circular business model innovation is also the topic of the fourth and fifth paper of this special issue. Both of these works focus on incumbent firms. Arekrans et al. (2022) explore three empirical cases of large incumbent firms that engage with radical circular business model innovation, while Kuhlmann et al. (2022) present two cases, with the latter authors particularly engaging with the thinking of Christensen (1997) around disruption and innovation in large incumbent firms. Both papers highlight that disruptive circular business model innovation and thus circular disruption is feasible for incumbent firms, albeit a lot of efforts must be undertaken. Arekrans et al. (2022) find that leadership commitment and sustainability targets can drive radical circular business model innovation. Meanwhile, Kuhlmann et al. (2022) highlight how creating separated organizational structures by the incumbent such as a start-up outside of the existing company can also act as a catalyst for change. Furthermore, elements such as an innovation strategy and partnerships matter.

In the sixth and seventh papers of this special issue, Henry et al. (2022) and Dröge et al. (2022) further shift from incumbents to the entrepreneurs and the policy-makers and their possibly pivotal role in jumpstarting circular disruption. Henry et al. (2022) describe the peculiarities regarding circular start-up founders. Unlike sustainability founders, circular start-up founders are much more interested in scaling their business—and thus may have much more potential than sustainability founders in accelerating the transition towards CE, according to this work. Meanwhile, Dröge et al. (2022) provide a case study on policy entrepreneurship—the very first case study, as far as we are aware, that introduces the policy entrepreneurship concept into the CE literature. The authors outline how a single committed policymaker, in a conducive setting, may be able to disproportionately impact an entire country's transition towards CE. These two papers thus shift the focus from the macro- and meso-levels that are core and centre in the early papers of the special issue to the pivotal role that every single individual can play in the CE transition.

The special issue closes with two contributions on digitization as an enabler for circular disruption. Some joke that the videoconferencing software, such as Zoom, have done more to reduce greenhouse gas emissions than all electric car companies combined. This is at least somewhat echoed by Rusch et al. (2022) who provide the very first systematic review regarding the potential of digital technologies for sustainable product management in a CE. This research highlights that an integrated and holistic utilization of digital technologies can drive major changes and improve a variety of CE related areas, overtaking a fragmented and underexplored view of this field. Their work is complemented by Neligan et al. (2022) who analyse how digitization efforts of 599 German manufacturing firms and 296 industrial service providers impact their resource footprint. The take-away of both papers is: Digitization may be one of the most under-estimated enablers for a circular disruption.

3 | OUTLOOK

The nine articles of this special issue evidence a main conclusion: There is no circular disruption out there thus far. However, we believe now is the time for this special issue because at least some industries may be at the brink of circular disruption. While this special issue was compiled, much has happened—in particular among circular start-ups. Whereas start-ups are arguably not the only players that may accelerate the transition to CE (Bauwens, 2021; Henry et al., 2020), we note that multiple circular start-ups have raised significant funding in the past 12 months—we are not aware that any circular start-up has been able to raise this amount of funding previously (Koetsier, 2022; Lomas, 2022), which indicates that fundamental, structural change may be under way.

Examples are the circular start-ups Twig, Back Market and Grover. Twig is a London-based circular start-up that gives instant cash-outs on used fashion and electronics, founded in mid-2020. This start-up raised USD 35 million in early 2022 (Lomas, 2022).

Meanwhile, Grover, a Berlin-based circular start-up that runs a subscription model where people can for set fees rent out consumer electronics, founded in 2015, raised 71 million in mid-2021. Lastly, Back Market, a Paris-based circular start-up that sells refurbished tech such as iPhones, founded in early 2014, raised as much as USD 510 million in early 2022 (Koetsier, 2022). There is talk in the start-up community that more circular start-ups may soon raise comparable funding.

There are many buzzwords in the sustainability discourse with some authors (e.g., Henry et al., 2021), even having suggested that 'circular economy' constitutes one. The readers of this editorial may critically ask whether 'circular disruption' is really more than another addition to what Engelman (2013) called the 'sustainababble'. The guest editorial team of this special issue hope that the papers at hand prove otherwise—'circular disruption' is meant as a substantive concept and framework that can aid scholars and practitioners alike that engage with CE. We are keen for feedback from readers on this concept and we very much hope it inspires the community dedicated to CE to further advance this concept both in theory as well as in practice.

Lastly, the guest editorial team would like to acknowledge the contributions of the authors of this special issue and express their gratitude to the valuable comments of reviewers and to the Editor of the *Business Strategy and the Environment* journal, Professor Richard Welford, for accepting our proposal for this special issue, and for the unflinching support provided by the Journal Manager, Scott Lam.

ACKNOWLEDGEMENT

This special issue was partially funded via the Dutch Research Council (NWO), file number: 438.17.904.

CONFLICT OF INTEREST

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

AUTHOR CONTRIBUTIONS

Julian Kirchherr: Conceptualization; writing – original draft. **Thomas Bauwens:** Writing – review and editing. **Tomás B. Ramos:** Writing – review and editing

KEYWORDS

circular business models, circular disruption, circular economy, innovation, socio-technical systems, stakeholders, sustainability

Julian Kirchherr¹

Thomas Bauwens¹

Tomás B. Ramos²

¹Innovation Studies Group, Copernicus Institute of Sustainable Development, Utrecht University, Utrecht, The Netherlands

²CENSE - Center for Environmental and Sustainability Research, Department of Environmental Sciences and Engineering, NOVA School of Science and Technology, NOVA University Lisbon, Lisbon, Portugal

Correspondence

Julian Kirchherr, Innovation Studies Group, Copernicus Institute of Sustainable Development, Utrecht University, Princetonlaan 8a, 3584 CB Utrecht, The Netherlands.

Email: j.kirchherr@uu.nl

REFERENCES

- Allwood, J. M. (2014). Squaring the circular economy: The role of recycling within a hierarchy of material management strategies. In *Handbook of recycling: State-of-the-art for practitioners, analysts, and scientists* (pp. 445–477). Elsevier. <https://doi.org/10.1016/B978-0-12-396459-5.00030-1>
- Aminoff, A., & Pihlajamaa, M. (2020). Business experimentation for a circular economy—Learning in the front end of innovation. *Journal of Cleaner Production*, 275, 124051. <https://doi.org/10.1016/J.JCLEPRO.2020.124051>
- Arekrans, J., Ritzén, S., & Laurenti, R. (2022). Managing disruptive innovation when adopting circular Economy as a strategic issue. *Business Strategy and the Environment*.
- Bauwens, T. (2021). Are the circular economy and economic growth compatible? A case for post-growth circularity. *Resources, Conservation and Recycling*, 175, 105852. <https://doi.org/10.1016/J.RESCONREC.2021.105852>
- Bauwens, T., Blomsma, F., Weissbrod, I., & Kirchherr, J. (2022). The 'need for speed': Towards circular disruption—What it is, how to make it happen and how to know it's happening. *Business Strategy and the Environment*.
- Bauwens, T., Hekkert, M., & Kirchherr, J. (2020). Circular futures: What will they look like? *Ecological Economics*, 175, 106703. <https://doi.org/10.1016/J.ECOLECON.2020.106703>
- Blomsma, F. (2022). Making sense of circular economy: Understanding the progression from idea to action. *Business Strategy and the Environment*.
- Blomsma, F., & Brennan, G. (2017). The emergence of circular Economy: A new framing around prolonging resource productivity. *Journal of Industrial Ecology*, 21(3), 603–614. <https://doi.org/10.1111/JIEC.12603>
- Boulding, K. E. (1966). The economics of the coming spaceship Earth. <http://www.ub.edu/prometheus21/articulos/obsprometheus/BOULDING.pdf>
- Calisto Friant, M., Vermeulen, W. J. V., & Salomone, R. (2020). A typology of circular economy discourses: Navigating the diverse visions of a contested paradigm. *Resources, Conservation and Recycling*, 161, 104917. <https://doi.org/10.1016/J.RESCONREC.2020.104917>
- Christensen, C. M. (1997). The innovator's dilemma: When new technologies cause great firms to fail. <https://www.hbs.edu/faculty/Pages/item.aspx?num=46>
- Circle Economy. (2020). The circularity gap report—The Netherlands. <https://circularity-gap.world/netherlands>
- Circle Economy. (2021). The circularity gap report. https://assets.website-files.com/5d26d80e8836af2d12ed1269/60210bc3227314e1d952c6da_20210122%20-%2020CGR%20Global%202021%20-%20Report%20-%20210x297mm.pdf
- De Angelis, R., Howard, M., & Miemczyk, J. (2018). Supply chain management and the circular economy: Towards the circular supply chain. *Production Planning and Control*, 29(6), 425–437. <https://doi.org/10.1080/09537287.2018.1449244>
- Del Vecchio, P., Urbinati, A., & Kirchherr, J. (2022). Enablers of managerial practices for circular business model design: An empirical investigation of an agro-energy company in a rural area. *IEEE Transactions on Engineering Management*. <https://doi.org/10.1109/TEM.2021.3138327>
- Dröge, H., Raggi, A., Ramos, T., & Kirchherr, J. (2022). Towards a circular disruption: On the pivotal role of circular Economy policy entrepreneurs. *Business Strategy and the Environment*.

- EMF. (2014). Towards the circular economy: Accelerating the scale-up across global supply chains. <https://ellenmacarthurfoundation.org/towards-the-circular-economy-vol-3-accelerating-the-scale-up-across-global>
- Engelman, R. (2013). Beyond sustainababble. In *State of the world 2013: Is sustainability still possible?* (pp. 3–16). Worldwatch Institute. https://doi.org/10.5822/978-1-61091-458-1_1
- Foster, R. N. (1986). Working the S-curve: Assessing technological threats. *Research Management*, 29(4), 17–20. <https://doi.org/10.1080/00345334.1986.11756976>
- Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The circular economy—A new sustainability paradigm? *Journal of Cleaner Production*, 143, 757–768. <https://doi.org/10.1016/J.JCLEPRO.2016.12.048>
- Govindan, K., & Hasanagic, M. (2018). A systematic review on drivers, barriers, and practices towards circular economy: A supply chain perspective. *International Journal of Production Research*, 56(1–2), 278–311. <https://doi.org/10.1080/00207543.2017.1402141>
- Gunderson, L. H., & Holling, C. S. (2002). *Panarchy: Understanding transformations in human and natural systems* (Vol. 114, Issue 2). Island Press. http://www.sciencedirect.com/science/article/pii/S0006320703000417%5Cnhttp://www.sciencedirect.com/science?_ob=MiamiImageURL&_cid=271811&_user=492137&_pii=S0006320703000417&_check=y&_origin=gateway&_coverDate=31-Dec-2003&view=c&wchp=dGLzVIS-z5kzk&md5=5f8d
- Haas, W., Krausmann, F., Wiedenhofer, D., & Heinz, M. (2015). How circular is the global Economy?: An assessment of material flows, waste production, and recycling in the European Union and the world in 2005. *Journal of Industrial Ecology*, 19(5), 765–777. <https://doi.org/10.1111/JIEC.12244>
- Hartley, K., van Santen, R., & Kirchherr, J. (2020). Policies for transitioning towards a circular economy: Expectations from the European Union (EU). *Resources, Conservation and Recycling*, 155, 104634. <https://doi.org/10.1016/j.resconrec.2019.104634>
- Hartley, K., Roosendaal, J., & Kirchherr, J. (2021). Barriers to the circular economy: The case of the Dutch technical and interior textiles industries. *Journal of Industrial Ecology*. <https://doi.org/10.1111/JIEC.13196>
- Hekkert, M. P., Suurs, R. A. A., Negro, S. O., Kuhlmann, S., & Smits, R. E. H. M. (2007). Functions of innovation systems: A new approach for analysing technological change. *Technological Forecasting and Social Change*, 74(4), 413–432. <https://doi.org/10.1016/J.TECHFORE.2006.03.002>
- Henry, M., Bauwens, T., Hekkert, M., & Kirchherr, J. (2020). A typology of circular start-ups: An analysis of 128 circular business models. *Journal of Cleaner Production*, 245, 118528. <https://doi.org/10.1016/J.JCLEPRO.2019.118528>
- Henry, M., Hoogenstrijd, T., & Kirchherr, J. (2022). Motivations and identities of “grassroots” circular entrepreneurs: An initial exploration. *Business Strategy and the Environment*. <https://doi.org/10.4324/9780367816650-9>
- Henry, M., Schraven, D., Bocken, N., Frenken, K., Hekkert, M., & Kirchherr, J. (2021). The battle of the buzzwords: A comparative review of the circular economy and the sharing economy concepts. *Environmental Innovation and Societal Transitions*, 38, 1–21. <https://doi.org/10.1016/J.EIST.2020.10.008>
- Hobson, K. (2020). The limits of the loops: critical environmental politics and the circular economy. *Environmental Politics*, 30(1–2), 161–179. <https://doi.org/10.1080/09644016.2020.1816052>
- Keijer, T., Bakker, V., & Slootweg, J. C. (2019). Circular chemistry to enable a circular economy. *Nature Chemistry*, 11(3), 190–195. <https://doi.org/10.1038/s41557-019-0226-9>
- Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the circular economy: Evidence from the European Union (EU). *Ecological Economics*, 150, 264–272. <https://doi.org/10.1016/j.ecolecon.2018.04.028>
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- Klein, N., Ramos, T. B., & Deutz, P. (2021). Factors and strategies for circularity implementation in the public sector: An organisational change management approach for sustainability. *Corporate Social Responsibility and Environmental Management*. <https://doi.org/10.1002/CSR.2215>
- Koetsier, J. (2022). Big cash for old tech: Back market raises \$510 million for reselling old electronics. <https://www.forbes.com/sites/johnkoetsier/2022/01/11/old-tech-for-big-cash-back-market-raises-510-million-for-reselling-old-electronics/?sh=391e01316e01>
- Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hess, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M. S., ... Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31, 1–32. <https://doi.org/10.1016/J.EIST.2019.01.004>
- Konietzko, J., Baldassarre, B., Brown, P., Bocken, N., & Hultink, E. J. (2020). Circular business model experimentation: Demystifying assumptions. *Journal of Cleaner Production*, 277, 122596. <https://doi.org/10.1016/J.JCLEPRO.2020.122596>
- Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular Economy: The concept and its limitations. *Ecological Economics*, 143, 37–46. <https://doi.org/10.1016/J.ECOLECON.2017.06.041>
- Kuhlmann, M., Bening, C. R., & Hoffmann, V. H. (2022). How incumbents realize disruptive circular innovation overcoming the innovators dilemma for a circular Economy. *Business Strategy and the Environment*.
- Lomas, N. (2022). Twig takes \$35 M to turn stuff you own into a way to pay. https://techcrunch.com/2022/01/11/twig-series-a/?guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAJzVTw9x_NF76wJdfV7QzXaBHG5F90ml9a-LEpvO3gzhDbILtGQ53M-MEGjqVf4C5M5s2zciB67AGDwlTy4hm4UzCBbkxIOb-Igq6ln2T8BMDvt8vljgeZSt_2ZfDzPfen7a5NI_G7
- Lowe, B. H., & Genovese, A. (2022). What theories of value (could) underpin our circular futures? *Ecological Economics*, 195, 107382. <https://doi.org/10.1016/J.ECOLECON.2022.107382>
- Markard, J., van Lente, H., Wells, P., & Yap, X. S. (2021). Neglected developments undermining sustainability transitions. *Environmental Innovation and Societal Transitions*, 41, 39–41. <https://doi.org/10.1016/J.EIST.2021.10.012>
- Mazzucato, M. (2016). From market fixing to market-creating: a new framework for innovation policy. *Industry and Innovation*, 23(2), 140–156. <https://doi.org/10.1080/13662716.2016.1146124>
- Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities. *Industrial and Corporate Change*, 27(5), 803–815. <https://doi.org/10.1093/ICC/DTY034>
- Mazzucato, M. (2021). *Mission Economy: A moonshot guide to changing capitalism*. Harper Business.
- McDowall, W., Geng, Y., Huang, B., Barteková, E., Bleischwitz, R., Türkeli, S., Kemp, R., & Doménech, T. (2017). Circular Economy policies in China and Europe. *Journal of Industrial Ecology*, 21(3), 651–661. <https://doi.org/10.1111/JIEC.12597>
- Milius, L. (2021). Overarching policy framework for product life extension in a circular economy—A bottom-up business perspective. *Environmental Policy and Governance*, 31(4), 330–346. <https://doi.org/10.1002/EET.1927>
- Neligan, A., Geissdoerfer, M., Schögl, J.-P., & Baumgartner, R. J. (2022). Circular disruption: Digitalisation as a driver of circular economy business models. *Business Strategy and the Environment*.

- Reike, D., Negro, S. O., & Hekkert, M. P. (2022). Understanding circular economy transitions: The case of circular textiles. *Business Strategy and the Environment*.
- Reuter, M. A., Van Schaik, A., Gutzmer, J., Bartie, N., & Abadías-Llamas, A. (2019). Challenges of the circular economy: A material, metallurgical, and product design perspective. *Annual Review of Materials Research*, 49, 253–274. <https://doi.org/10.1146/ANNUREV-MATSCI-070218-010057>
- Rotmans, J., & Kemp, R. (2000). Transities & transitie management. De casus van een emissiearme energievoorziening. https://www.researchgate.net/publication/285706943_Transities_transitiemanagement_De_casus_van_ee_n_emissiearme_energievoorziening
- Rusch, M., Schöggel, J. P., & Baumgartner, R. J. (2022). Application of digital technologies for sustainable product management in a circular economy—A review. *Business Strategy and the Environment*.
- Skene, K. R. (2018). Circles, spirals, pyramids and cubes: Why the circular economy cannot work. *Sustainability Science*, 13(2), 479–492. <https://doi.org/10.1007/S11625-017-0443-3>
- Urbinati, A., Chiaroni, D., & Chiesa, V. (2017). Towards a new taxonomy of circular economy business models. *Journal of Cleaner Production*, 168, 487–498. <https://doi.org/10.1016/J.JCLEPRO.2017.09.047>
- van Keulen, M., & Kirchherr, J. (2021). The implementation of the circular Economy: Barriers and enablers in the coffee value chain. *Journal of Cleaner Production*, 281, 125033. <https://doi.org/10.1016/J.JCLEPRO.2020.125033>