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The circular economy: New or Refurbished as CE 3.0? — Exploring Controversies in the Conceptualization of the Circular Economy through a Focus on History and Resource Value Retention Options

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ABSTRACT

Over the last decade, the concept of the circular economy has regained attention, especially related to efforts to achieve a more sustainable society. The ‘revival’ of the circular economy has been accompanied by controversies and confusions across different actors in science and practice. With this article we attempt at contributing to advanced clarity in the field and providing a heuristic that is useful in practice. Initially, we take a focus on the historical development of the concept of circular economy and value retention options (ROs) for products and materials aiming for increased circularity. We propose to distinguish three phases in the evolution of the circular economy and argue that the concept – in its dominant framing – is not as new as frequently claimed. Having established this background knowledge, we give insights into ‘how far we are’ globally, with respect to the implementation of circularity, arguing that high levels of circularity have already been reached in different parts of the globe with regard to longer loop value retention options, such as energy recovery and recycling. Subsequently, we show that the confusion surrounding the circular economy is more far-reaching the divergent scholarly perspectives on retention options and unite the most common views a 10Rtypology. We conclude that policymakers and businesses should focus their efforts on realization of the more desirable, shorter loop retention options, like remanufacturing, refurbishing and repurposing – yet with a view on feasibility and overall system effects. Scholars, on the other hand, should assist the parties contributing to an increased circular economy in practice by taking up a more active role in attaining consensus in conceptualizing the circular economy.

1. Introduction to Confusions in Conceptualizing CE

During the last 5–10 years, the concept of the ‘circular economy’ (CE) has received growing attention on various levels, among them policymaking, advocacy and consultancy, and science. A Scopus search on the term shows an increase of 50% in academic publications over the past five years, a trend that is even more visible for the Journal of Resources, Conservation and Recycling: the first CE article is recorded in 2007, and over two thirds of the total 101 publications listed on the term stem from the period 2015–2017.

In international politics, the urgency of closing materials loops is also more recently actively promoted by consortia of global actors, like the OECD,² the WEF² and UNEP² through various reports and events (UNEP, 2011, 2016; OECD, 2016; WEF, 2014, 2016). Japan and China

were the first key Asian economic players to formally introduce CE policies on national level. In Europe, many states have implemented CE initiatives, policies and pilot programmes, most notably Denmark, Germany, the Netherlands, and the UK are taking the lead (EUKN, 2015). On supranational level, the European Union (EU) is – more slowly – following suit with a CE action plan, including legislative proposals (EC, 2015).

As this article shows, large differences manifest itself globally with regard to CE, yet the potential ascribed to CE of breaking the global “take-make-consume and dispose” pattern of growth — a linear model based on the assumption that resources are abundant, available, easy to source and cheap to dispose of (...)” (EEA 2016, p. 9) is widely shared among different societal actors across the globe. The move towards a more circular economic model can hence be interpreted as confrontation with

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these untenable assumptions. CE is widely posed as alternative model of production and consumption, a growth strategy enabling the ‘decoupling’ of resource use from economic growth, thereby contributing to sustainable development (UNEP, 2011; McKinsey and Company, 2015; EC, 2015; OECD, 2016; EMAF, 2016a,b; Ghisellini et al., 2014; Geissdoerfer et al., 2017).

More critical voices have questioned the potential ascribed to CE, targeting especially the ‘myth of decoupling’ (Gregson et al., 2015; Hobson, 2015; Lazarevic and Valve, 2017). The 2011 UNEP report on “Decoupling Natural Resource Use and Environmental Impacts from Economic Growth” reveals that related sustainability concepts and approaches like Industrial Ecology (IE), eco-efficiency and Cleaner Production (CP) have contributed to achieving relative but not absolute decoupling.

With a view on its potential impact, a concern is that CE has been argued to lack conceptual clarity and an accepted definition (Yuan et al., 2008; Lieder and Rashid, 2015). Recent literature reviews have made first attempts at discerning key conceptual elements of CE and its link to other sustainability related concepts (see Ghisellini et al., 2014; Geissdoerfer et al., 2017). However, as Blomsma and Brennan (2017) argued, “theoretical or paradigmatic clarity regarding the concept of CE has yet to emerge” (p.610). An important example, is the framing of CE as new, innovative, and transformative in character, and simultaneously, as easy match with existing ecological modernization initiatives, in some of the literature (Geng and Doberstein, 2008; Liu et al., 2009; Zhu et al., 2010). This almost paradoxical framing suggests that fundamental paradigmatic questions of CE conceptualization remain indeed unsolved.

Consultancy and advocacy have been especially active in framing CE as new, yet easily attainable and lending their expertise to policymakers, the framing is echoed in policymaking. Suggesting a sharp contrast between the current linear and a circular economy, Accenture and Circle Economy write: “Climate change and the impending shortage of raw materials demand a shift from linear to zero-waste circular cycles.” (Accenture & Circle Economy 2016, p. 4). Likewise, the Ellen MacArthur Foundation (EMAF) finds that “the call for a new economic model [CE] is getting louder” (EMAF, 2013, p.6). In the scientific literature, the debate is typically more nuanced, however some authors view CE as “a new frame of mind, a new perspective” (Bonciu, 2014, p. 83), “a new path of industrialization” Xiao & Huang (2010, p. 97) or an approach that will require “a paradigm shift in the way things are made” (Preston, 2012, p. 2).

However, looking at the theoretical underpinnings of CE, these are arguably far from new. System thinking and circularity in ecological and economic systems are rooted in literature, dating some decades ago, and these literature streams were themselves inspired by ideas on agricultural and human metabolism dating back to the 18th century (Schivelbusch, 2015) whereas the more specific ideas on CE have been argued to date back to the metaphor of Spaceship Earth (Boulding, 1966). Practically, it can be claimed that advanced economies in Northwestern Europe have created up to 70–90% circularity for key bulk materials including metals and plastics (EEA, 2013), and in developing countries the absence of formal resource ‘reutilization arrangements’ has led to the emergence of an informal recovery sector (Gu et al., 2016).

Pointing out CE as new and transformative hence seems to ask for characterization of the concept in terms of maturity through a closer look at its historic and geographic evolution. As its first aim, the present article conducts a short literature review on the development of CE (Section 3). We propose – playing with its terminology – to view CE as a refurbished rather than as a virgin concept. Artificially distinguishing three phases of development, we show that many elements of its conceptualization have reincarnated various times with its basic thoughts are found back in other, older key sustainability sub-concepts like IE, CP, Closed-Loop-Supply Chain Management (CLSC) and Ecodesign.

Based on this overview, we put forward the idea that instead of CE

being *per se* new or transformative, elements indicative of the new combinations of the ‘established teachings’ that would characterize a CE concept entailing the potential to induce transformative sustainability change, have to be carefully defined and shaped by scientists and practitioners, precisely at this stage where CE carries momentum in various types of literature. A crude distinction between two schools of thought (reformist and transformational) serves us as vehicle to elucidate some of the main distinctions made in literature.

In line with other authors (Hultman and Corvellec, 2012; Blomsma and Brennan, 2017), we establish as one of decisive elements of a more transformative view of CE, nuanced material hierarchies as operationalization principle of CE, sometimes called R-hierarchies or imperatives. While the 3R-imperatives of ‘reduce, reuse recycle’ form an accepted notion of CE in theory and practice – see the Chinese policy – there has recently been emphasis on more nuanced hierarchies with shorter loop options like ‘redesign’, ‘refurbish’, ‘repurpose’, as enabling the highest possible value retention of resources over multiple product life cycles.

Hence, the second aim of this article is an in-depth exploration of the understanding of this key operationalization principle used in the literature. Our analysis of 69 academic articles on their conceptualization of R-imperatives, finds this to vary starkly among different scholars and disciplines. Authors not only find varying numbers of R-imperatives, such as 3Rs, 4Rs or 6Rs, but different author(-groups) assign different attributes and meanings which implies that divergent conceptualizations of this key CE principle dominate the literature (see Section 4).

As a response to recent calls for better conceptualization (Blomsma and Brennan, 2017) we go beyond reviewing and synthesize the most common perspectives on R-imperatives into a single systemic typology of 10 resource value retention options (ROs) which we illustrate, as most common in the literature, as a number of Rs. As part of the integrated view, we suggest discriminating two related life cycles, a Product *Produce and Use* Life Cycle and a Product *Concept and Design* Life Cycle in connection with the 10Rs. Through our typology and the visual frameworks, we seek to underline the idea that a concept rooted in system thinking calls for transdisciplinary, scholarly efforts at synthesis and systemic thinking for it to gain potential of system-changing character.

In Section 2, we first outline the research design employed for attaining the aims of this paper, specifically the different types of literature reviews conducted are explained. The following two sections, present the results of the literature reviews on CE history and its conceptual elements (see Section 3), and the progress made with regard to CE policies and measurement of circularity (Section 4). In Section 5, we provide our review and synthesis of R-imperatives or ROs. Finally, Section 6 reflects on the implications for the key stakeholders in conceptualizing CE and provides imperatives for action on future policy and academic approaches.

2. Research Method

This article is based on two distinct literature reviews, and designed to address gaps voiced previously in research related to 1) paradigmatic clarity in the conceptualization of CE and 2) lack of a coherent conceptualization of a specific operationalization principle, the R-imperatives, as outlined in Section 1. According to the typology of literature reviews defined by Grant and Booth (2009) the reviews can be classified as ‘critical reviews’. We have chosen for this type of review, because Grant and Booth (2009) propose it as highly suitable method, where rather than pointing out all existing knowledge and research gaps, its objective is pointing to inconsistencies, resolving ideas related to competing schools of thought, and launching new conceptual development.

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