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Author(s): Mäkelä, Marileena; Onkila, Tiina

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Domination of Managerial and Technical Frames—How the Circular Economy Is Reported in Finnish Business

Marileena Mäkelä^{1,2} · Tiina Onkila¹

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Abstract

Our research combines two research fields—the circular economy (CE) and sustainability reporting. Previous CE literature has focused on economic and environmental aspects, while the focus on social aspects has been rare. In the field of sustainability reporting, research on CE reporting is lacking. We address this gap. Our data consist of 32 sustainability reports from large Finnish companies. We applied frame analysis to the reports and found that CE reporting varies from none to moderate. Furthermore, we identified three different frames of CE reporting: CE management, technical CE and social CE. The management and technical frames dominate our data. This study contributes to the prior literature on CE reporting by showing how CE is positively framed in sustainability reports but lacks indications of the systematic change that is considered the core of CE in its previous conceptualisations. To achieve strong sustainability, companies urgently need to change the ways in which they operate.

Keywords Circular economy · Sustainability reporting · Large companies · Frame analysis · Content analysis

Introduction

The concept of a circular economy (CE) has been introduced due to problems in the current linear economy. The linear economy can be described as a ‘take-make-dispose’ system [1, 2] in which raw materials are converted into final products and, in the end, disposed of as waste [3, 4]. In contrast, circulation is at the core of CE. Products, components and materials remain in use [5], and the R framework is central to the concept. Based on Kirchherr et al.’s [6] review, the 3R framework of reduce, reuse and recycle is the most commonly used framework. However, previous literature also shows the existence of the R10 framework: refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle and recover [7]. While previous definitions highlight the economic and environmental dimensions of CE, Kirchherr

✉ Marileena Mäkelä
marileena.t.makela@jyu.fi

¹ Jyväskylä University School of Business and Economics, University of Jyväskylä, Jyväskylä, Finland

² School of Resource Wisdom, University of Jyväskylä, Jyväskylä, Finland

et al. [6], Korhonen et al. [8] and Prieto-Sandoval et al. [9] included sustainable development; Kirchherr et al. [6] mentioned social equity; and Murray et al. [10] added human wellbeing as part of CE. The inclusion of these three aspects—economic, environmental and social—brings the CE concept close to the concept of sustainability [11–13].

Despite the increasing discussion on the concept of CE, business transformation towards CE practices is happening only slowly, with different supportive and hindering factors influencing the change [14]. CE is intended to create transformational changes within businesses and become an integral part of sustainable business practice, in which multiple sustainability issues compete for attention. Sustainability reporting is a key practice for sustainable businesses, and the reporting of CE issues is slowly increasing. Although only a limited amount of research on the inclusion of CE in sustainability reporting exists, it provides an understanding of the pressures and integration practices regarding CE [15–17]. Sustainability reports are a part of the sustainability practice suggested as aspirational talk [18], which not only can stimulate improvements but can also focus our attention on key aspects of sustainability. So far, however, research on CE reporting lacks an understanding of how CE is framed in sustainability reports and an analysis of how these frames draw our attention to certain features of CE and shape our future understanding of the phenomenon.

To fill this gap, we applied frame analysis [19] and the concept of CE in sustainability reporting. We understand sustainability reporting as a systematic process through which an organisation collects and processes sustainability-related data from inside (and outside) the company. The Global Reporting Initiative (GRI) [20] has determined that the content of sustainability reporting should include the economic, environmental and social impacts of organisations.

This paper analyses how Finnish companies report on CE and addresses the following research question: How is CE framed in the sustainability reports of Finnish companies? Finnish companies were selected for the analysis because Finland has ambitious national targets for establishing CEs. In 2019, Finland set the aim to be the world's leader in CE [21]. In its strategic programme to promote CE, Finland aims to become a carbon-neutral CE in 2035 [22]. This study identifies three frames that draw the attention of the reader to the technical, managerial and social features of CE. It contributes to the prior literature on CE reporting by showing how CE is positively framed by the companies in sustainability reports but lacks indications of the systematic change that is considered the core of CE in its previous conceptualisations. This is also our main contribution to the Special Issue. We show that companies are currently more focused on resource efficiency approaches than resource sufficiency. Based on our research, we urge companies to reconsider the way they operate from CE and sustainability perspectives to achieve strong sustainability.

The remainder of the paper is structured as follows. The ‘[Theoretical Background](#)’ section presents the theoretical background of our work and explains the concepts of CE and sustainability reporting. In the ‘[Materials and Methods](#)’ section, we set forth our materials and methods, namely the case companies, their reporting and the analysis of the reports. The ‘[Results](#)’ section presents our findings, starting with a short quantitative analysis followed by a more detailed qualitative analysis, and we end our paper with a discussion and conclusions.

Theoretical Background

Defining CE Briefly

Nowadays, research on CE is increasing and gaining momentum. In their review, Schöggel et al. [23] showed a sharp increase in the number of CE studies from 2016 onwards [see also 12]. Despite this growth, the literature still includes multiple definitions of the term [6, 23, 24]. In the following paragraphs, we will first discuss the definitions and then summarise CE studies based on the literature reviews.

We have gathered some definitions from the literature, which are presented in Table 1. Although the definitions vary, the wideness of the concept can be summarised by five aspects: (1) CE is a systemic concept; (2) CE can be applied at the micro, meso and macro levels; (3) CE includes economic, environmental and social wellbeing; (4) the energy and material loops need to be closed; and (5) the boundaries of Earth need to be respected.

To provide an overview of the previous CE literature, we selected eight literature reviews with varying focuses. Geissdoerfer et al. [12] and Nikolaou et al. [13] compared the concepts of sustainability and CE based on the literature. In their review, Kirchherr et al. [6] analysed definitions of CE. The main aim of D'Amato et al.'s [26] review was to compare green economy, CE and bioeconomy. Prieto-Sandoval et al. [9] produced a general review of the previous CE literature. Desing et al. [25] focused on the views of companies. Schöggel et al.'s [23] review concentrated on the two last decades of CE literature. Lastly, Sehnem et al. [27] conducted a meta-analysis of 37 previous literature reviews. Based on these studies, we highlight four aspects as a summary of previous CE literature.

First, CE seems to be, foremost, an economic concept. Environmental applications exist, but social applications are rare. For example, Geissdoerfer et al. [12] observed that the priority of CE is on economic aspects. Of the environmental issues, only resources, waste and emissions are typically considered, and social aspects are usually neglected. Kirchherr et al. [6] found similar results: economic aspects are at the centre of the definitions, followed by environmental aspects, and social issues are seldom discussed. D'Amato et al.'s [26] conclusions were similar: the CE literature is dominated by discussions on resource efficiency, resource productivity and decoupling resource use from economic growth, and little attention is given to social issues. Schöggel et al. [23] concurred with these messages. Therefore, it is evident that the previous literature has mainly applied an economic perspective, with few environmental CE studies and only marginal social CE studies.

Second, the circulation of resources, especially recycling, is the concept most often associated with CE. Based on their analysis, Geissdoerfer et al. [12] found that the main motivation for developing CE is the better use of resources (i.e., the circulation of resources). Kirchherr et al. [6] noticed that CE often referred to reduce, reuse and recycle, with an emphasis on recycle. Furthermore, Prieto-Sandoval et al. [9] highlighted that circulation is key to a CE; materials and goods are kept in use and circulation for a long time, which minimises resource use. In Desing et al.'s [25] analysis, from companies' perspectives, CE means improving efficiency, reducing resource use and minimising waste. Lastly, Schöggel et al. [23] noticed that from the R frameworks, recycling was the most commonly applied, followed by remanufacture, repair and reuse.

Third, CE can be applied at three levels. The micro level refers to CE applications in companies and among consumers, the meso level applies to industrial parks and the macro level extends to country-level applications. Both Prieto-Sandoval et al. [9] and Nikolaou et al. [13] used this framework in their analyses. CE studies at the micro level

Table 1 Definitions of CE

Reference	Definition
Kirchherr et al. [6, 224]	'A circular economy describes an economic system that is based on business models which replace the "end-of-life" concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations'
Geissdoerfer et al. [12], 759]	'We define the Circular Economy as a regenerative system in which resource input and waste, emission, and energy leakage are minimised by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling'
Prieto-Sandoval et al. [9, 618]	'We defined circular economy as an economic system that represents a change of paradigm in the way that human society is interrelated with nature and aims to prevent the depletion of resources, close energy and materials loops, and facilitate sustainable development through its implementation at the micro (enterprises and consumers), meso (economic agents integrated in symbiosis) and macro (city, regions and governments) levels. Attaining this circular model requires cyclical and regenerative environmental innovations in the way society legislates, produces and consumes'
Desing et al. [25, 7-8]	'The Circular Economy is a model adopting a resource-based and systemic view, aiming at taking into account all the variables of the system Earth, in order to maintain its viability for human beings. It serves the society to achieve well-being within the physical limits and planetary boundaries. It achieves that through technology and business model innovation, which provide the goods and services required by society, leading to long term economic prosperity. These goods and services are powered by renewable energy and rely on materials which are either renewable through biological processes or can be safely kept in the technosphere, requiring minimum raw material extraction and ensuring safe disposal of inevitable waste and dispersion in the environment. CE builds on and manages the sustainably available resources and optimizes their utilization through minimizing entropy production, slow cycles and resource and energy efficiency'
Korhonen et al. [8, 39]	'Circular economy is an economy constructed from societal production-consumption systems that maximizes the service produced from the linear nature-society-nature material and energy throughput flow. This is done by using cyclical materials flows, renewable energy sources and cascading 1-type energy flows. Successful circular economy contributes to all the three dimensions of sustainable development. Circular economy limits the throughput flow to a level that nature tolerates and utilises ecosystem cycles in economic cycles by respecting their natural reproduction rates'

focus on products from two aspects [13]: first, how companies produce CE-based products, and second, how consumers react to CE-based products and CE-based consumption. Sehnem et al. [27] saw company-focused CE studies as the core. Meso-level CE studies concentrate on corporate collaboration incorporating industrial ecology and

industrial symbiosis [13]. Lastly, CE studies at the macro level consider the advancement of the CE through regional and national policies [13].

Fourth, although the CE literature addressed only limited themes in the beginning, nowadays, the themes are starting to vary. Sehnem et al. [27] nicely summarised the current variation by stating that CE research is about focusing on waste management via business models, closed-loop cycles, sustainable supply chains and innovations. In addition, Schöggel et al. [23] reported on this variation. They noticed that at the beginning of 2000, few themes were addressed, but that by 2019, the themes had increased significantly. The most common themes are still optimisation, waste and efficiency, but more and more studies are focused on innovations and business models. In addition, some critiques of the limited CE themes have been raised. For instance, Kirchherr et al. [6] noticed that the definitions seldom speak of the systemic change required to achieve CE. In addition, Desing et al. [25] doubted whether we can really solve global problems by focusing solely on the efficient use of resources.

Sustainability Reporting and CE

Sustainability reporting is an increasingly common practice for addressing social, environmental and economic responsibilities in business. The awareness of sustainability reporting and its principles has also increased among business actors [28]. The GRI [20] sets a well-known framework for the scope of aspects to be reported, ranging from environmental issues, such as waste and energy issues, to multiple social and economic issues. The GRI also offers guidelines and principles for reporting quality, which are not easily implemented by company representatives [29]. The reporting guidelines leave room for choosing how to prioritise the multiple issues to be reported. However, the reporting process is often considered complex and costly, engaging multiple actors within firms [30], which influences the outcome of the process and what aspects receive the most attention in the report.

To date, sustainability reporting has been studied extensively. Literature reviews have been conducted to synthesise and summarise the focus areas and key findings of these studies. Hahn and Kühnen [31] and Dienes et al. [32] provided reviews on what determines and drives sustainability reporting. Hahn and Kühnen [31] showed which factors influence sustainability reporting and how and to what extent they influence the quality of reporting. This stream was complemented by Fifka [33], who reviewed the differences in the determinants of sustainability reporting within different countries and regional contexts. Dienes et al.'s [32] review found that firm size, media visibility and ownership structure are the most powerful drivers for sustainability reporting. Traxler et al. [34] reviewed the sustainability reporting literature on the interaction between management control and sustainability reporting and showed their interplay.

In addition to these cross-cutting reviews, more focused literature reviews on sustainability reporting have been conducted. Dumay et al. [35] focused their review on the development of integrated reporting and found that there has been little research so far on reporting practices. Ceulemans et al. [36] focused on the context of sustainability reporting in higher education and showed how it has been studied. As these reviews show, sustainability reporting is typically treated as a whole in the studies, and we still lack an understanding of reporting on more specific issues, such as CE.

Despite the growing awareness and improved quality of sustainability reports [28], such reporting remains a much-criticised practice. While previously criticised for being merely a way to seek legitimacy while maintaining ‘unsustainability’ [37–39] in the dominance

of managerial approaches [40–42], in the unbalance and focus on overly positive views [43], and in the lack of stakeholder accountability [40], the criticism increasingly addresses sustainability reporting as a decoupled practice [44, 45] that is detached from sustainability changes within organisations and questions its usefulness and transparency [46]. Despite this criticism, Christensen et al. [18] presented the role of sustainability communication as aspirational talk that has the potential to stimulate improvement. They suggested that such language use could be an important resource for social change, although the talk would be somewhat decoupled from practice [18]. Through this notion, we believe that the question of how sustainability issues are framed in sustainability reports is meaningful for shaping future actions and changes regarding these reports, and it is therefore important to pay attention to the framing of issues such as CE.

Sustainability management within firms is a phenomenon that involves pressure in grappling with the multiple social, environmental and economic tensions that must be confronted in addressing sustainability in business [47]. Multiple social and environmental concerns can include multiple valuable and desirable objectives, which can be interdependent and conflicting [48]. A failure to address such tensions may be one reason for the criticisms of sustainability reporting, as stakeholders evaluate the reports from the perspective of their own priorities. Therefore, within sustainability management and reporting, multiple aspects compete for attention. Even different pillars of sustainability, such as environmental sustainability, consist of a magnitude of issues, such as climate change, biodiversity and CE. Framing these issues in sustainability reports can also influence the attention and priorities given to them in the future [18].

Although Schaltegger et al. [49] criticised the fact that companies' reporting does not contribute to sustainable development because it focuses on specific issues rather than the whole picture, drawing attention to specific issues and how they are framed in reports helps us better understand how they are formed and assigned priorities and what kinds of change in needs are perceived. However, as mentioned, sustainability reporting research has generally focused on treating sustainability reporting as a whole instead of framing specific issues, and seldom has the target of the analysis been a certain term. However, there are a few exceptions. For example, Laine [50] focused on the term 'sustainable development' and how it is used in reports, and Erkko et al. [51], Hoffrén and Apajalahti [52] and Koskela and Vehmas [53] focused on how eco-efficiency has been addressed in sustainability reports.

In this study, we focused on CE reporting. Only a few studies have examined how CE has been addressed in sustainability reporting; only three studies have focused on CE directly. First, Stewart and Niero [15] showed how CE has started to be integrated into corporate sustainability, and they reported that activities mainly orientate to the main product but also involve collaboration with business actors. Second, Dagiliene et al. [16] showed how institutional pressures influence CE reporting. Third, Barnabè and Nazir [17] showed how integrated reporting can also serve in the analysis and presentation of CE. This lack of CE reporting studies was a key result of Opferkuch et al.'s [54] study; they noticed that even the reporting frameworks hardly mentioned CE.

In addition, some studies that share some perspectives with reporting, such as measurement, policies and strategies, and which use sustainability reports as data sources, have touched upon the term CE; however, the reporting has not been the focus of the study. Moraga et al. [55] showed that most CE indicators focus on measuring the preservation of materials, and Veleva et al. [56] showed that business CE practice still lacks effective CE indicators to measure the progress and engagement of employees. Marco-Fondevila et al. [57] continued with this critical view by asking whether public CE policies reach

company practices and showing how business perceptions, as presented in the sustainability report, often differ from those proposed in the European Union (EU) CE Action Plan. Fortunati et al. [58] focused on the strategic role of CE in corporate social responsibility (CSR) and the relationship between the two concepts, as presented in sustainability reports. Furthermore, the positioning of CE in corporate sustainability communication has been analysed within other datasets. Bocken et al. [59] analysed the positioning of CE in the press releases of S&P 500 firms between 2004 and 2015 and noticed a slow introduction of the concept but little evidence of more radical and original approaches to CE.

Previous studies on CE reporting are limited, and they lack an understanding of the different frames of CE given in sustainability reports and what influences how they can be addressed in the future. We contribute to the literature by studying CE reporting in Finnish companies.

Materials and Methods

Case Companies and Their Reports

We selected the largest Finnish companies for our analysis because previous studies have shown that large companies are active sustainability reporters [see, e.g. 31]. We analysed the most recent sustainability reports of each company at the time the reports were collected (November 2020); the most recent reports were from 2019. We focused on sustainability reports when available, as we assumed they would contain more information on CE than annual reports. The following is a short description of the analysed companies and their reporting practices.

The large Finnish companies were selected from the Nasdaq Helsinki [60] and from the large cap section, which included 32 companies. Table 2 lists the details of the companies and their report types. The analysed companies represent various industries: 19 from the manufacturing industry, for example, the manufacturing of fibre-based products, consumer products, forest industry products and elevators; eight companies from service industries, including telecommunications, ICT and banking; and the remaining companies from the real estate, retail and energy industries. Nineteen companies named their report a sustainability report (or equivalent), 11 reports were called annual reports (or equivalent), one report was referred to as an annual and sustainability report and one was called an environmental report.

Analysis of the Reports

We applied frame analysis, based on Goffman's [19] work, to understand how CE is framed in sustainability reports. Frame analysis focuses on how objects and events are framed in different contexts and how these frames influence the understanding of and meanings given to those issues [19]. It is a day-to-day sensemaking process on which individuals rely while making sense of, for example, their daily interactions, rituals and discourse and many other social experiences [19, 61]. Frame analysis thus focuses on those culturally determined definitions of reality that people use in their sensemaking of objects and events [19]. However, unlike discourse analysis and sensemaking, frame analysis does not pay attention to social interaction but allows for interpretations of the framing of certain objects and events that are considered to be more monolithic [62]. Frames are powerful in directing our

Table 2 Analysed companies and their reports

Company's name	Industry	Company's code	Name of the report
Ahlstrom-Munksjö	Manufacturing industry (fibre-based products)	Manufacturing company A	Annual & Sustainability Report 2019
Cargotec	Manufacturing industry (cargo solutions)	Manufacturing company B	Annual review 2019
Citycon	Real estate industry (shopping centres)	Real estate company A	Sustainability accounts 2019
Elisa	Service industry (telecommunications)	Service company A	Responsibility 2019
Fiskars	Manufacturing industry (consumer products)	Manufacturing company C	Sustainability report 2019
Fortum	Energy industry (energy production)	Energy company A	Sustainability 2019
Huhtamaki	Manufacturing industry (packaging)	Manufacturing company D	Sustainability Report 2019
Kemira	Manufacturing industry (chemistry)	Manufacturing company E	Corporate Sustainability 2019
Kesko	Retail	Retail company A	Annual report 2019
Kojamo	Real estate company (housing)	Real estate company B	Annual report 2019
Kone	Manufacturing industry (Elevators)	Manufacturing company F	Sustainability report 2019
Konecranes	Manufacturing industry (Lifting business)	Manufacturing company G	Sustainability report 2019
Metsä Board	Manufacturing industry (forest industry products)	Manufacturing company H	Annual report 2019
Metso	Manufacturing industry (products for mining and process industries)	Manufacturing company I	Business overview 2019
Neste	Energy industry (oil refinery)	Energy company B	Sustainability report 2019
Nokia	Service industry (ICT)	Service company B	People & planet report 2019
Nokian renkaat	Manufacturing industry (tires)	Manufacturing company J	Sustainability report 2019
Nordea	Service industry (banking)	Service company C	Sustainability report 2019
Orion	Manufacturing industry (pharmaceuticals)	Manufacturing company K	Sustainability report 2019
Outotec	Manufacturing industry (mining, metal and chemical industry products)	Manufacturing company L	Sustainability report 2019
Outokumpu	Manufacturing industry (steel)	Manufacturing company M	Sustainability review 2019
Sampo	Service industry (banking)	Service company D	Corporate responsibility report 2019
Sanoma	Service industry (media)	Service company E	Annual review 2019
SSAB	Manufacturing industry (steel)	Manufacturing company N	Annual report 2019
Stora Enso	Manufacturing industry (forest industry)	Manufacturing company O	Sustainability 2019

Table 2 (continued)

Company's name	Industry	Company's code	Name of the report
Telia	Service industry (telecommunications)	Service company F	Environmental report 2019
Terveystalo	Service company (health care)	Service company G	Corporate responsibility report 2019
TietoEVERY	Service industry (ICT)	Service company H	Sustainability report 2019
UPM Kymmene	Manufacturing company (forest industry)	Manufacturing company P	Annual report 2019
Valmet	Manufacturing industry (pulp, paper and energy industry products)	Manufacturing company R	Annual review 2019
Wärtsilä	Manufacturing industry (marine and energy industry products)	Manufacturing company Q	Annual report 2019
YIT	Manufacturing industry (construction)	Manufacturing company S	Report of the board of directors and financial statements 2019

attention to certain features of events and texts. They are like ‘picture frames’ that define the boundaries of an object and direct our attention to what events and texts are important for our perception, experience and understanding of issues, objects or events [61]. Such powerful frames create limitations, as perceiving the world through frames that determine our understanding inevitably excludes a part of the complex world around us [61].

Frame analysis can be applied for multiple purposes, such as sorting out underlying logics and situating frames in context. In this study, we applied frame analysis to understand the meanings given to CE in sustainability reporting and thus to analyse ‘what is in the frame’ [63]. In our analysis process, we combined the principles of frame analysis with the techniques of content analysis [64, 65]. We carried out the analysis both quantitatively and qualitatively, as called for in the frame analysis field [63]. Our analysis included multiple steps, as explained below.

First, we downloaded the reports in English from each company’s webpage. Second, we read through the reports to identify the sections that covered CE. We focused on the use of the actual term ‘circular economy’. When reading the reports, we noticed that some companies used the word ‘circular’ multiple times in connection with various other words, such as ‘circular products and services’, ‘circular flexible packaging’, ‘circular mindset’, ‘circular material flows’, ‘circular value’, ‘circular solutions’ and ‘circular design’. These sections were excluded unless ‘circular economy’ was also mentioned. Third, we marked the sections that discussed CE. We identified that there were three types of sections: (1) ‘paragraphs’ if CE was only mentioned in passing; (2) ‘subheadings’ if the companies used CE in the subheading of a small section; (3) ‘headings’, which meant that CE was mentioned in the heading of a longer section. We interpreted that these three types of sections indicate the varying importance of CE in a company. Only a few references to CE indicate that the company has recognised the need to use CE only as a current catchword. However, devoting whole sections (CE in headings) to CE indicates that the company has implemented CE in its sustainability work. Fourth, the quantitative analysis focused on calculating the occurrence of the term ‘CE’. Fifth, we performed a qualitative analysis by applying frame analysis. We identified key themes in how CE was presented in each section of the reports. Later, we studied how the companies made sense of CE and grouped these themes as the frames of CE. Companies’ understanding and sensemaking of the CE construct its meaning in society.

Based on our analysis, we identified that the companies used three different frames—CE management, technical CE and social CE—with each frame including one to four themes. While reading and coding the data, we noticed that a section could belong to multiple themes. For example, it was typical that in one section, the company discussed its approach in material recovery, energy recovery and waste management.

Results

Quantitative Overview

Table 3 provides a quantitative overview of our analysis. We identified three different reporting styles: The first group consisted of nine companies that did not mention CE in their reports. The second group consisted of 15 companies that mentioned CE less than 10 times. The third group comprised eight companies that made multiple mentions of CE. All three groups contained both the service industry and manufacturing companies. Furthermore, we

Table 3 Quantitative overview of CE reporting

Company	Total mentions	In text	In headings	In subheadings
Manufacturing company A	1	1	0	0
Manufacturing company B	0	0	0	0
Real estate company A	0	0	0	0
Service company A	2	2	0	0
Manufacturing company C	9	9	0	0
Energy company A	28	25	1	2
Manufacturing company D	7	7	0	0
Manufacturing company E	6	6	0	0
Retail company A	11	8	1	2
Real estate company B	1	0	1	0
Manufacturing company F	5	0	0	5
Manufacturing company G	17	16	0	1
Manufacturing company H	4	2	1	1
Manufacturing company I	3	2	0	1
Energy company B	13	13	0	0
Service company B	3	3	0	0
Manufacturing company J	1	1	0	0
Service company C	3	3	0	0
Manufacturing company K	0	0	0	0
Manufacturing company L	3	2	1	0
Manufacturing company M	11	8	1	2
Service company D	0	0	0	0
Service company E	0	0	0	0
Manufacturing company N	2	1	1	0
Manufacturing company O	18	16	0	2
Service company F	0	0	0	0
Service company G	0	0	0	0
Service company H	1	1	0	0
Manufacturing company P	43	37	1	5
Manufacturing company R	0	0	0	0
Manufacturing company Q	0	0	0	0
Manufacturing company S	10	10	0	0
Total	202	173	8	21

noticed that the companies used not only the concept of CE in their reports but also synonyms of it, such as ‘circular and sustainable economy’ (Huhtamäki, Metsä Board, UPM), ‘circular, low-carbon society’ (Konecranes) and ‘circular bioeconomy’ (e.g. Stora Enso).

Identified Frames

Summary of the Frames

Our analysis led us to identify three frames in which the companies talked about CE: CE management, technical CE and social CE. Within these frames, different meanings were given to CE, and implicitly, different definitions of the phenomenon were provided [cf. 19]. These frames also drew readers' attention to certain features of CE. There were differences in how often these frames were used in the reports; CE management (43%) and technical CE (41%) were almost equally present, while social CE (15%) was seldom present. In the following discussion, we introduce the content of each frame. Table 4 summarises the frames, their content and amounts in the studied data.

CE Management Frame

The CE management frame consisted of four themes: CE drivers, current and future business opportunities, aims of CE and CE training. Overall, CE drivers were the second most common theme (20%). Under this theme, the companies discussed the reasons why they think CE actions are needed and important. Many companies named the various megatrends as reasons and often stated that, with CE, they can address global problems (i.e. climate change, problems with the use of plastics, resource scarcity and population growth). Some companies identified CE as a trend that needs to be addressed. On the other hand, some megatrends, such as digitalisation, were seen as tools or opportunities to implement CE. Quite often, legislation, especially legislation or strategies from the EU, such as the EU's CE Package, was seen as a strong driver. Furthermore, multiple companies named the UN's Sustainable Development Goals (SDGs) as important for them. Companies connected their CE actions to four SDGs: SDG 9 (industry, innovation and infrastructure), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production) and SDG 13 (climate action). In this frame, companies commonly saw themselves, and especially their products, as solutions to global environmental problems, as discussed in the following two extracts from the reports:

The shift towards a sustainable, mostly fossil-free and circular economy is a megatrend which impacts and drives us forwards on many levels. The desire to replace plastic and aluminum [sic.] provides growing markets for products such as cooking and baking papers made from vegetable parchment as well as teabags and coffee pods made from compostable fiber materials. There is a growing trend of prohibiting the use of plastics for many uses, such as shopping bags, disposable drinking straws and food packaging. (Ahlstrom-Muncksjö, Manufacturing company A)

The ICT industry is a key player in the mitigation of climate change and in making the operating methods of society more environmentally friendly. As services become digital, we can reduce traffic emissions and optimise logistics and production in the use of energy and raw materials. This will allow us to use resources smarter and be part of the circular economy. (Elisa, Service company A)

The second theme in the CE management frame is current and future business opportunities (13%). In this theme, the companies presented multiple new and current business opportunities arising from CE applications. The companies highlighted both their

Table 4 Corporate CE frames identified in the sustainability reports

Frame	Theme	Frequency	Examples of phrasing	Remarks
CE management	CE drivers	20%	Climate change, digitalisation, plastics issue, SDGs, megatrends, EU strategy and resource scarcity	Companies identify multiple drivers for CE. Often, companies see themselves and CE as solutions for global problems
	Current and future business opportunities in CE	13%	New business model; building options for new businesses; our CE business is expanding; innovating for CE; we adopt a CE business model; and CE business models are central to us	CE is seen to offer multiple different business opportunities
	Aims of CE	10%	Sustainability commitment, sustainability priority, key environmental aspects, strategic actions, road map and material aspects	CE is identified as a key challenge to address
	CE training	0.8%	Trainings and workshops on CE	CE as a topic of personnel or management training
Technical CE	CE as material recovery	25%	Recycling, recyclable/recyclability, reuse, recover, resource efficiency, raw material efficiency and circulation of materials	Strong focus on recycling types of activities. Seldom mention repairing and reusing
	CE as energy recovery	9%	Energy efficiency, energy recovery, waste heat from operations, waste fuels, use of renewable energy and decreasing energy consumption	Various energy-related aspects were seen as tools for CE
	CE as waste management	8%	Zero waste targets, the amounts of waste produced and reducing waste	Seeing CE only as a waste treatment issue is seldom in the reports
Social CE	CE collaboration	15%	Work with our partners; engage in active dialogue; is a founding member; signed an agreement; and developing cooperation with others	Companies are active members in networks. Companies cooperate with research partners and supply chain companies

SUSTAINABLE URBAN DEVELOPMENT





Circular economy	Defining YIT's potential for the circular economy and setting objectives		implemented with circular economy measures
	Initiating circular economy pilot projects		work in progress
Sustainable urban development	Extending the key indicators for sustainable urban development		

Fig. 1 Sustainability targets and key indicators 2019 (YIT, 2020)

STRATEGIC ACTIONS	1	Pursuing leadership in circular economy solutions
	2	Strengthening responsible and transparent sourcing in the supply chain
	3	Commercialisation of sustainability through our own brand products
	4	Creating data-based services for customers and the society using customer data and AI responsibly
	5	Expanding communal responsibility initiatives together with K-retailers and our employees
	6	Reducing energy consumption and increasing our own renewable energy production

Fig. 2 Strategic actions of a retail company (Kesko, 2020)

current products and operations and future possibilities; therefore, their attention is focused on CE as a current and future-oriented opportunity. For example, many companies reported on their business model, which was either already a CE business model or was working towards a CE business model. In the future-oriented parts, the companies discussed, for example, new ventures, innovations, opportunities and options. In the current actions, the companies highlighted how their current products and operations contribute to CE, as shown in the following extracts.

We have studied the circular economy and explored opportunities that are available to the business. Using a strong consumer understanding as a compass, our Scandinavian Living team defined four pilot programs looking at new business opportunities, all ticking a series of boxes when it comes to consumer expectations. Based on the pilots conducted in 2018, we identified the two most viable and interesting business opportunities that were expanded during 2019. (Fiskars, Manufacturing company C)

We enable our customers globally and across industries to improve their water, energy and raw material efficiency. As experts in chemistry, we enable circularity through the design of our products and increasingly adopt circular economy business models in our own operations. (Kemira, Manufacturing company E)

The third theme in the CE management frame, the aims of CE (10%), focuses on companies' internal commitments and targets. Many of the companies recognised that CE is one of the most important aspects of their sustainability work. Therefore, CE was named as a sustainability priority, key environmental aspect, strategic action, critical area, material aspect or topic or sustainability theme. Figures 1 and 2 show examples of this frame in a manufacturing company and a retail company.

The last theme in the CE management frame was CE training. It was mentioned only by two companies that a topic of their employee or management training was CE.

Technical CE Frame

The second frame, technical CE, also consisted of three themes. The most commonly identified theme was material recovery (25%). Typically, within this theme, the companies described their recycling approaches and thus drew the attention of the reader to the recycling features of CE. These varied from tables listing the amounts of recycled waste to describing actions to help their customers recycle. Some companies reported on their use of recycled raw materials. For example, a steel manufacturer claimed that ‘steel is the most recycled material in the world’. Furthermore, the companies provided descriptions of material recovery, as the following examples show:

In building options for significant new businesses, Fortum is focusing on the circular economy and resource efficiency through waste recycling and recovery and new bio-originated products. Our circular economy services utilise waste stream materials as efficiently as possible and reduce the formation of greenhouse gases generated from biodegradable waste at landfills. (Fortum – Energy company A)

The circular economy also plays an important role in reducing food waste. K-stores are exploring numerous ways of utilising their own food waste by turning it into new added value products. Fruits, vegetables and bread going to waste can become raw materials for new jams, juices, smoothies and even beer. (Kesko, Retail company A)

The second theme in the technical CE frame was identified as CE as energy recovery (9%). This theme contains various energy-related issues linked to CE. Many of the companies focused on the importance of energy efficiency in their operations. Quite a few companies stated that they use or have increased their use of renewable energy, and a few mentioned that they aimed to decrease their consumption of energy. A typical discussion item was the energy recovery of waste. Furthermore, a few companies mentioned the heat recovery of, for example, data centres.

Building our processes around a circular economy helps us improve our resource and energy efficiency while creating value for the customer by reducing their environmental footprint. (Konecranes, Manufacturing company G)

We create circular economy solutions in the value chain of forest industry products. We see the residues and side streams as valuable raw materials, a source of energy and, thus, of real business opportunities. Our research into pulp and paper mill side streams is aimed at finding more efficient ways to utilise by-products such as sludge, ash, green liquor dregs and waste heat. (UPM-Kymmene, Manufacturing company P)

The last theme in the technical CE frame is CE as waste management (7%). In this frame, the companies reported the amounts of waste produced in a table format. Some companies named ‘zero waste’ targets, while others mentioned their general aim to reduce the amount of waste. Some of the companies that operate in the area of waste management saw that the waste management services they provide are also CE services.

Our waste and circular economy service covers, e.g. the safe treatment of hazardous waste, the recycling, processing and manufacturing of plastic and metal into secondary raw materials for industry, and environmental construction services by utilising industry’s side streams. (Fortum, Energy company A)

Circular economy means both financial and environmental efficiency. UPM aims to reuse materials and products, reduce the amount of solid waste and increase recycling and recovery in its operations. (UPM-Kymmene, Manufacturing company P)

Social CE Frame

The last frame, social CE, consisted of only one theme, which was labelled CE collaboration (15%). Within this theme, the companies described their active role in the CE, in which instead of concrete action, the attention was focused on networking and collaboration. The companies were members of various networks promoting CE and often cooperated with both Finnish and international research institutions in this effort. A typical way of cooperating was with their customers or other members of their supply chain. Some companies recognised that cooperation needs to widen to partners other than just their own supply chain members. A few times, non-governmental organisations (NGOs) were mentioned as CE collaboration partners, as shown in the following excerpts.

KONE is an active participant in organizations developing codes, standards and guidelines for improving safety, accessibility, cybersecurity, energy efficiency, circular economy, as well as other organizations advancing sustainable development. (Kone, Manufacturing company F)

Huhtamäki is a founding member of 4evergreen, an industry alliance formed at the end of 2019 to boost the contribution of fiber-based packaging to a circular and sustainable economy, minimizing their impact on climate and environment. The members of the alliance come from various phases across the fiber-based packaging value chain. (Huhtamäki, Manufacturing company D)

In 2019, we started and strengthened our collaboration with several research institutions. This included strategic cooperation with Åbo Akademi University, with the aim of improving the competitiveness of both parties while increasing Finnish chemical industry expertise in such fields as chemical and process engineering, bioeconomy and the circular economy. (Neste, Energy company B)

Discussion

The aim of our study was to analyse how Finnish companies report on CE. Theoretically, we built on the concepts of CE and sustainability. Our study revealed that CE is mentioned in various ways in companies' sustainability reports. Some companies do not mention the concept of CE at all; some mention it only in passing, while others have grasped what the concept means and have started to identify new kinds of business opportunities. In addition, we identified that companies use three different frames to describe their CE action: CE management, technical CE and social CE.

We find five aspects notable in our analysis. First, it seems that large Finnish companies are starting to recognise the importance of CE, but with a rather limited view. These views are discussed in more detail below. The companies that had grasped the meaning of CE often named CE as a priority or material aspect in their sustainability work. Furthermore, the companies saw CE as a tool to address global problems, such as climate change and resource scarcity. However, about one-third of the analysed companies did not report on CE at all.

Second, overall, CE reporting can be seen to have a very positive tone in our data. The companies identified multiple business opportunities arising from the CE approach. Moreover, the companies identified various ways in which they promote or apply CE in their daily operations. The positivity of CE reporting aligns with the previous sustainability

reporting literature, which shows that companies tend to focus on positive news (see, e.g. 66–68). However, the positive nature of sustainability reporting is also seen as a major weakness, lowering the trustworthiness of the reports. By focusing on the positive news and success stories, companies are able to hide the negative sustainability impacts from the reader. Noteworthy in our research is that companies did not face any problems in implementing CE. Although the companies acknowledged global environmental problems, they were often able to provide solutions to these problems with the CE.

Third, the companies mentioned multiple concrete CE actions. For example, they measure the amounts of waste, recycle waste and burn waste for energy; they use recycled raw material and collaborate with different partners; and they modify their business models towards CE. These actions are very much aligned with the previous literature, in which recycling has been seen as the dominant CE action [6, 23]. Based on Kirchherr et al. [6], our results are typical of corporate CE reporting. Focusing on the lower levels of the waste hierarchy (such as recycling) is easy for companies because they have been doing this for years; therefore, it does not require major changes in their operations. From the point of view of CE, however, this sole focus on recycling is problematic. Maitre-Ekern [2] pointed out that, with the exception of only a few materials, the recycling process tends to downcycle to lower-value products. The biggest difference between our results and the CE literature concerns waste. For example, Kirchherr et al. [6] proposed that we would not need the concept of waste in the future; however, our data showed that companies are still producing and measuring waste. In addition, the mentions of business models in our data are interesting from the viewpoint of the previous literature. Kirchherr et al. [6] claimed that business models are seldom discussed, but Schögl et al. [23] and Sehnem et al. [27] noticed a rise in mentions of CE business models in recent CE literature. We agree with these two studies that companies are starting to consider CE business models.

Fourth, linked with the second and third points, the companies' CE reporting consisted of a fair amount of 'future talk'. It was often framed by visions, options and possibilities, which means the companies expect that, in the future, CE will be a profitable business for them. Also, the companies reported on the CE aims and targets they want to achieve in the future. One such aim is 'zero waste', which is not currently a reality for them. Another example of this future talk is how companies see themselves solving global problems. On the one hand, future talk is positive because ambitious aims and targets force companies to think about their operations and find new and environmentally better ways to operate. On the other hand, too much focus on the future makes it difficult for report readers to see the current situation.

Fifth, the role of CE collaboration was rather small in our data. On the one hand, the companies recognise the role of collaboration, as they mentioned multiple different organisations with whom they cooperate in promoting CE. On the other hand, the majority of CE actions in the companies address the technical issues of waste management, recycling and improving efficiencies. Our findings support the previous literature. For example, Geissdoerfer et al. [12], Kirchherr et al. [6], Schögl et al. [23] and Sarja et al. [14] claimed that the social aspects of CE are seldom discussed in the CE literature. Nevertheless, the true application of CE requires major changes in the operating procedures of most companies. Collaboration between business partners and other partners is key in this regard.

Finally, when CE reporting is perceived as aspirational talk, meaning that despite inconsistencies between words and actions, it has the potential to stimulate improvements [18], we noticed that the CE is very positively framed in sustainability reports as a future opportunity, which may foster future changes towards implementing the CE. However, such framing happened in only a few CE descriptions in the reports, while the majority were

dominated by very limited views of CE, such as recycling, energy issues and waste targets. Thus, despite the positive framing of CE as an opportunity, it is still mainly reported as a technical and managerial issue and lacks views on transformational changes in wider systems, even though such changes in reaching full systems are the basis of CE definitions [6, 25]. The technical and managerial focus is aligned with Sarfaty's [69] critique of relying too heavily on indicators and numbers in sustainability reporting, although many sustainability issues cannot be summarised in a single indicator. Sarfaty's argument might clarify our companies' focus on waste and recycling, as these topics are rather easily quantifiable and reportable, such as waste amounts and recycling rates.

In our case, the focus of CE reporting was on very limited actions and changes. We therefore suggest that current practices in CE reporting are likely to stimulate only incremental changes towards the CE. This notion highlights how despite its aspirational features to stimulate changes [18], sustainability reporting may also limit such changes. Such possibly negative influences of sustainability communication have been previously found by Winkler et al. [70], who suggested that maintaining self-persuasive rhetoric may lead to vicious circles of disengagement. We believe that the current practice of CE reporting is in danger of having such self-persuasive features, which raise expectations but still often lack concrete deeds and actions. To avoid such dangers, we suggest, as the practical contribution of our study, a clear focus on concrete actions in CE reporting, which would mean focusing on what the company is currently doing to implement CE.

This study naturally has some limitations that should be addressed in future studies. First, the focus of this analysis has been on the Finnish context only, although CE as a phenomenon is not limited to country contexts. Therefore, we suggest more global studies on CE reporting, including comparative studies that provide further understanding of the cultural differences influencing CE. Second, our study provided an understanding of the framing of CE in current sustainability reports but lacked a longitudinal understanding. Thus, we do not yet know how CE has emerged as a concept in the reports or how its framing has developed over the years. This understanding would give us indications of the direction in which CE reporting is developing. For future research, we therefore suggest a longitudinal study on the use and framing of the CE concept in sustainability reports. Third, in this study, we applied frame analysis and connected CE reporting to aspirational talk research, which naturally limited the theoretical and analytical tools used in this study. We suggest widening both the theoretical and analytical perspectives to analyse how CE is reported in sustainability reports and what kinds of meanings are given to the concept. This would mean applying different theories of communication, as well as research methods, such as discourse and rhetoric analysis.

Conclusions

CE is presented as a solution to major global environmental problems. Linked to that, and based on our results, we conclude with two final remarks. First, implementing a CE needs to be a systemic approach, with all types of companies taking CE actions. Second, CE needs to be understood and practised more widely than just focusing on recycling.

We see CE as a systemic concept for the economy; therefore, CE should be practised by all business sectors. For this reason, we selected the largest Finnish companies as our sample, including both manufacturing and service companies. CE applications in the manufacturing industry are intuitively easy to comprehend: The focus is on keeping the products

in use for a long(er) period in comparison to the current situation. However, new links between the manufacturing and service sectors should be created in the promotion of CE. In the future, products will be rented, loaned, shared, recycled, maintained and repaired more than today, which means that there will be more need for the service sector.

To continue the idea that CE is a systemic concept for the economy, our results are not very encouraging. The concrete current CE actions of the companies we studied are recycling activities. Thus, it seems that many companies are simply rebranding their waste management practices as CE work. However, recycling alone does not solve the global environmental problems caused by (over)production and (over)consumption. If we want to solve these problems, the whole production and consumption system must be converted into a CE model in which, instead of owning products, we will have access to products by renting and sharing, for example. In many companies, this idea greatly challenges their current business models and logic. Currently, companies focus on selling more and more products to customers and inventing new products to replace current models. In contrast, in a CE system, the majority of products would be products-as-service, such that the product's ownership would remain with the manufacturer, whose ambition would be to produce durable and repairable products.

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Declarations

Ethics Approval and Consent to Participate Not applicable.

Consent for Publication Not applicable.

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