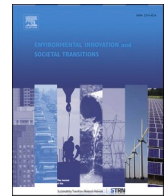




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Research article

The battle of the buzzwords: A comparative review of the circular economy and the sharing economy concepts

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ABSTRACT

Circular economy (CE) and sharing economy (SE) are much discussed concepts but potential links between them have not been examined systematically so far. The concepts' popularity coupled with a lack of definitional consensus may hinder their potential to advance sustainability transitions. Hence, the first comparative bibliometric study of these two concepts was carried out. It was found that they share notable links in the fields of sustainability, business models, sustainable consumption and governance. Business model literature reveals links mostly in the realms of platform- and service-based activities. The field of SE has a strong consumer focus but, unlike CE, barely addressed rebound effects so far. Governance literature shows a general top-down dynamic driving CE, while SE is considered to be bottom-up. SE is conceptualized as a subset of CE which opens possibilities for mutual enrichment. The findings aim to provoke more dialogue between the CE and SE communities.

1. Introduction

The discourse around the concepts of circular economy (CE) and sharing economy (SE) has grown significantly among businesses and policy makers (Geissdoerfer et al., 2017; Mont et al., 2020; Morozov, 2018; Rushe, 2019).¹ However, concepts in rapidly growing fields tend to diffuse in their meaning: a process that both CE and SE have undergone (Belk, 2014a; de Vries and Petersen, 2009; Kirchherr et al., 2017). This diffusion can be problematic because SE and CE are expected to play significant roles in future sustainability paradigms. In principle, both are linked to the concept of 'strong sustainability' (Peace, Turner, 1989) because CE and SE preserve natural resources for humanity's and the planet's sakes, rather than substitute resources through human capital (Ayres et al., 1998; Blomsma, Tennant, 2020). However, both concepts have been criticized for deviating from the idea of sustainability due to

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¹ During the total of 2012 to 2016, 281 articles containing the term 'sharing economy' in their title, abstract or keywords could be found in Scopus. This number was surpassed on a respective annual basis in the years 2017 and 2018, where 377 and 525 articles could be found. Regarding CE, even higher growth numbers can be observed. The Scopus search – synonymously conducted for CE – lead to the following results: 829 articles in 2012–2016, 713 in 2017 and 1,181 in 2018.

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exaggerated neoclassical and neoliberal interpretations (Martin, 2016; Martins, 2016; Murillo et al., 2017).

Despite their similarities, CE and SE have rarely been examined jointly in scholarly discourse.² Schwanholz and Leipold (2020) recently found that digital SE platforms relate to CE, but do not reflect this relation in their objectives or business models. In addition, Jabbour et al. (2020) presented the first peer-reviewed article that “unexpected[ly] unveil[ed]” (p. 10) a potentially synergetic relationship between SE and CE. Thus, these concepts slowly converged over time, but there is a lack of systematic reviews concerning potential connections between SE and CE.

The changing definitions of both concepts may also impede their usage. For instance, notions regarding CE range from it mainly focusing on recycling (Allwood, 2014) to it focusing on reusing and reducing (Reike et al., 2018). Furthermore, CE is regularly affiliated with various other terms such as ‘performance economy’ and ‘cradle-to-cradle’ (Braungart et al., 2007; Merli et al., 2018; Stahel, 1981). Meanwhile, definitions of SE include Belk’s (2014b) restrictive definition which specifies that SE entails temporary access to under-utilized (‘idle’) goods³ for no fees or compensation and Plewnia and Guenther’s (2018) broad definition, which states that SE involves the activities or platforms that facilitate sharing among at least two market players.

CE is often criticized for lacking a social perspective, and scientific work that addresses consumption in the context of CE is scarce (Ferrasso et al., 2020; Schröder et al., 2019). In turn, SE has a strong consumer perspective, and its social impact has become increasingly discussed in scholarly work (Mont et al., 2020). However, literature on SE has lagged behind that of CE in terms of business models and their interactions with socio-technical and organizational systems (Andreassen et al., 2018; Grinevich, Huber, 2015). This lack of literature can be potentially compensated through CE literature’s strong business model focus and systemic perspective (Camacho-Otero et al., 2018; Konietzko et al., 2020). A comparative study would help advance this knowledge base and holds the potential for fruitful dialogues between CE and SE scholars to improve future policies and business actions.

The aim of this paper is to comprehensively explore such conceptual links. Accordingly, the research questions addressed in this paper are as follows: What are the links between the concepts of CE and SE in scholarly literature? And how can the insights in these two types of literature enrich each other? This study is to be understood as a conceptual contribution to the bodies of CE/SE literature. A comparative bibliometric analysis was carried out and complemented by a qualitative analysis of conceptual links.

Overall, it was found that the two literary fields have been largely isolated from each other. However, this study’s analyses revealed that CE and SE scholars can benefit from learning about each concept’s disciplinary origins (see Section 3), and the concepts’ links to sustainability, business models, sustainable consumption and governance (see Section 6).

The remainder of this paper is organized as follows. Section 2 outlines the methodological approach of the bibliometric and content analyses. The disciplinary foundations of SE and CE are outlined in Section 3. Section 4 presents the concept’s characteristics through a preliminary analysis of the bibliometric results. Section 5 presents SE’s and CE’s joint growth over time and scholars’ recent approximations. Section 6 discusses the identified literary overlaps of the two fields in the form of an extended literature review based on the bibliometric analysis, and a qualitative comparison. Finally, this study’s findings are concluded and synthesized in Section 7.

2. Methods

Scholars have argued that quantitative and qualitative methods produce particularly rigorous and insightful reviews (Brewerton and Millward, 2001; Seuring et al., 2005). Therefore, a bibliometric analysis and a content analysis were combined for this work. An *a priori* coding framework (see Fig. 5) was derived from the bibliometrics to inform and guide the content analysis. Titles, keywords, abstracts and the content of identified scholarly writings were scrutinized. This study’s research approach is summarized in Fig. 1 and explained in this section.

Bibliometrics is a powerful approach when analyzing data that have been demarcated by ill-defined concepts, such as CE and SE. Bibliometric analysis also allows for an objective (quantitative) perspective on a subject matter (Albort-Morant, Ribeiro-Soriano, 2016) based on an empirical and systematic examination of the full body of relevant scholarly writing. This approach has been successfully employed in a variety of fields, ranging from computer-aided diagnosis (Takahashi and Kajikawa, 2017) to social entrepreneurship (Rey-Martí et al., 2016) and sustainable development (Hassan et al., 2014).

² Peer-reviewed CE review articles such as Geisendorf and Pietrulla (2018) or Lahti et al. (2018) incidentally conceptualize sharing as a type of CE practice but do not mention the term ‘sharing economy’. Similarly, peer-reviewed SE review articles such as Katrini (2018), Mont et al. (2020) and Netter et al. (2019) do not mention the term ‘circular economy’ or discuss circular concepts. Homrich et al. (2018) state SE can help companies to move towards CE without outlining concrete propositions or examples.

³ The temporary lending of human capital (i.e. services such as transport or cooking) does not fall under sharing economy and is instead referred to as the ‘gig economy’ (Frenken and Schor, 2017)

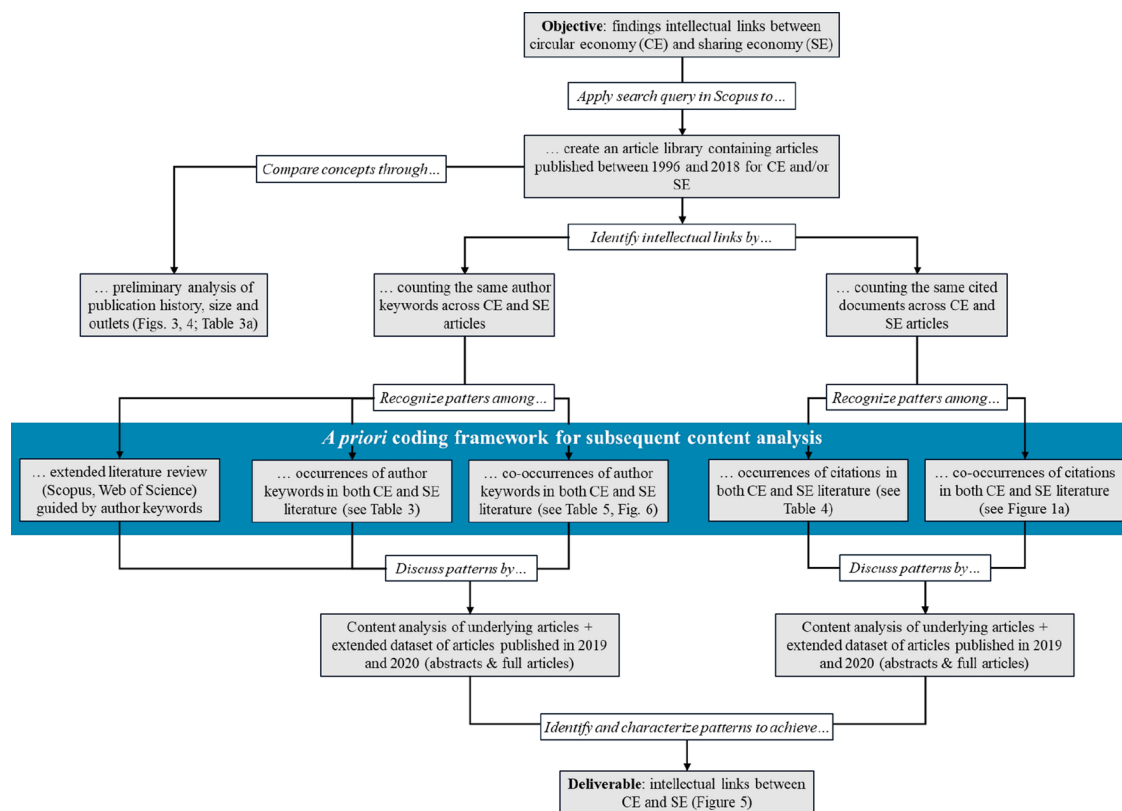


Fig. 1. Research approach.

Source: Constructed by authors; Note: Number of articles per stage (i.e. count of articles considered in analyses) can be found in Fig. 5; partly, also article abstracts where searched since 763 articles in the article library did not include author keywords; extended dataset for content analysis included articles published before September 2020.

The strength of an analysis depends on the comprehensiveness of the underlying database. Of the two large academic databases, Web of Science and Scopus, Scopus was concluded to be the better for this study's purposes given its larger coverage.⁴ Every article that contains the phrase 'circular economy' or 'sharing economy', or both, in its title, abstract or keywords⁵ was considered for the bibliometric analysis. A total of 4422 writings published between 1996 and 2018 were retrieved from Scopus via the OR-operator. The bibliometric information was downloaded, placed in an academic library and cleaned for analysis and coding. This exercise was conducted by two of this paper's authors independently, and compiled results were cross-checked to ensure objectivity.

One of this study's approaches was to measure keywords' (co-) occurrences to determine indications of intellectual links between CE and SE. This approach is generally deemed to be useful because keywords concisely express the conceptual frame that authors draw for their work (de Jong et al., 2015). By counting the number of CE articles and SE articles, conclusions can be drawn about the degree

⁴ Scopus includes a stable publication record of journals since 1996, and – in contrast to Web of Science – in Scopus publications are not lost if the outlet misses an ISI indexing for a year (Schraven et al., 2013). Additionally, Scopus is particularly exhaustive regarding conference proceedings (Strotmann and Zhao, 2010; Tetè et al., 2014), which is relevant for fast-moving fields like CE and SE, as conference proceedings have shorter timespans from submission to publication than other outlets. Therefore, journal articles are not the one type of dominant outlet for relevant scientific knowledge (Lisée et al., 2008; Powell, 2016; Raan et al., 2007). Additionally, it can be noted that Scopus also includes some non-scholarly literature, e. g. The Economist. It is of relevance to include non-scholarly literature in this comparative review since this literature is said to significantly shape both the scholarly CE and SE discourse (Ghisellini et al., 2016; Kirchherr et al., 2017; Oh and Moon, 2016).

⁵ Search queries with different operators executed in online database Scopus:- (TITLE-ABS-KEY ("circular economy") AND TITLE-ABS-KEY ("sharing economy")) AND PUBYEAR > 1995 AND PUBYEAR < 2019- (TITLE-ABS-KEY ("circular economy") OR TITLE-ABS-KEY ("sharing economy")) AND PUBYEAR > 1995 AND PUBYEAR < 2019

of association per author keyword⁶ (see Table 2). Given the scarcity of joint CE-SE analyses, occurrences of keywords in articles that contained both terms (direct links; column CE \cap SE in Table 1) and keywords which frequently occurred in the separate literature bodies were taken into consideration (indirect links/co-occurrences; see Fig. 2). Co-occurring keywords indicated themes that were relevant in both fields. To ensure their significance, co-occurring keywords were only taken into consideration if they appeared in at least 15 % of the compiled writings per field (see Table 4).

This study also measured scientific and non-scientific citations' (co-) occurrences. The citations that appeared most frequently within the retrieved articles were counted to determine the direct links between influential publications and CE and SE literature (see Table 3). Like the keyword analysis, citations that co-occurred in articles which solely discussed CE or SE were studied to guide the coding process and content analysis.

The counting of keywords and citations has been deemed to be a superficial method of analysis (Melkers, 2013; Russell, Rousseau, 2016). Qualitative analysis can remedy this notion (Wallin, 2005); therefore, this study also conducted a content analysis. A qualitative content analysis can identify thematic patterns within texts and allows for a more subjective interpretation than quantitative bibliometrics. The thematic patterns presented in Section 6 emerged from the keywords and corresponding articles that this study examined (Hsieh, Shannon, 2005; Seuring et al., 2005). The coding framework (see Fig. 5) was guided by the salient terms from the initial keyword and citation analyses. This type of analysis can be referred to as 'a priori coding' (Haney, 1998; Saldana, 2009; Stuckey, 2015) because the set of codes was not drawn from a text or transcript (emergent coding) but was created through a bibliometric analysis.

The compiled article library allowed for filtering and keyword searches within titles, abstracts and two article keyword fields as well as searches within any combination of those four parameters (see Table 1). For instance, a thematic cluster around SE and CE business models could be established through the identified keywords 'business model(s)', 'design', 'innovation' and 'product-service systems', which were all present in both literature bodies and were used by authors in connotation with business models (see Section 6.2 and Fig. 6).

To further the content analysis, full articles were reviewed to identify if they could serve as evidence for underlying notable bibliometric patterns. These patterns were then qualitatively assessed to determine whether they were caused by shared conceptual foundations. The articles were identified by filtering the article library for relevant terms that built direct and indirect links (see Section 4 and 5 for links; see Fig. 5 for thematic grouping). The resulting set of 1191 articles was truncated further based on the authors' qualitative assessments and objective prioritization criteria.

The first criterion was articles' currency to ensure that recent growth and potential approximation of CE and SE literature were not overlooked (articles published after 2015 were preferred). The number of citations of an article served as the second selection criterion so that the analysis represented dominant lines of thinking in both fields (articles with more than 15 citations were preferred). Article type was the third criterion; specifically, peer-reviewed articles were prioritized over conference proceedings.

Following the criteria's application, a sub-set of 134 articles was created that built the foundation for the content analysis. Another 48 articles were added, which were published between January 2019 and September 2020 and were identified through a manual literature review by applying the same *a priori* coding scheme (see Fig. 5 for a detailed article count and full coding scheme). In addition, the most relevant references from the citation analysis were examined for their relation to the identified literary themes and were included in the analysis where applicable.

3. Disciplinary foundations

The concept of CE has been popularized by organizations, such as the Ellen MacArthur Foundation, but the term's origins are much older (Blomsma, Brennan, 2017; Bocken et al., 2017a). The creation of CE is attributed to Boulding and his flagship publication *Spaceship Earth* (1966; Persson, 2015), which also spawned ecological economics and industrial ecology. Industrial ecology was the first scholarly field to examine the possible circulation of resources (Blomsma, Brennan, 2017; Lifset, 1997; Lifset, Graedel, 2002). Ayres' (1994); Frosch and Gallopoulos's (1989), and Pearce and Turner's (1989) work initiated the 'development period' of CE that led to the widespread use of the term (Bocken et al., 2017a; Martins, 2016). The CE model has been proposed to foster sustainability through alternative engineering solutions for products, services, business models and socio-economic systems (Konietzko, 2020; Molina-Moreno et al., 2017). However, the social and environmental benefits, definitional consensus, operationalizability and measurability of a CE are still challenged (Perella, 2014a; Geissdoerfer et al., 2017).

Recently, scholars have wished for the now neoclassical, linear interpretations of ecological economics and industrial ecology to return to their more classical circular origins (e.g. Commoner, 1971). This means that capital aggregation should not be valued irrespectively of its source, and economic value should not be determined based on consumer preferences alone. Scholars and practitioners in ecological economics and industrial ecology should aim to better understand and value the natural roots of economic activity because only then can ecological capital be sustainably maintained for future generations (Liu, 2012; Martins, 2016;

⁶ *Keywords plus* or *Index keywords* – search filters automated by scientific databases based on algorithms scanning e.g. an article's references' titles (Garfield, 1990; Gil-Leiva and Alonso-Arroyo, 2007; Turney, 2000) – were not included in the research. They do not necessarily represent how authors intentionally relate their study conceptually but are rather a latent/unobserved ('algorithm-guided') variable in this context. An unrestricted inclusion bears the risk of overstating existing links between the agendas of SE and CE research since un-/conscious links cannot be differentiated. The neglect of *Index keywords* and *Keywords plus* was remedied by the analysis of the most (cross-) cited articles of SE and CE papers (see Table 4a, Table 3a in Appendix).

Table 1
Exemplary filter results in SE/CE library of 4422 scientific articles.

Title contains..	Abstract contains..	Author keywords contain..	Author keywords contain..	Article count	#SE-related articles	#CE-related articles
–	'platform'	'Airbnb'	–	58	58	0
–	'business model-'	'design'	–	28	10	18
'empiric-'				49	23	26
		'sustainab-'	'soci-'	32	10	21
'china' or 'chinese'				290	18	272

Note: analysed time period.1996–2018.

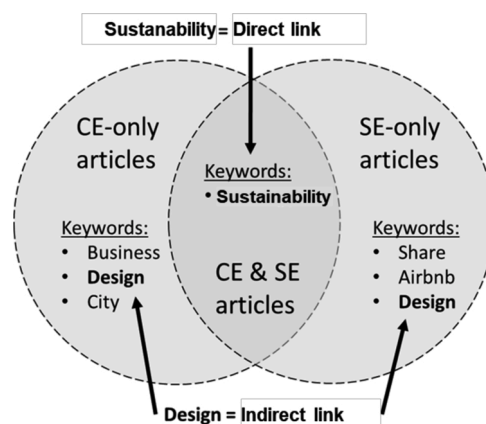


Fig. 2. Direct and indirect keyword links (schematic diagram; exemplary keywords).

Source: Constructed by authors.

Melgar-Melgar, Hall, 2020).

Here, techniques such as life-cycle assessment and material flow analysis come to the fore. Both methods of analysis assess the environmental impacts of each stage of a product, process or service (LCA) or the biophysical processes in a system (MFA; [Birat, 2015](#); [Brunner, Rechberger, 2003](#); [Pincetl, 2012](#); [Zhang et al., 2013](#)). Our article library contained 188 articles that included the terms 'LCA' or 'life-cycle-assessment' (113 results) and 'MFA' or 'material flow analysis' (75 results) in their abstracts; these articles were all affiliated with CE. Accordingly, the working definition of CE that this study used is as follows: the creation of resource loops in a defined (economic) system according to the system's underlying biophysical roots to minimize waste and pollution or maximize resource utilization.

SE was coined as a concept recently and popularized through publications by [Botsman and Rogers \(2010\)](#) and [Belk \(2014a, 2014b\)](#). The disciplinary roots of SE, however, lie in anthropology and sociology ([Polanyi, 1957](#)), as well as in the economic theory of two-sided platforms and network externalities ([McGee, Sammut-Bonnici, 2015](#); [Rochet and Tirole, 2003](#)). Early writings of human sharing concluded that sharing is related to a basic principle in various research disciplines such as anthropology or behavioral economics: reciprocity ([Shaheen et al., 1999](#); [Stack, 1974](#)). Reciprocity can be understood as the calculated non-market exchange of goods or services ('give and take') between humans in which one's prestation creates an obligation for the other based on trust ([Hann, 2006](#); [Parry, 1986](#)). This fundamental theory was shaped and projected into modern society by [Mauss \(1954\)](#) and [Malinowski \(1922\)](#).

Building on this theory, [Polanyi \(1957\)](#) determined four modes of allocation: household, reciprocity, redistribution and market exchange. Household members often co-own goods; reciprocity takes place in personal networks (e.g., friends); redistributive schemes involve a centralized body (e.g. a municipality) that manages an asset and governs the asset's use; and market exchange concerns market participants who rent out their underutilized goods, or parts of their goods, to strangers.

Market exchange has become an exemplar of SE in recent years through the advent of online marketplaces and platforms, as well as the increasing positive network externalities social actors could harness ([Iasevoli et al., 2018](#)). Large-scale peer-to-peer sharing activities' high transaction costs and levels of uncertainty can now be mitigated through digital and information technologies, such as rating systems ([Codagnone, Martens, 2016](#); [Lit et al., 2018](#)). This indicates a tendency for SE conceptualizations to focus on the consumer-side of the value chain (also see [Acquier et al., 2017](#); [Netter et al., 2019](#)). The concept of a SE is used in various research domains related to platform transactions such as trust, regulation, computer science, blockchain and reputation systems (e.g. [Avital et al., 2014](#); [Ert et al., 2016](#); [Schor and Fitzmaurice, 2015](#)). SE appears in connotation or used interchangeably with terms such as collaborative consumption and peer economy ([Camacho-Otero et al., 2018](#); [Mont et al., 2020](#); [Pazaitis et al., 2017](#)). Yet, some scholarly voices (e.g. [Belk, 2014a](#)) emphasize the distinction between collaborative consumption and sharing because sharing does not necessarily involve fees or other compensation. For the purpose of this research, SE is understood as a redistribution scheme and,

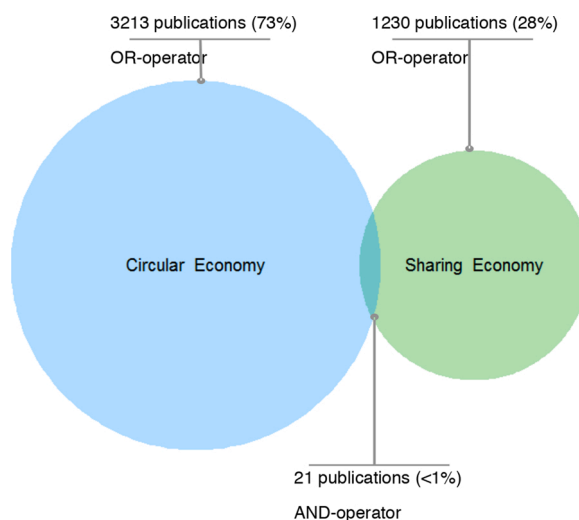


Fig. 3. Literature bodies of CE and SE concepts 1996-2018.

Source: Constructed by authors; numbers including 2019 result in a same relative spread (5215 for CE, 1949 for SE, 23 overlap articles).

primarily, a market exchange mediated by (digital) platforms to enable temporary access to under-utilized ('idle') resources (see Curtis, Mont, 2020; Frenken and Schor, 2017; acc. to Polanyi, 1957).

4. Bibliometric results

The retrieved set of 4422 articles were broken down into individual bodies of knowledge concerning CE, SE, and their overlap. The Venn diagram in Fig. 3 shows that the body of CE literature is almost three times the size of SE literature. This is probably because the term CE was coined 20 years before that of SE. As already outlined, the direct scientific overlap (AND-operator in Scopus search query) accounted for less than 1% of the dataset.

The 21 identified papers that mentioned both SE and CE (see Table 4a) were all recently published. Because SE was established in recent years (Arcidiacono, Pais, 2018) the convergence of the two fields could only be expected to occur thereafter. Furthermore, Blomsma and Brennan (2017) argue that, after 2013, CE scholars began to increasingly relate CE to other concepts. Only one of the 21 overlap articles contained substantive links between CE and SE.⁷ Therefore, this article illustrates the lack of dedicated systematic research on the links and relations between SE and CE.

The notion that SE and CE literature rarely directly overlap solidifies when examining dominant keywords (see Table 2) and citations (see Table 3). 16 out of the 20 most common keywords in the article library show a clear association with one of the two concepts. 'Collaborative consumption' was the only keyword that shows a noteworthy direct link between SE and CE literature (>5%). Terms that had relatively more balanced applications in the respective literature bodies were 'sustainability', 'business model(s)' and 'innovation'. This paper elaborates on these keywords in Section 6, in which 'innovation' is considered a transversal term given its inconsistent occurrences. The term was thematized around sustainability (e.g. social innovation) and business models (e.g. business model innovation) in the discourse.⁸

None of the top 10 cited publications seemed to be equally relevant for both the SE and CE fields. More than 90 % of the citations were made by articles from either SE or CE literature (see Table 3). Only one paper out of the top 50 cited publications (see Table 2a for full list) showed a noteworthy deviation from this trend: Tukker's (2004) analysis of product-service-systems. The articles that most frequently and equally cross-cited the top 50 cited references also belonged to the group of 21 articles that included both terms SE and CE (AND-operator), such as Barbu et al. (2018) and Camacho-Otero et al. (2018).

5. Joint growth and recent approximation

SE and CE are considered 'new' types of economies that have the potential to overhaul the dominant mass production systems and business practices with more resource-efficient alternatives (Dos Santos et al., 2017; Easterling, 2018; Todeschini et al., 2017). Thus, CE may eliminate waste from global supply chains without hampering economic growth (see Yap, 2005), while SE can fundamentally

⁷ Sposato et al. (2017) scrutinized how sharing business models can contribute to the circularity of product-service life cycles, and they suggest that a hierarchy exists between the two concepts. However, this study is a singular piece of evidence in which the authors took a relatively unstructured approach to illuminate the SE/CE relationship (<100-word description of methodological approach, <10 scientific references)

⁸ Both terms 'business model innovation' and 'social innovation' are the 2nd and 3rd most appearing author keywords containing the term 'innovation' with 15 and 19 appearances accordingly

Table 2
Most common keywords in both CE and SE literature.

Rank	Author keyword	Keyword count in articles of the domain:			
		CE \cup SE	CE	SE	CE \cap SE
1	Circular economy	1580	1563 (99 %)	0 (0%)	17 (1%)
2	Sharing economy	644	0 (0%)	629 (98 %)	15 (2%)
3	Sustainability	268	227 (85 %)	40 (15 %)	1 (1%)
4	Recycling	179	178 (99 %)	1 (1%)	0 (0%)
5	Sustainable development	136	129 (95 %)	6 (4%)	1 (1%)
6	Airbnb	126	0 (0%)	126 (100 %)	0 (0%)
7	Collaborative consumption (CC)	102	3 (3%)	94 (92 %)	5 (5%)
8	Industrial ecology	93	91 (98 %)	1 (1%)	1 (1%)
9	Waste management	81	81 (100 %)	0 (0%)	0 (0%)
10	Industrial symbiosis	78	78 (100 %)	0 (0%)	0 (0%)
11	Life cycle assessment	74	72 (97 %)	2 (3%)	0 (0%)
12	Resource efficiency	68	67 (99 %)	0 (0%)	1 (1%)
	Business model(s)	68	45 (66 %)	23 (34 %)	0 (0%)
13	China	66	66 (100 %)	0 (0%)	0 (0%)
14	Remanufacturing	55	54 (98 %)	0 (0%)	1 (2%)
15	Waste	49	49 (100 %)	0 (0%)	0 (0%)
16	Reuse	47	47 (100 %)	0 (0%)	0 (0%)
17	Innovation	40	23 (58 %)	17 (42 %)	0 (0%)
18	Reverse logistics	39	39 (100 %)	0 (0%)	0 (0%)
19	Biogas (production)	39	36 (100 %)	0 (0%)	0 (0%)
20	Sharing	37	0 (0%)	37 (100 %)	0 (0%)

Note: \cup = or, \cap = and.

Table 3
Most common citations in SE/CE article library (based on OR-operator in Scopus search query, see appendix for full overview).

Rank	Reference	Reference Count			
		CE \cup SE	CE	SE	CE \cap SE
1	Ellen MacArthur Foundation, 2015a . Towards A Circular Economy: Business Rationale For An Accelerated Transition	366	354 (97 %)	4 (1%)	8
2	European Commission, 2015 . Closing the Loop. An EU Action Plan for the Circular Economy	299	296 (99 %)	0 (0%)	3
3	Belk, 2014a, 2014b . You are what you can access sharing and collaborative consumption. <i>Journal of Business Research</i> , Vol. 67, Issue 8, pp. 1595–1600	261	9 (3%)	249 (95 %)	3
4	Botsman, R., Rogers, R, 2010 . What's Mine Is Yours: The Rise of Collaborative Consumption. HarperCollins, New York, United States	249	13 (5%)	230 (92 %)	6
5	Ghisellini, P., Cialani, C., Ulgiati, A., 2016 . A review on circular economy – The expected transition to a balanced interplay of environmental and economic systems. <i>Journal of Cleaner Production</i> , Vol. 114, pp. 11–32	241	236 (98 %)	0 (0%)	5
6	Hamari et al., 2016 . The sharing economy: why people participate in collaborative consumption. <i>Journal of the Association for Information Science and Technology</i>	220	3 (1%)	216 (98 %)	1
7	Bardhi and Eckhardt, 2012 . Access-based consumption the case of car sharing, <i>Journal of Consumer Research</i> , Vol. 39, Vol. 4, pp. 881–898	197	9 (5%)	187 (95 %)	1
8	Braungart and McDonough, 2002 . Cradle to Cradle: Remaking the Way we Make Things	160	155 (97 %)	2 (1%)	3
9	Lieder, M., Rashid, A., 2016 . Towards a circular economy implementation: A comprehensive review in context of the manufacturing industry. <i>Journal of Cleaner Production</i> , Volume 115, pp. 36–51.	155	153 (99 %)	0 (0%)	2
10	EC Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on Waste and Repealing certain directives. <i>Official Journal of European Communities</i> , 312, pp. 3–30	153	153 (100 %)	0 (0%)	0

Note: \cup = or, \cap = and.

reduce the amount of consumer goods in circulation and urban land space required ([Frenken, 2017](#); [Lan et al., 2017](#)).

The concepts of CE and SE both received increased attention because of the 2008 financial crisis. After 2008, governments and businesses were searching for models to revive economic growth ([Coca-Stefaniak, Carroll, 2015](#); [Habibi et al., 2017](#)). CE emerged as a suitable concept to sustainably transition the capitalist dominated economic model which had caused the crisis ([Cave, 2015](#); [East-erling, 2018](#); [IMSA, 2013](#); [Pratt, 2014](#); [Richardson, 2015](#)). Most recently, CE literature grew significantly due to a publication by the Ellen MacArthur Foundation in 2012 ([Lieder, Rashid, 2016](#); [Murray et al., 2017](#); see [Fig. 4](#)). SE literature experienced its major growth

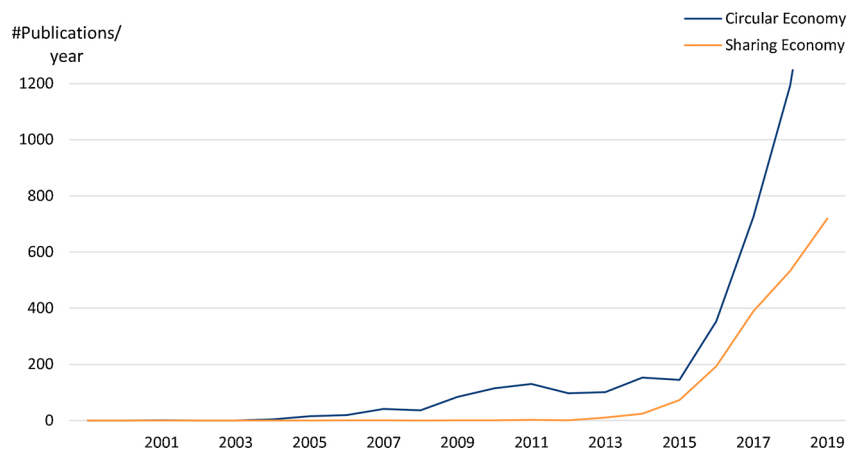


Fig. 4. CE and SE publications per year 2000-2019.

Source: Constructed by authors.

in publications around 2012 as well, but this growth was driven by collaborative consumption, peer-to-peer platforms, blockchain and online marketplaces (e.g. Andersson et al., 2013; Sarkar et al., 2013; Sundararajan, 2016).

These historical events indicate a more systematic and scholar-driven perspective for CE in which thought and knowledge are conceptual and emphasized over experience. SE's growth in scholarly work is instead driven by experience that leads to the creation of knowledge.⁹ CE's more conceptual footprint is substantiated by its related dominant keywords (e.g. 'industrial ecology' and 'industrial symbiosis') and the visionary and advisory character of its most cited publications (Ellen MacArthur Foundation (EMF), 2012, 2013, 2015a, 2015b; EMF, McKinsey and Co., 2014; European Commission (EC), 2008, 2015). These examples may be the reason why CE underwent a mission drift and why implementing circular concepts no longer conforms to CE's theoretical origins. The growing number and scale of empirical cases in SE research – though they lack systemic quality – (Boons, Bocken, 2018) and CE's systemic character indicate that scholars of these two fields may learn from each other.

The beginning of the convergence of CE and SE literature can be observed in the review of identified indirect links and recent scholarly work (Jabbour et al., 2020; Schwanholz, Leipold, 2020). Apart from the terms 'collaborative consumption', 'business model (s)' and 'sustainability', 'governance' was also identified as a relevant indirect thematic pattern. Even though it did not appear in the 20 most common keywords, 'governance' and related terms such as 'regulation' and 'smart city', are noteworthy due to their equal appearances in both SE and CE literature (see Table 4). Furthermore, the emerging themes of 'consumer behavior' and 'sustainable consumption' were subsumed by 'collaborative consumption' (see Section 6.3). Regarding sustainable consumption, this study's analysis applied the definition of collaborative consumption, which includes business-to-business collaboration (i.e. monetizing idle capacity of existing assets and residual resources; Botsman, 2013). Therefore, this study discusses industrial symbiosis – though often considered a production-based approach – in the context of sustainable (industrial) consumption (see Section 6.3).

Similar to the term 'innovation', concepts such as 'supply chain (management)' and 'design' are considered transversal or sub-themes. Thus, 'design' mostly appears and is discussed as a sub-theme of business models, and 'supply chain (management)' is discussed in the context of disciplinary foundations, business models and sustainable consumption.

6. Conceptual links in literature

Based on the insights presented in Tables 2–4, the following conceptual links between SE and CE were identified: sustainability, business models, sustainable consumption and governance. These are discussed in light of the dominant (sub-)themes per topic which were directly derived from the bibliometric analysis that dictated the coding framework (see Fig. 5).

6.1. Sustainability

In addition to the thematic pattern that emerged from the keyword analysis, the list of dominant outlets indicated that sustainability is a core theme in SE and CE literature. The largest share of publications (more than 30 %) can be found in outlets that distinctly

⁹ 309 articles in the dataset contain the terms 'Uber' or 'Airbnb' in their abstract and 'Airbnb' is among the top 10 overall keywords (see Table 2). All three are renown exemplars of successful sharing economy ventures.

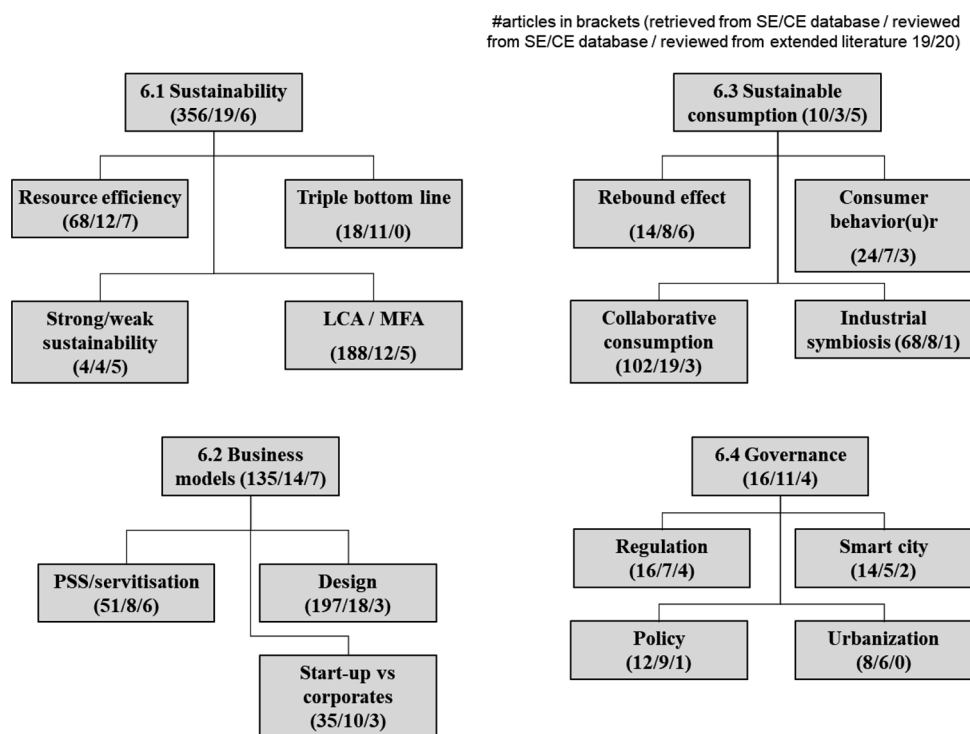
Table 4

Indirect links - Top 10 author keywords with balanced (>15 %) appearances across CE and SE literature.

Rank	Author keyword	Keyword count in articles of the domain:				Section
		CE ∪ SE	CE	SE	CE ∩ SE	
1	Sustainability	268	227 (85 %)	39 (15 %)	2 (1%)	6.1
2	Business model(s)	68	45 (66 %)	23 (34 %)	0 (0%)	6.2
3	Innovation	40	23 (58 %)	17 (43 %)	0 (0%)	6.1, 6.2, 6.3
4	Supply chain (management)	35	28 (80 %)	7 (20 %)	0 (0%)	3., 6.2, 6.3
5	Consumer behavior(u)r	22	14 (64 %)	7 (32 %)	1 (5%)	6.3
6	Sustainable consumption	19	12 (63 %)	5 (26 %)	2 (11 %)	6.3
	Design	19	11 (58 %)	8 (42 %)	0 (0%)	6.2
7	Smart city	18	4 (22 %)	14 (78 %)	0 (0%)	6.4
8	Regulation	17	5 (29 %)	12 (71 %)	0 (0%)	6.4
9	Case study*	17	12 (71 %)	5 (29 %)	0 (0%)	–
10	Education*	16	12 (75 %)	4 (25 %)	0 (0%)	–
	Literature review*	16	10 (63 %)	5 (31 %)	1 (6%)	–
	Governance	16	7 (44 %)	9 (56 %)	0 (0%)	6.4

Note: Only those author keywords included whose counts are composed of at least 15 % from SE- and CE-related articles respectively.

* The content analysis evinced that the author keywords ‘Case study’, ‘Education’ and ‘Literature review’ emerged with a balanced appearance in CE and SE literature due to their generic/methodological character. Literature review articles were extensively included in this work to discuss results and findings (e.g. Ferrasso et al., 2020; Ghisselini, 2016; Mont et al., 2020).

**Fig. 5.** SE/CE coding framework and article count.

Note: Including double counts when articles included several of the dominant author keywords in one coding group. Therefore, the number of reviewed articles is not 272 as the numbers in the figure indicate, but 182.

Table 5

Focus on triple bottom line dimensions of CE and SE – article abstract analysis.

	‘Environmental + sustainab-’	‘Economic + sustainab-’	‘Social/societal + sustainab-’	Total
SE	20 % (38)	42 % (76)	38 % (73)	175
CE	41 % (603)	40 % (593)	20 % (299)	1474

Note: Combination of the respective terms ‘environmental’, ‘economic’ and ‘social/societal’ and the prefix ‘sustainab-’ in article abstracts.

focus on sustainability,¹⁰ such as the *Journal of Cleaner Production, Resources Conservation And Recycling and Sustainability (Switzerland)* (Multidisciplinary Digital Publishing Institute, 2019; Schober et al., 2018). CE scholars use the term ‘sustainability’ disproportionately more than SE scholars (see Tables 2 and 5) while SE is contested stronger regarding this topic. While some authors believe that SE contributes to sustainable growth (Bonciu and Bălgăr, 2016), other recent scholarly works contest this theory (Acquier, 2017; Martin, 2016; Schor, 2014, 2017; Yeomans, 2015). Evidence found in the bibliometric analysis supports this contention, namely, the imbalance in occurrences of the keyword ‘resource efficiency’. CE authors exclusively use ‘resource efficiency’ (see Table 2) even though democratically organized sharing practices can directly contribute to resource efficiency (see Guo et al., 2018b; Martin et al., 2010).

SE literature also deals intensively with social themes (see Table 5; Pouri, Hilti, 2018). This finding indicates that a gap between theory and practice exists in SE literature because SE is criticized for its lack of social perspective in practice. Various scholars have observed factors that possibly reproduce existing social bias and hamper equitable access such as income, education, age, digital affection and race (Cheng, Foley, 2018; Cherry, Pidgeon, 2018; Edelman et al., 2017; Hsiao et al., 2018; Li et al., 2018; Schor, 2014). Furthermore, scale economies and network externalities, combined with the high costs of switching, can lead to platform provider monopolies as well as information and power imbalances (Calo and Rosenblat, 2017; Ritter, Schanz, 2019; Theurl et al., 2015). CE research deals more intensively with economic and environmental topics than societal ones (Cazzaniga, Detomati, 2017; Cooper et al., 2017; Merli et al., 2018), as various authors have claimed that CE neglects the social dimension (Moreau et al., 2017; Schulz et al., 2019). CE’s blind spot for the social dimension can potentially be addressed through leveraging the existing research on SE’s societal implications and the hierarchy between CE and SE.

From an institutionalist point of view, one can argue that the exact economic, social and environmental impacts of SE are contingent on accompanying regulatory and ownership structures, such as a political-economic model (Curtis, Mont, 2020; Frenken, 2017). If, for instance, most SE platforms use market logic, sharing may increase overall rents through economic utilization models for owners of scarce goods and (unregulated) expansion of commercial platforms. However, it would contribute little to social cohesion or the environment as transactions would increasingly become impersonal and economic surplus would not necessarily be invested in more eco-friendly alternatives (Ottelin et al., 2017). However, economic outcomes could be more equal if platforms earnings become subject to progressive taxation by governments (redistribution logic) or become owned by their users in a democratic, cooperative form (also see Gorenflo, 2015; Theurl et al., 2015). Benefits from social cohesion and efficient resource use could be substantial (Frenken, 2017; cf. Frenken et al., 2020).

Both the CE and SE models risk not exploiting their full sustainable potential by abandoning the disciplinary origins and strong sustainability paradigms they were originally reputed for. Contemporary CE practices have been criticized for commoditizing nature, neglecting environmental ethics and favoring an application of weak sustainability (Turner, 1993; Washington, Maloney, 2020). In addition, institutionalized sharing practices have been criticized for dissociating from their roots in reciprocity and adopting a strongly market-oriented character during the late 20th century (Light and Miskelly, 2015; Martin et al., 2015; Pais and Provasi, 2015; Washington, 2017). However, these shifts could be remedied by leveraging a stronger intellectual exchange between the disciplines. By building on SE’s knowledge base in economic anthropology and value creation in two-sided markets, nature’s interests could hypothetically be safeguarded by creating stronger human obligations (e.g. carbon offsetting) when exploiting nature. A common ground for SE and CE to further converge could be Polanyi’s (1944) substantive interpretation of economy, in which humans interact with natural resources rather than ‘economize’ them. Thus, utility maximization is a potential, but not an imperative outcome. Substantivism combined with ‘biospheric reciprocity’ requires a better understanding of the biophysical roots of economic and social activity.

For instance, envisaged changes in downstream activities (e.g. logistics, consumption) of a sustainable food system must be evaluated also based on their respective effects on the system’s underlying natural resources. The allocation of resulting environmental expenses could be applied according to a ‘polluter-pay principle’ (Ruiz-Rosa et al., 2020) and facilitated through life-cycle assessments (for impact tracking and evaluation) and digital platforms (for data confidentiality and market transparency). Accordingly, necessary regenerative agricultural measures that address, for instance, soil carbon, water quality and (soil) biodiversity (i.e. nature’s interests; Schreefel et al., 2020) could be implemented fairly. Similarly, the sharing approaches that the fields of (design) anthropology and social innovation take¹¹ could be amended with information gathered in life-cycle assessments and material flow analyses.

Kjaer et al. (2018) evaluated sharing-based business models’ environmental performances by performing a life-cycle assessment. Similarly, Amatuni et al. (2020) examined the environmental impacts of car sharing by adopting a life-cycle perspective. Thus, the ‘obligations’ that an economic system’s production and material disposal have for nature could be examined, measured and accordingly reflected in certain areas, such as revenue models or pricing. This ethical inclusive and data-driven perspective could enrich both SE and CE practices and could help these models avoid continuing the neoclassical economic paths they are criticized for. A full overview of potential areas of discussion between CE and SE scholars based on the terms’ disciplinary foundations and conceptual links can be found in Table 6.

¹⁰ CE outlets show an additional focus only on engineering and special issues covering a breadth of CE-related topics (Esposito et al., 2018). SE is dealt with in various fields besides sustainable development such as computer science, hospitality management and business literature outlets. It should be noted that the most chosen outlets can only provide a preliminary indication on the thematic orientation of the concepts, especially since the article library also contains conference proceedings (Meho, 2019). See Table 3a in Appendix for full list of top outlets per field

¹¹ E.g. Pink et al.’s (2020) study on autonomous/shared driving, Pais and Provasi (2015) analysis of economic and social relations in SE or Lan et al.’s (2017) study of consumers’ willingness to co-create value through sharing

Table 6
Proposed reciprocal enrichment of SE and CE literature fields.

	Sharing economy	Circular economy
Disciplinary origins	Strengthen SE's conceptual muscle' to develop a systemic vision and aspiration for viable large-scale sharing practices	Balance conceptual CE knowledge with knowledge based on real-life experience to foster a coherent understanding and avoid mission drift
Sustainability	Mutual elevation towards a strong sustainability narrative: build on SE's principles of reciprocity and ICT technology as well as CE's insights from life-cycle assessments and material flow analyses to systematically include and adequately reflect ('polluter-pay principle') a context-specific obligation towards nature in sustainable systems Better embed sharing practices in existing CE discourse on environmental impact (e.g. resource efficiency) Expand research on the circular and sustainable potential of SE business models	Strengthen research on societal impact of CE benefiting from existing SE knowledge Build on SE's platform and service design capabilities to facilitate supply-demand matching in circular systems
Business models	Extend upstream perspective to allow for effective use of sharing practices throughout business ecosystems Focus on corporates' inter- and intraorganizational approaches towards SE Focus on a potential 'sharing economy rebound' drawing learnings from work on CE rebound	Scrutinize small- and medium-sized companies' and start-ups' CE strategies to comprehensively illuminate CE's disruptive potential Leverage SE's understanding of platform architecture to facilitate information exchange and governance of industrial symbiosis
Sustainable consumption	Increase attention to organizational perspectives on shared consumption to increase resource utilization Achieve more balanced development of sustainable solutions taking rebound effects in production and consumption into consideration Take top-down perspective to enable better informed and more efficient collaboration and sharing practices among incumbent and corporate players	Build on the knowledge of semantics of SE to create an incisive and palpable CE narrative Develop a better understanding of bottom-up diffusion of CE practices and small-scale intervention as driving force behind CE
Governance	Create a more differentiated view of the (partly) complex sharing systems to allow for adequate and informed regulatory intervention Strengthen perspective on the Global South, especially considering a regional growth of the economic scale to create opportunities for 'leapfrogging' towards sustainable development	

6.2. Business models

The existing relations between SE and CE in business model literature are caused by scientists who consider the private sector to be highly relevant to these economic models and who consider business models to be vehicles that drive SE and CE (Lüdeke-Freund et al., 2018; Lewandowski, 2016; van Renswoude et al., 2015; Rosa et al., 2019). Circular and sharing business models enable companies to improve the sustainability of their business practices within and beyond organizational boundaries while also creating a competitive advantage (Antikainen et al., 2018; Lieder, Rashid, 2016). However, scholars have also observed that research on SE and CE business models requires structuring and focus (Bocken et al., 2017a; Lobbers et al., 2017). This encumbers CE's and SE's practical application and provides them an innovative and explorative character (Bianchini et al., 2018; Cohen, Kietzmann, 2014; Muñoz, Cohen, 2018).

CE scholars tend to consider sharing models to be use-oriented subsets of circular practices (Hobson, Lynch, 2016; Lacy, Rutqvist, 2016; Ranta, Saari, 2020). 'Product-service system(s)' and 'servitization' are prevalent themes in this context (Kopnina, 2017; Mont, 2002; Tukker, 2015) and are considered to be major drivers of the respective fields (Lehmacher, 2016; McLaren, Agyeman, 2015). Product-service systems enable access to company-owned assets and facilitate the provision of privately owned assets (Piscicelli et al., 2015). These types of systems primarily refer to the downstream activities of a business model, such as the revenue model (Urbinati et al., 2017). The reason why scholars tend to view sharing models as a subset of circular practices is that CE literature addresses both downstream activities and (Ferrasso et al., 2020) upstream interventions (Bocken et al., 2016; Henry et al., 2019). Literature that acknowledges upstream and business-to-business sharing practices is scarce (Choi et al., 2014; Sterev et al., 2018). Consequently, both fields could benefit from systematically and effectively implementing sharing practices or servitization in circular business ecosystems (Jabbour et al., 2020; Kanda and Matschewsky, 2018). The SE literature that was found in this study rarely addressed any relation with CE; therefore, SE scholars have neglected SE's circular and sustainable potential (see Table 6).

Scholars of CE and SE consider design interventions to be necessary to enable business models (Amasawa et al., 2018; Belk, 2017; Daae et al., 2018; Fleischmann, 2018; Moreno et al., 2016).¹² CE literature could benefit from SE's enhanced knowledge of service design and digital architecture, which are both considered key instruments in delivering service-based business models (Bettoni et al., 2018). Hence, optimal engagement, supply-demand matching and use of blockchain technology could be used for intervention (Fischer, 2018; Guo et al., 2018a; Han et al., 2018; Wu et al., 2018). In turn, SE could benefit from CE scholar's knowledge about upstream design interventions, such as process and product design, eco-design and Design-for-X (DfX, e.g. design for reusability, design for remanufacturing, design for longevity) approaches (Bakker et al., 2014; Sassanelli et al., 2020). For example, Jabbour et al. (2020) provided one of the first pieces of evidence that show how information technologies (e.g. Internet of Things, sensors, big data) can be

¹² "Design", "Eco(-)design" and "product design" are all among the top 20 author keywords in the co-occurrence analysis (see Fig. 5). While "design" is equally treated in both literature bodies (58% CE, 42% SE), "product design", "eco-design" or "DfX" show a unanimous affiliation with CE and "service design" is only mentioned in SE articles

leveraged in the product design process to unlock the full sharing potential along the value chain (see De Sousa Jabbour et al., 2018). This mutual exchange is a promising path towards systematically integrating product-service systems and sharing and circular business model concepts.

SE literature focuses on the role of newer firms and entrepreneurs (Chasin et al., 2018a, 2018b; Hasan and Birgach, 2016) rather than longstanding corporations (Bocken et al., 2017b; Parker et al., 2015). CE research, however, examines both newer companies' and longstanding corporations' activities - with emphasis on the latter (Bocken et al., 2017a; McIntyre and Ortiz, 2016). Yet, only a modest number of studies exist that address small- and medium-sized circular companies and their disruptive potential (Stewart, Niero, 2018; Singh et al., 2018).¹³ CE has a longer history than SE, and cases such as Uber and Airbnb might partially explain SE literature's increased attention on start-ups. Nevertheless, SE is generally considered to atomize business transactions and offer chances for emerging businesses that disrupt incumbents (Easterling, 2018; Liang et al., 2018; Sundararajan, 2016). This implies that CE scholars can scrutinize more start-ups and small- and medium-sized enterprises while SE scholars can examine incumbents' and corporations' approaches.

6.3. Sustainable consumption

Considerations of potential rebound effects are generally absent from SE discourse, but are more prominent in that of CE.¹⁴ Overall, less than 1% of the articles in the dataset discuss the rebound effect; therefore, this study concludes that this area is underdeveloped for both concepts. For SE literature, the scientific evaluation of a potential 'sharing economy rebound' seems to be a relevant and valuable addition to the academic discourse especially when considering SE's strong footprint in consumer behaviour research (Cheng, 2016; Roos, Hahn, 2017). Schor (2014, 2017) and Pouri and Hilti (2018) mention potential downsides of sharing platforms related to new economic activities. These downsides include increased travel due to home sharing, decreased use of public transport due to ride sharing and 'total commercialization': in which interpersonal transactions (e.g. neighbours helping one another) become digital markets via perfect pricing and information mechanisms. These problems highlight the ethics of SE and the criticism regarding its neoliberal interpretations (Theurl et al., 2015). For example, Warmington-Lundström and Laurenti (2019) were some of the first who empirically scrutinized the sharing rebound effect of peer-to-peer boat sharing and concluded that lessees in particular experience rebound effects' negative consequences through increased personal use and increased air travel (also see Briceno et al., 2005).

The scientific community has emphasized the relevance of unintended environmental effects driven by consumer behaviour. The need for preventive policies and lifestyle interventions is increasingly acknowledged (Skjelvik et al., 2017; Zink, Geyer, 2017). Both bodies of literature identify semantics as an aspect that is relevant to this discussion. Only one CE article was found in the library that deals with semantics from a user perspective,¹⁵ while SE seems to have a stronger scholarly footing in this subject (Banning, 2016; Baralla et al., 2017; von Hoffen et al., 2015; Liao et al., 2017). Given the concepts' historic development, one could argue that CE scholars need to make up leeway because – even though CE has an inspiring character (Perella, 2014b) – SE is arguably the more palpable concept for consumers. It is also noteworthy, that the broad use of the term SE has led to a dilution of its meaning, and has spawned alternate titles, such as 'pseudo-sharing' or 'share-washing' (Belk, 2014b; Curtis, Lehner, 2019; Pink et al., 2020)

Scholars agree (e.g. Laurenti et al., 2016; Widmer et al., 2018) that a successful prevention of rebound effects can only be achieved through disruptive, rather than incremental innovations and a coordinated interplay of production and consumption. This holistic perspective is even more important when considering that measures taken in high carbon-intensive activities tend to result in relatively smaller rebound effects (Chitnis et al., 2013). Therefore, these measures should be identified and prioritized in an economic system, for instance, through life-cycle assessments (Finnveden et al., 2009; Table 6).

The keyword co-occurrence analysis (see Fig. 6) indicated that 'collaborative consumption' is a theme that connects CE and SE literature. 'Collaborative consumption' is defined as an approach that is applied at the levels of business-to-consumer, consumer-to-consumer and business-to-business transactions and outperforms traditional services especially when applied in the digital domain (Botsman, 2013; Gutiérrez et al., 2017; Park, Armstrong, 2017). SE scholars tend to employ the term 'collaborative consumption' to emphasize that SE enables collaboration among consumers (Barbu et al., 2018; Svecová, Veber, 2017). CE scholars use the term to emphasize that a CE requires increased collaboration in supply chains to organize circular consumption in complementary configurations (Aminoff et al., 2016; Herczeg et al., 2018; Junnila et al., 2018).

In this context, industrial symbiosis is often referenced, and this study proposes that scholars re-evaluate the strong link between industrial symbiosis and production-based approaches. Industrial symbiosis entails sustainable business-to-business consumption practices in which infrastructures and residual resources are consumed collaboratively. Therefore, organizational approaches, internal policies and structures that promote industrial symbiosis among employees (e.g. in procurement and operations) could be contrasted

¹³ SMEs are examined only in a few small studies (<10 N, regionally limited cases; e.g. Bocken et al., 2018; Fischer and Pascucci, 2017; first large-N study by Henry et al., 2019). Bibliometrically, 14 out of the 16 articles from the SE library that feature the term 'incumbent' in their abstract mention it in the context of new market entrants' disruptive impact on incumbents and industries (e.g. Crittenden et al., 2017; Santoso et al., 2018); while only 4 of the 8 articles out of the CE library containing the term 'start-up' in their abstract even deal with the organizational form (e.g. De Angelis et al., 2018).

¹⁴ The rebound effect describes the phenomenon that the increase of resource productivity (also through reduced ownership) does not lead to a reduced, but rather increased usage, and thus production. It is prominent in the sustainable consumption discussions as an improvement in one behaviour might result in direct or indirect negative impacts elsewhere (Junnila et al., 2018; Zink, Geyer, 2017)

¹⁵ The only study in the library underlying this research is Bovea et al.'s (2018) study on labelling of circular products

with, or even informed by, studies of sharing behavior and market exchange (Denning, 2015). Both SE and CE studies include collaborative consumption to economically valorize idle resources (or ‘waste’ in CE terms) and thereby increase environmental gains (Belk, 2014a, 2014b; Botsman, 2013). The major obstacles that are preventing a wide assimilation of industrial symbiosis are a lack of (primary) information and a lack of independent facilitator support for regulation and governance (Lombardi, 2017). Digital platforms, the dominant vehicle of modern SE might present a promising solution for increased upstream supply chain collaboration and sharing (see Fraccascia and Yazan, 2018; Li et al., 2019; Kosmo, 2019). Furthermore, SE scholar’s knowledge of blockchain technology can be leveraged by CE researchers to bridge information asymmetries and avoid complex regulatory frameworks in circular systems (e.g. Romero’s et al. (2017) concept of Green Virtual Enterprises or when sharing product-specific impact data throughout global supply chains). SE researchers could also elaborate more on organizational sharing behavior to achieve more efficient inter-organizational resource usage.

6.4. Governance

CE research tends to exhibit a top-down character because it is strongly influenced by governmental and policy interventions. Three of the most common citations in CE literature have a distinct focus on policy. These references, Yuan et al. (2006); European Commission (2008) and European Commission (2015), reinforce the claim that the European Commission and China are influential forces behind the CE (also see Nelles et al., 2016; People’s Republic of China, 2008). In fact, the initial increase in CE literature before 2012 began in 2005, which was considerably influenced by China’s Circular Economy initiative (Lowe, 2005; Yap, 2005). Thus, almost 60 % of all CE publications found between 2005 and 2011 contain the terms ‘China’ or ‘Chinese’ in their title, abstract or keywords.

It is worth noting that neither SE nor CE scholars seem to focus on developing or emerging countries (2 % of the dataset), but they do have a clear tendency to examine developed countries (20 % of the dataset; Kirchherr, van Santen, 2019).¹⁶ An increased focus on emerging countries could become particularly promising when the economic scale shifts towards the Global South, where context-specific interventions can foster development and ‘leapfrogging’ opportunities for sustainability (Geng, Doberstein, 2008; Preston, Lehne, 2017).

As mentioned above, SE publications mainly focus on peer-to-peer interactions, which causes SEs to be viewed as being bottom-up rather than top-down. Scholars agree that targeted policy interventions are highly relevant for supporting the efficient establishment of SE practices (Følstad et al., 2018; Richards, Hamilton, 2018). However, in contrast to CE, SE has received less direct support from policymakers due to safety or market regulations (Dupuis, 2018; Pfeffer-Gillett, 2016; Prendeville et al., 2018). Chen et al. (2018) and Crommerlin et al. (2018) argue that short-term rental laws might slow down the development of the peer-to-peer home-sharing market and that city officials have tightened their SE regulations rather than loosened them. This phenomenon can be connected to an atomized view on individual sharing platforms rather than a wholistic, systemic perspective on SE (Boons and Bocken, 2018).

Finally, urban environments were identified as a theme that builds common ground between both concepts.¹⁷ Cities are considered to be a highly relevant unit of analysis, as hubs for sharing practices, and circular transitions (Cohen and Muñoz, 2016; Geissinger et al., 2019; Wang et al., 2018). The dominant threads that were identified regarding urban sharing practices show that sharing practices equally relate to themes such as evolving information and communication technology (Dudás et al., 2017), sharing in distinct business sectors (Tedjasaputra, Sari, 2016; Wang, Nicolau, 2017) and smart city development (Gadecki, 2018; Pick, 2017). In fact, despite policymakers’ partially critical reactions to SE ventures, sharing activities have often been included in the growing number of municipal smart city agendas (Almirall et al., 2016; Capdevilla, Zarlenga, 2015; Hsu, 2018; Zvolska et al., 2018). Similarly, the concept of CE plays a role in scientific work that focuses on smart cities and urban sustainability transitions, in which implementation of circular models is considered to be a defining criterion (Fang et al., 2017; Petit-Boix and Leipold, 2018; Koop, van Leeuwen, 2017).

7. Conclusion

This paper analyzes the literary development and conceptual links between the literature concerning the sharing economy (SE) and circular economy (CE) to contribute to a productive exchange between the scholars of these two fields. Both fields have been presented as normative solutions for sustainable development, but have recently diffused in their meaning due to a steep growth in literary work and neoclassical interpretations. One of this study’s major findings was that scientific literature only places the concepts of SE and CE in direct relation to each other incidentally, despite the conceptual links that exist between the two models. Future business and policy decisions will benefit from a better understanding of the relations between these two concepts. Thus, this paper presented the first holistic approach to linking these concepts and provided for them a structured narrative.

Unlike the *Game of Thrones* episode ‘Battle of the Bastards’ which inspired the title of this paper, the ‘battle’ between SE and CE literature has not resulted in the demise of one of the parties involved. In fact, this study’s analyses revealed high compatibility and ample room for the two ideas to meet. Examples for mutual enrichment in this context could be improved regulation and better perspectives on sharing in complex value chains. Furthermore, facilitated information exchange and governance in circular systems

¹⁶ Abstracts of all articles in the dataset were searched for the terms “developing country/-ies” and all 81 country names in the World Bank’s low and lower-middle income clusters (World Bank Group, 2020). Abstracts of all articles in the dataset were searched for the following countries’ names: China, France, Germany, USA, UK, Italy, Spain (all in World Bank’s higher-middle or high income cluster; World Bank Group, 2020)

¹⁷ 471 articles in the article library contain the words ‘urban’, ‘city’ or ‘cities’ in their abstract (303x CE, 165x SE, 3x BOTH) and more than 100 articles’ keywords contain the term ‘urban’. In total 113 articles with ‘urban’ in their keywords were found (71x CE, 40x SE, 2x BOTH).

could leverage SE scholar's understanding of information and communications technologies and the internet of things.

Both concepts and their contemporary understandings share histories as proposed responses to the 2008 economic crisis. After 2008, literature concerning both SE and CE experienced a boom: the increase in CE literature was driven by the Ellen MacArthur Foundation's flagship publications and developed countries' national policies such as China and the EU. The increase in SE literature was influenced by the rise of digital peer-to-peer interaction. This study's bibliometric analysis exposed the most prevalent overlapping themes within these two bodies of literature: sustainability, business models, sustainable consumption and governance. However, from a sole literary and bibliometric perspective, little evidence was found that suggests these are strong relationships.

Another key finding of this study was that most scholars who analyze SE and CE business models conjointly unanimously consider SE to be a subset of CE. They often portray SE business models as one out of several possible applications of CE. This perspective is shared by scholars who solely examine CE, but it is not found within SE research in which the relation or hierarchy of SE and CE business models is not addressed. This finding indicates that there is space for SE research to explore its circular potential, which may add opportunities for the implementation of sharing business models, or even business ecosystems. Concrete pathways towards achieving this outcome could be presented in the context of product design or platform- and service-based business models. SE literature's focus on small- and medium-sized enterprises and entrepreneurs and CE literature's inclination to focus on incumbents imply that both fields should expand their respective organizational perspectives. In addition, the potential rebound effects of circular or sharing interventions are mentioned by scholars from both fields but are more carefully examined by CE publications.

Researchers agree that SE and CE can be significant drivers of sustainable development, however the view on both should be further nuanced. Despite this belief in on SE and CE, scholars approach sustainability differently in reference to the respective concepts. Beyond the economic dimension of sustainable development that is shared by both concepts, CE literature places a stronger focus on environmental issues while SE literature rather deals with societal implications. The respective emphases are probably related to the concepts' disciplinary origins, as CE was originally used in the field of industrial ecology while SE is rooted in anthropology, economic sociology and computer science. Potentially, the combination of SE's advanced discourse surrounding reciprocity and computer science, and the biophysical roots of economic and social activity that the CE discourse builds upon, could lead to a new form of natural ethics. The environmental burden caused by exploitive resource extraction could be evaluated and assessed by means of CE techniques. Building on this assessment, the costs of necessary mitigation measures to safeguard nature's interests could be reciprocally allocated to relevant parties in the dependent system (e.g. through reflecting of regenerative measures in price calculations). Required levels of data security and confidentiality could be maintained through the application of digital platforms or blockchain. Thus, the exploitation of nature would cause a measurable obligation for its beneficiaries throughout a socio-economic system.

This study's analysis revealed room for mutual exchanges between SE and CE scholars, particularly regarding the general direction from which the concepts are approached. CE has a stronger systemic character, while scientists, public authorities and practitioners focus on factual incidents rather than aspirational visions for SE. Thus, CE is thought to be top-down while SE is thought to be bottom-up. In fact, there is significant evidence that shows public interference has hindered the spread of sharing practices and business models, particularly in urban areas. This is partly caused by the SE not being viewed as systemic. In general, cities have been identified as potential targets for SE and CE because both models play a role in urban development, such as smart cities, urban sustainability and increased information and communication technology use.

One of this study's limitations is its content analysis, as the analysis possesses a subjective character that could trigger disagreements. This shortcoming was addressed by the addition of the bibliometric analysis's findings to guide the analysis and to quantitatively support the arguments that were made. Thus, a more objective and balanced argument could be provided. Furthermore, the choice of a specific combination of keywords used in the bibliometric analysis (e.g. the exclusion of the terms 'sharing' or 'circular') bears the risk of missing some relevant works. To remedy this limitation, some of the bibliometrically excluded terms were used in the content analysis of recent literature.

Not all the publications gathered through the Scopus search query contained keywords, abstracts or journal information. Therefore, the analyses presented in this paper vary marginally regarding the article components that were analyzed. This variation depended on the most comprehensive data that could be found to help answering the questions at hand. Finally, the constantly growing nature of the CE and SE literature fields allowed only for articles that were published before the end of 2018 to be included in the bibliometric analysis. To mitigate this limitation and capture most recent developments in CE and SE literature, this study's content analysis also included articles that were published between 2019 and September 2020.

With this article, the authors of this research seek to initiate a more involved and fruitful debate between the scientific and practical fields of SE and CE. Therefore, this study identifies and highlights the areas which hold the most potential for mutual benefit between CE and SE scholars, as well as points of contention. This contributes to an improved application of CE and SE on the path towards socially and environmentally sustainable economies.

Declaration of Competing Interest

The authors report no declarations of interest.

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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.eist.2020.10>.

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