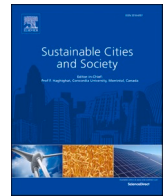




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# The lack of social impact considerations in transitioning towards urban circular economies: a scoping review

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## ABSTRACT

Worldwide, cities are implementing circular economy (CE) strategies to reduce the resources they consume and their environmental impact. However, the evidence of the intended and unintended social consequences of the transition to “circular cities” is scattered. The lack of a coherent overview of the evidence on the subject can hinder effective decision-making in policy and practice. This study examines the extent to which the current literature addresses the social impacts that a transition to a CE produces in cities. We used a methodological approach related to systematic mapping to collate the evidence published over the past decade globally. The study finds that social impacts have rarely been considered in studies of circular cities, and where they have been discussed, the scope has been quite limited, only covering employment (mostly of informal sector workers) and governance practices. This scoping review highlights the need to further analyse and integrate social impact considerations into decision-making connected to transitions towards circular cities.

## 1. Introduction

The concept of circular economy (CE) has gained traction as a progressive approach to tackling pressing, crosscutting challenges linked to resource management and utilisation, as well as sustainable development. It has been declared as one of the key solutions to help countries meet the goals of the Paris Agreement in limiting global temperature rise to 1.5°C above pre-industrial levels (Circle Economy, 2021) and has been put forward by the European Commission (2015, 2020), for example, in the European Green Deal (European Commission, 2019b) as a key strategy to meet EU climate goals. Increasingly, the argument also has been made that a CE model can provide tools for the achievement of the Sustainable Development Goals (SDGs), with direct impacts in particular on SDG 6 Clean Water and Sanitation, SDG 8 Decent Work and Economic Growth, SDG 11 Sustainable Cities and Communities, SDG 12 Responsible Consumption and Production, SDG 13 Climate Action, SDG 14 Life Below Water and Goal 15 Life on Land (Schroeder et al., 2019; Suárez-Eiroa et al., 2019). Furthermore, according to at least one estimate, an ambitious CE agenda could increase gross domestic product by 2%, increase employment opportunities by 1.6% and reduce carbon dioxide emissions by close to 25% by 2050 (Aguilar-Hernandez et al.,

2021).

Consensus is still lacking on the definition and scope of CE. After reviewing 114 definitions of CE, Kirchherr et al. (2017) defined it as “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 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”.

This definition has several aspects in common with some of the other highly cited and recent definitions (Ellen MacArthur Foundation, 2015; Geissdoerfer et al., 2017; Korhonen et al., 2018). Specifically, CE is an economic system where certain “R frameworks” can be applied to reduce material, energy, and waste flows, and is aimed at reducing not only environmental impacts of consumption and production systems, but also social and economic impacts. Currently, the list of “Rs” amounts to 10, including “refusing”, “repairing” and “recovery” of energy from incineration of materials (Potting et al., 2017). Table 1 shows how the definitions above incorporate the 10 Rs: while Kirchherr et al. (2017)

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have a narrow focus on 4 Rs, the Ellen MacArthur Foundation covers almost all 10.

With over 55% of the global population living in cities, the role of cities in supporting the sustainability agenda, and CE in particular, is increasingly being recognised (Paiho et al., 2020; Williams, 2016, 2019). Within cities, the transition to a CE model has the potential to impact many individuals in terms of their livelihoods, access to resources and services, and social welfare. Municipal governments can play a central role in CE transitions (Chen, 2021): they are often responsible for areas such as waste management and urban planning; have a role in ensuring social inclusion and welfare; and are also subject to financial motives, as CE employment and business opportunities could generate taxation or reduce waste management costs for municipal governments (CCRE, 2016). In the past decade, policy, practice and research related to the CE on the urban level has expanded rapidly, with guidelines and best practice guides being developed by foundations (Ellen MacArthur Foundation, 2019), governments (European Commission & European Economic and Social Committee, 2017; OECD, 2020) and private sector companies (Circle Economy, 2015; Metabolic, 2021). Scholars have also reviewed a number of initiatives that cities have undertaken related to CE, to understand the drivers behind adoption of circular strategies as well as the environmental impacts of those strategies ((Petit-Boix and Leipold, 2018); Prendeville et al., 2018; Williams, 2016).

As in the definitions above, CE intrinsically has a societal aspect, partly through the jobs it provides (in the “economic system”), but also through its impact on access, affordability and the consumption of materials, energy, goods and services. The European Commission, among others, heralded its CE strategy as an opportunity for social integration and cohesion (European Commission, 2019a). However, existing bibliometric and systematic literature reviews addressing CE transitions (e.g. Alhawari et al., 2021; Homrich et al., 2018; Michelini et al., 2017; Nobre & Tavares, 2017; Prieto-Sandoval et al., 2018; Reike et al., 2018; Ruiz-Real et al., 2018) focus mostly on the environmental, technological and/or economic side of CE. Kirchherr et al. (2017), in their review of 114 definitions of CE, also found that less than 20% consider social equity; Merli et al. (2018) reported that only 12 of the 551 articles they reviewed covered the social dimension.

Furthermore, where social impacts are mentioned, they focus mostly on positive societal impacts: The Ellen MacArthur Foundation (2017), for example, emphasized the possibility to increase liveability in cities, create employment opportunities, increase citizens’ disposable income, and reduce the demands on municipal budgets. Korhonen et al. (2018) reported on three social wins: “new employment opportunities through new uses of the value embedded in resources; increased sense of community, cooperation and participation through the sharing economy; and user groups share the function and service of a physical product instead of individuals owning and consuming the physical product” (p.40).

As reported in other urban sustainability and resilience research (Agyeman & Evans, 2003; Meerow et al., 2019), there is a risk that the benefits of circular transition might be unevenly distributed and that a

circular transition will negatively impact the equality of human welfare and development. The central question about urban circular transformation is: an urban CE transformation for whom, and at what price? Social impacts, intended or unintended, of any directed transition need to be evaluated carefully alongside environmental and techno-economic aspects to make sure that “no one is left behind”. Actions targeting improvements in urban circularity should take into account broader social impacts and avoid causing rebound effects and displacing issues elsewhere. Or, as concluded by (Hobson & Lynch, 2016), “what is at stake then, if the social and political facets of the CE are not given greater consideration” (p.22)?

To our knowledge, no review has considered how social impacts of CE affect circular cities. We aim to address that gap: here we assess the extent to which social impacts have been considered in the research on circular cities and map the knowledge gaps in the field.

This work presents two contributions: 1) a scoping review of the literature around social impacts of urban transitions towards a CE and 2) identification of arenas that need more empirical evidence to inform decision-making on how to make the CE work for a more inclusive, just and equitable future while avoiding trade-offs and negative impacts on human development.

In Section 2, we discuss key concepts and assumptions of the review and describe our review method and strategy. Section 3 presents the results of the review process. In Section 4 we discuss the status of the consideration of social impacts in circular cities, and highlight gaps in how social impacts have been viewed in the transition process. Section 5 concludes by highlighting implications of the scoping review for future research and decision-making around circular urban transitions.

## 2. Materials and methods

### 2.1. Urban CE definition

Cities are urban areas, classified by the OECD as having at least 50,000 habitants within their boundaries (Dijkstra & Poelman, 2012). Like CE in general, there is not yet a clear definition of urban CE.

Prendeville et al. (2018, p. 176), for example, define a circular city as a city “that practices CE principles to close resource loops, in partnership with the city’s stakeholders (citizens, community, business and knowledge stakeholders), to realize its vision of a future-proof city”. The Ellen MacArthur Foundation (2017), in turn, posited that “circular cities aim to eliminate the concept of waste, keep assets at their highest value at all times, and are enabled by digital technology. A circular city seeks to generate prosperity, increase liveability, and improve resilience for the city and its citizens, while aiming to decouple the creation of value from the consumption of finite resources”. Kirchherr et al. (2017) placed CE in cities as a part of the macro-level approach of the CE. Paiho et al. (2020) defined a circular city as “based on closing, slowing and narrowing the resource loops as far as possible after the potential for conservation, efficiency improvements, resource sharing, servitization and virtualization has been exhausted, with remaining needs for fresh material and energy being covered as far as possible

**Table 1**  
Overview R frameworks and CE definitions

Strategy	R strategy	Kirchherr et al., 2017	Geissdoerfer et al., 2017	(Korhonen et al., 2018	Ellen MacArthur Foundation, 2015
Smarter product use and manufacture	R0. Refuse				
	R1. Rethink				X
	R2. Reduce	X			X
Extend lifespan of products and its parts	R3. Reuse	X	x	X	X
	R4. Repair		x	X	X
	R5. Refurbish		x	X	X
	R6. Remanufacture		x	X	X
	R7. Repurpose				X
Useful application of materials	R8. Recycle	X	x	X	X
	R9. Recover	X			X

Source: own elaboration, based on (Ellen MacArthur Foundation, 2015; Geissdoerfer et al., 2017; Kirchherr et al., 2017; Korhonen et al., 2018; Potting et al., 2017)

based on local production using renewable natural resources” (p. 6).

Another approach, as taken by (Petit-Boix and Leipold, 2018), entails organising the strategies in cities according to recurring themes. While no definition is put forward on what a circular city is, strategies were organised in four target urban systems (infrastructure, social consumption, industries and businesses, and urban planning) with 21 types of initiatives. Like (Petit-Boix and Leipold, 2018), we approached circular cities inductively, framing circular cities as cities that apply any of the 10 R frameworks, within one or multiple industries, to close, slow and/or narrow the material, energy and waste flows within their geographical area. This entails actions from municipal (and other) governments, citizens, industry, research and civil society actors, within the geographical boundary of the city. For the classification of industry, we use the EU’s NACE codes, which allocate economic activities to sectors (EUROSTAT, 2008).

## 2.2. Social impact definition

To date, there is no agreement on how social considerations should be taken up within circular cities and transitions (Pitkänen et al., 2020). One attempt to classify social indicators and CE is from Padilla-Rivera et al. (2020), who reviewed 60 articles on CE and developed a list of social indicators for CE. However, their search seems quite restrictive and the indicators they suggested are not compared to existing social impact indicators. Others, such as Koumparou (2017) and Moreau et al. (2017), covered social and institutional dimensions of circular economy, but did not place it in a city context (both) or define CE (Koumparou, 2017). Moreau et al. (2017) referred to the concepts of labour conditions, wealth distribution (including entitlement and access to resources) and governance, but they did not critically appraise these concepts.

Therefore, to fulfil the objectives of this review, we follow the International Association for Impact Assessment’s definition of social impacts as “the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions” (Vanclay et al., 2015). These impacts manifest themselves in eight areas (see Table 2). This definition is the most holistic and considers impacts not

**Table 2**  
Conceptualisation of social impact areas and their descriptions

Impact area	Description
People’s way of life (category 1)	How people live, work, play and interact with one another on a day-to-day basis
People’s culture (category 2)	Shared beliefs, customs, values and language or dialect
People’s community (category 3)	Cohesion, stability, character, services and facilities of the community
Political systems (category 4)	The extent to which people are able to participate in decisions that affect their lives, the level of democratisation that is taking place, and the resources provided for this purpose
People’s environment (category 5)	The quality of the air and water people use; the availability and quality of the food they eat; the level of hazard or risk, dust and noise they are exposed to; the adequacy of sanitation; their physical safety; and their access to and control over resources
People’s health and wellbeing (category 6)	The state of complete physical, mental, social and spiritual wellbeing and not merely the absence of disease or infirmity
People’s personal and property rights (category 7)	Whether people are economically affected, or experience personal disadvantages, which may include a violation of their civil liberties
People’s fears and aspirations (category 8)	People’s perceptions about their own safety, their fears about the future of their community, and their aspirations for their future and the future of their children

Source: Vanclay, 2003, p. 8

only on employment, but also the changes in governance structures and access rights. This definition can be applied to transition processes, highlighting a change in status or situation.

## 2.3. Research design

### 2.3.1. A scoping review

We carried out a scoping review (James et al., 2016; Munn et al., 2018) to assess the extent to which social impacts have been considered in the research on circular cities and to map the knowledge gaps in the field. We selected this methodology because it is more rigorous than a literature review, given that it entails multiple, structured searches and a rigorous search process, including, among others, reporting on the papers found in each step in a PRISMA Flow diagram (see Figure 2). It is not a mapping review, as there is not yet an abundance of research in this field, nor a systematic review, as we do not aim to critically appraise the literature we found. Instead, we provide a descriptive analysis and qualitative thematic analysis (see section 3).

Figure 1 explains our research process, which followed these steps: 1) defining the search string and eligibility criteria; 2) carrying out the search; 3) checking the corpus for comprehensiveness and confirmation of the search string; 4) preparation of the final corpus; 5) article screening; and 6) data extraction. In the sections below, we provide more details on the search string, the eligibility criteria and screening, and on the data analysis and synthesis.

### 2.3.2. Search strategy

Considering that the CE discourse has gained prominence only over the past two decades, we focused on recent literature published 2010–2020. The search was limited to literature available in English. Following the guidance of Falagas et al. (2008), we conducted searches in February 2021 using the Web of Science bibliographic database to gather peer-reviewed sources. To include the breadth of experience accumulated by the practitioners of urban transitions, we expanded our search strategy to include grey literature and other non-peer-reviewed sources using the Google Scholar search engine. Table 3 contains the search string, with the Google Scholar string divided into several searches, given the limitation in characters for each search query. The Google Scholar search results were obtained through the Publish or Perish software (Harzing, 2007). We also added studies and reports compiled by organisations working on circular cities, namely, the OECD, Circle Economy and Metabolic.

The search string was developed after considering the search strings of other reviews related to the circular economy topic (Table 4). Before proceeding with the eligibility screening, a test for comprehensiveness was done to determine if relevant articles were included in the search results. We selected 13 articles on CE in cities, and the search was deemed comprehensive once all 13 articles were found in the search results. A list of these 13 articles is available in the research data for this article at [<https://doi.org/10.5281/zenodo.5207331>].

The results of the searches from Web of Science, Google Scholar and the manual additions were uploaded and combined in the review management software EPPI-Reviewer Web (Thomas et al., 2020). Duplicates were removed before proceeding to the article screening.

### 2.3.3. Eligibility criteria and article screening

The library of articles assembled in EPPI-Reviewer was screened for eligibility in two stages: 1) title and abstract, and 2) full text. The eligibility criteria, mapped against the PICOTS (Population, Intervention, Comparator, Outcomes, Timing, Setting) framework (Samson & Schoelles, 2012), are:

- Population (P): cities, municipalities or urban areas in all parts of the world. Studies focusing on CE in rural areas, at the micro-level (e.g., a product or a specific company), at the meso-level (e.g., an

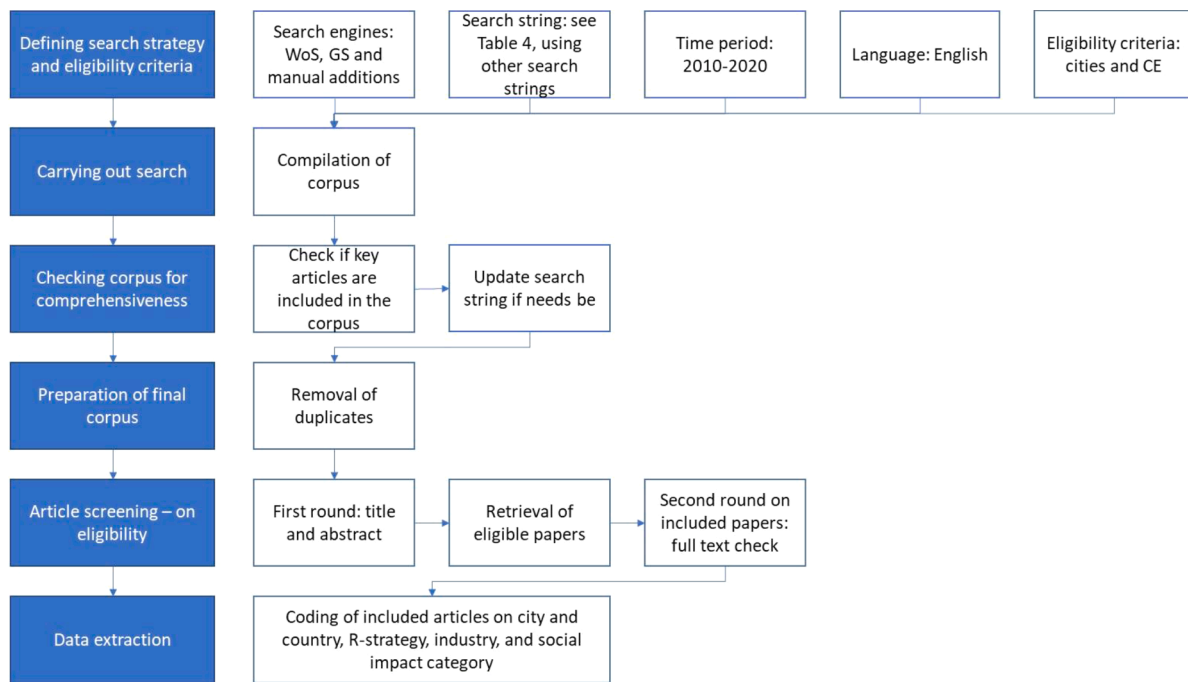


Figure 1. Research process

Table 3  
Search string used in the review in Web of Science and Google Scholar

Engine	Search string
Web of Science	ALL FIELDS: (Circular*) AND ALL FIELDS: ((Cit* OR urban OR municipal*))
Google Scholar	All in title: circular economy municipal OR urban OR cit*

Table 4  
Search strings of other reviews related to the circular economy

Review	Search string	Database used
(Geissdoerfer et al., 2017)	“circular economy”, sustainability and “circular economy” AND sustainability	Web of Science
(Homrich et al., 2018)	“circular economy”	ISI Web of Knowledge, Web of Science Core Collection and Scopus
(Ruiz-Real et al., 2018)	“Circular economy” and “environment”	Web of Science
(Camón Luis & Celma, 2020)	“circular economy”	Web of Science, Google Scholar and Scopus
(Carrière et al., 2020)	“circular economy”, “cities” and/or “circular cities”.	Dimensions

industrial park or economic sector), or at the national, supranational and international levels were excluded.

- Intervention (I): any strategies to implement the CE at city scale. Studies focusing on various other aspects of sustainability, e.g., sustainable consumption, green chemistry, smart cities, viable cities, or carbon-neutral cities were excluded.
- Timing (T): articles from the period 2010–2020.
- Setting (S): all kinds of studies available in English were included.

The comparator (C), the linear economy, was moot, as the focus of the review was on CE transitions. The coding for Outcomes (O, whether articles covered social impact) was done in the data extraction stage.

After the screening of titles and abstracts, the authors retrieved and screened full texts for eligibility. A list of the articles excluded at the full

text screening stage and those deemed eligible for data extraction is available in the research data for this article at [<https://doi.org/10.5281/zenodo.5207331>].

### 2.3.4. Data extraction and synthesis

Following the extraction of bibliographic information, the included articles were coded based on the following aspects: 1) the cities and countries discussed in the article; 2) the strategies covered in the article linked with the 10 Rs (Potting et al., 2017); 3) the sectors addressed in the article, with the categorizations based on NACE codes (EUROSTAT, 2008) and 4) whether or not they addressed social impacts, and if so, which categories, as derived from Table 2. The results were synthesized in tables and are presented in Section 3.

## 3. Results

### 3.1. The dataset

Figure 2 presents the results of our screening process to illustrate the articles we retained at each stage in our research process, using a PRISMA flow diagram – a well-established reporting template for systematic reviews (Page et al., 2021). The searches in Web of Science, Google Scholar and the manual additions resulted in 10,069 articles (9, 815; 240 and 14, respectively). After removal of duplicates, the titles and abstracts of 10,021 unique articles were screened for the eligibility criteria, and 9,840 articles were deemed irrelevant. Full texts were obtained for all 181 shortlisted articles. At the full text screening stage, 178 articles were deemed eligible. The three that were excluded were an editorial, did not focus on cities, and focused on the sharing economy, not on CE. In the data extraction stage, 178 articles were therefore coded. A review paper describing the full set of articles related to circular cities is forthcoming (own work).

### 3.2. Descriptive statistics

Of the 178 articles eligible for data extraction, only 14 articles (8%) explicitly discussed social impacts of circular cities. The first strand of articles focuses on informal workers in low and middle income countries



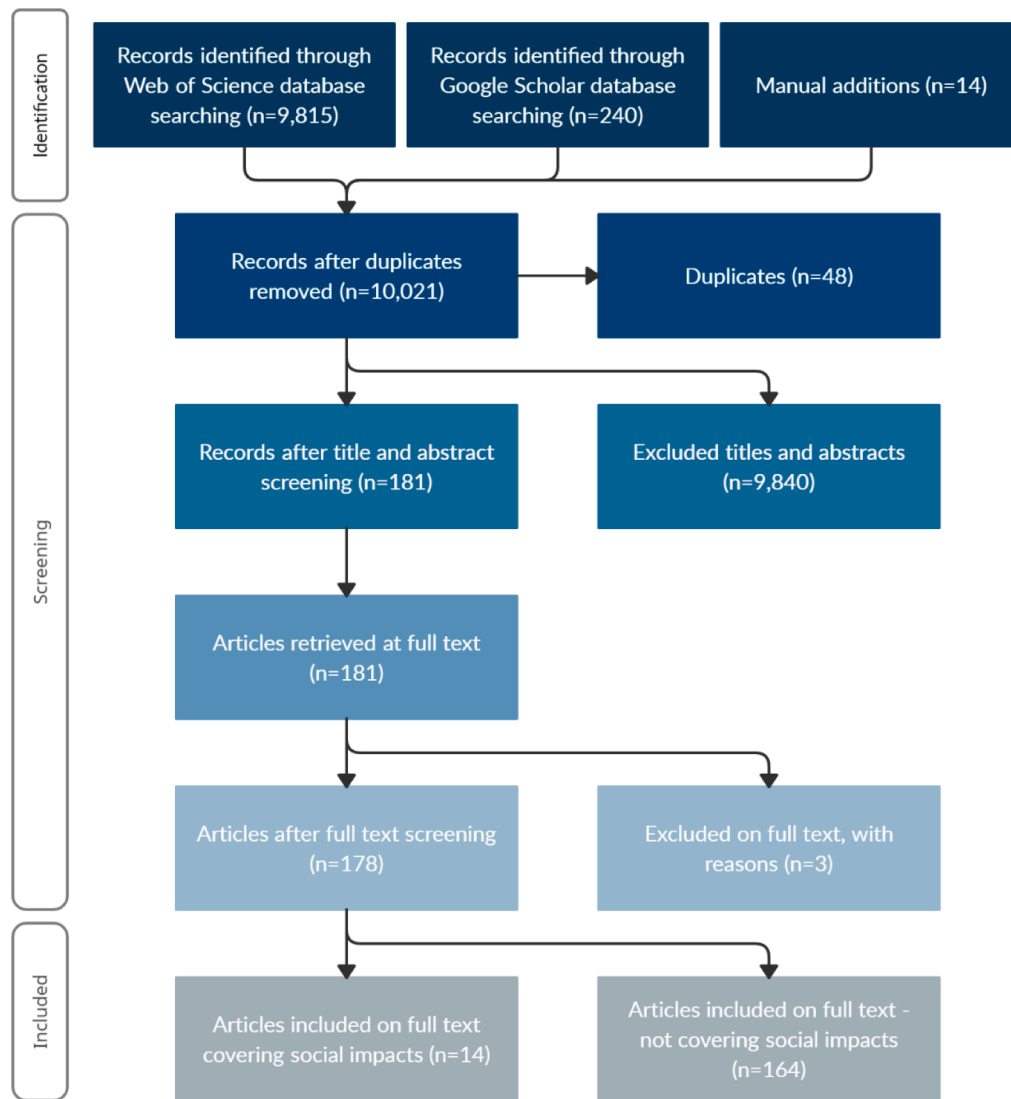


Figure 2. PRISMA flow diagram illustrating the search results and the articles excluded or included at each stage of the review process.

(10 articles in total): [Tong and Tao \(2016\)](#) described how a “waste city” in Beijing, P.R. China, was removed by the municipal government and how that affected informal waste workers. [Goldstein \(2017\)](#) commented on the paper, noting the hostile stance of municipal governments towards rural migrants and an interest in maximising land rents as key issues, after which [Tong \(2017\)](#) provided an additional commentary on how waste management is organised in P.R. China. Also in the waste industry, [Govender \(2017\)](#) reviewed the working conditions for informal waste workers in South African cities, as do [Kumble \(2019\)](#), who reported on how a composting project in Guatemala city, Guatemala, provided employment opportunities for youth and kept them in school; [Becerra et al. \(2020\)](#), who reviewed landfill conditions and CE possibilities for farmers in two cities in Argentina; [Burneo et al. \(2020\)](#), who assessed the possibility for urban mining and the informal economy in Cuenca, Ecuador; [Ferronato et al. \(2020\)](#), who reviewed the potential for formalizing the informal waste industry in La Paz, Bolivia; and [Miranda et al. \(2020\)](#) who reviewed the same for Londrina, Brazil, and [Siman et al. \(2020\)](#), also in Brazil.

A second strand of research focuses on developing countries, and more so on participation and governance (4 articles): [Izdebska and Knieling \(2020\)](#) discussed the role of citizens in planning and implementing waste management in four European cities; [Kębłowski et al. \(2020\)](#) reviewed the governance arrangements of a CE in Brussels,

Belgium; [Nogueira et al. \(2020\)](#) reviewed the key success factors for setting up CE food initiatives in Chicago, US; and [Soto \(2020\)](#) provided an overview of urban resources and potential for CE through a socio-spatial analysis of Glasgow, UK, and explained how the municipal government could improve resource management, regeneration, stakeholders’ cohesion and wellbeing in the city.

In terms of sectors, 11 articles focus on the waste sector (the 10 articles on informal waste workers in low and middle income countries and [Izdebska and Knieling, 2020](#)). [Nogueira et al. \(2020\)](#) discussed farmers’ markets, while [Kębłowski et al. \(2020\)](#) and [Soto \(2020\)](#) do not take a sectoral approach.

Looking at the social impacts that these articles cover ([Table 5](#)), we find that:

- 12 of the 14 papers covered outcomes related to people’s way of life (category 1), that is, how they live, work, play and interact with one another on a day-to-day basis. More specifically, they considered employment opportunities, mostly for informal sector workers. Only a few papers discussed income levels ([Burneo et al., 2020](#); [Miranda et al., 2020](#)).
- 5 papers covered community cohesion, stability, services and facilities (category 3), i.e., how people and initiatives interact with

**Table 5**  
Overview of how the 14 articles on circular cities covered social impacts

Author	People's way of life (category 1)	People's community (category 3)	Political systems (category 4)	People's environment (category 5)	People's personal and property rights (category 7)
(Goldstein, 2017; Tong, 2017; Tong & Tao, 2016)	Employment opportunities for informal waste workers	There are tensions between informal workers and households (e.g., informal waste workers are seen as a nuisance)	Municipal governments do not sufficiently consider the role of informal waste workers in the waste management system		Land rights are important to secure the position of informal waste workers in the city
(Govender, 2017)	Employment opportunities for informal waste workers				
(Kumble, 2019)	Employment opportunities for disadvantaged youth				Land rights are important (the land for the composting activity was donated)
(Becerra et al., 2020)	Employment opportunities for informal workers Nutrient recovery can lead to more income (longer planting season) and increased quality of life		Municipal governments should consider the role of informal workers in the waste management industry (and where feasible, formalise it)	Nutrient recovery and better waste management can lead to lower contamination of landfill sites, more and cleaner water	
(Burneo et al., 2020)	Employment opportunities for the informal sector workers Wages are below minimum wage – urban mining is not economically viable. Most waste pickers are female and over 55 years of age.		Municipal governments can formalise the waste industry but would need to make substantial investments	Increased recycling leads to lower emissions	
(Ferronato et al., 2020)	Employment opportunities for informal workers About 7% of the municipal solid waste is collected by informal waste workers		Municipal governments can formalise the waste industry but would need to make substantial investments	Increased recycling leads to lower emissions and lower contamination of landfill sites; more and cleaner water, as well as less contamination and pollution overall	
(Izdebska & Knieling, 2020)			Citizen involvement could lead to better waste management. Most cities focus on informing citizens, but few consult or actively involve citizens in co-design processes. Five critical success factors for waste management and CE in cities: strategic planning, inclusivity, transparency, continuity and resources		
(Kębtowski et al., 2020)			Citizen engagement is necessary for better urban planning – there are many small-scale initiatives, but few corporate actors are involved in the CE strategy. The legislative framework surrounding CE is complex.		
(Miranda et al., 2020)	Employment opportunities for informal waste workers Informal waste workers carry out municipal solid waste recycling. Informal waste workers earn little money and are looked down upon Better training of informal workers could lead to higher productivity.		Governments should recognize the importance of informal workers in the waste management system and create legal frameworks for waste picker cooperatives		
(Nogueira et al., 2020)	Employment opportunities	Farmers' markets impact their surrounding community and attention should be paid to integrating different viewpoints in the CE strategy	Cities are comprised both of hard infrastructure (buildings, roads) and soft infrastructure (institutions, intangible aspects and social behaviour). Municipal governments should regulate activities in the markets		
(Siman et al., 2020)	Employment opportunities for informal waste workers		Governments should recognize the importance of informal workers in the waste management system and create legal frameworks for waste picker cooperatives		
(Soto, 2020)					

(continued on next page)

Table 5 (continued)

Author	People's way of life (category 1)	People's community (category 3)	Political systems (category 4)	People's environment (category 5)	People's personal and property rights (category 7)
	Employment, spending, living within the city	Regeneration using CE principles can result in higher community cohesion	City governments should utilise spatialization in urban planning and CE strategies	Provides an overview of urban resources: a map of built assets, land, people, capital, goods and foods; water, energy and raw materials	

society, and the contribution CE can make to creating stronger ties between different groups in society.

- 12 of the 14 papers mentioned outcomes related to political systems (category 4): participation in decisions that affect lives, the level of democratization that is taking place, and the resources provided for this purpose. All articles discussing cities in the Global North covered governance and participation. For informal waste workers, CE entails recognising the role and contribution they make to waste management systems overall, and that municipal governments need to provide legal frameworks for informal waste workers to operate in (as they reduce the investments municipal governments need to make in waste management).
- only 4 of the 14 papers quantified the benefits for the environment (category 5), in terms of reduced greenhouse gas emissions, less pollution and contamination, and more and cleaner water (Becerra et al., 2020; Burneo et al., 2020; Ferronato et al., 2020). Soto (2020) did not quantify impacts, but rather presented a series of maps showing the flows of urban resources through the city of Glasgow, UK.
- With regards to personal and property rights (category 7), Kumble (2019) discussed land being donated to the project, while some of the articles on cities in P.R. China examined the importance of land rights and how they impact the group of people they are focusing on, albeit in less detail (Goldstein, 2017; Tong, 2017; Tong & Tao, 2016).
- None of the articles explicitly addressed cultural impacts (category 2); health impacts (category 6); or fears and aspirations (category 8).

The 164 articles that covered circular cities yet did not discuss the social impacts of CE strategies include articles that discussed informal workers, such as Shrestha (2018) and (Steuer, Ramusch, & Salhofer, 2018a,b), or how households can recycle more (Andersson & Stage, 2018; Knickmeyer, 2020; Liu et al., 2015; Miao, 2018). Others, such as Girard et al. (2019), discussed the importance of being people-oriented in the transition to circular cities [e.g., “they should evaluate the variations of well-being for the different social subjects starting from the consideration of their well-being conditions” (Girard et al., 2019, p. 27)], but they did not provide insight into the impacts either. In another paper, Girard and Nocca (2019) presented a series of indicators on social impact and circular cities (related to health and wellbeing, reduced crime, etc.) but did not apply it on their three selected case studies (the cities of Kalundborg, Dunkirk and Kawasaki). Campbell-Johnston et al. (2019) talked about the hard and soft barriers to CE in cities (including cultural barriers) but did not discuss how different sets of people, and different domains, would be impacted. Lekan and Rogers (2020) published on digitalization and inclusiveness in circular economy activities in cities and Rathore (2020) on informal workers in India; these authors also did not provide details on the impacts of circular transitions.

#### 4. Discussion

Overall, we can confirm that the social dimension of CE is under-represented, as pointed out also by previous work (Calisto Friant et al., 2020; Heurkens & Dąbrowski, 2020; Hobson & Lynch, 2016; Homrich et al., 2018; Kirchherr et al., 2017; Koumparou, 2017; Lekan & Rogers, 2020; Merli et al., 2018; Moreau et al., 2017). We agree with Bassens et al. (2020), who called for a wider discussion about CE in cities to

include social impacts, and Becerra et al. (2020), who found that “CE brings an opportunity to reshape our socio-economic development pathways towards social equity and environmental justice goals” (p. 1).

Where social impacts have been considered, a narrow interpretation has been followed: discussions have tended to centre around employment opportunities for informal sector workers in low and middle income countries. In some cases, the focus is on governance issues, something which Moreau et al. (2017) also did. However, looking at employment (social impact category 1), consideration should be given not only to wages: Willeghems and Bachus (2018), for example, identified different impacts depending on the type of CE strategy: job substitution, job creation or job transformation. None of the studies above mentioned the potential hollowing out of job content with a transition to CE; yet it has been mentioned by policymakers that the future of jobs needs to be carefully examined (Cambridge Econometrics et al., 2018; Chateau & Mavroeidi, 2020; IISD & Sitra, 2020; OECD, 2019).

In addition, the importance of social capital at a city level, as pointed out by Girard et al. (2019) and Girard and Nocca (2019), could have taken a more prominent place in the discussion around community cohesion (category 3). Social innovation in CE (aside from the affordability of CE products) and the potential of CE to transform society (through the quality of jobs created) are said to be new challenges related to the social dimension of CE (EESC, 2019), and indeed, Suchek et al. (2021), in their review of innovation and CE, found seven clusters in the literature but none related to social innovation.

However, recently, Marchesi and Tweed (2021) identified seven types of social innovation and how they impacted CE in cities through social housing; and Trudeau (2018) noted that participation of citizens in municipal planning and design is essential to engender feelings of pride of living and belonging in a city. Like Gravagnuolo et al. (2019), we find that the “fundamental role of citizens and communities in driving the shift of paradigm from a linear to a circular economy” (p. 6) should feature more prominently in the literature, and we wonder how digital technologies could enable and/or hinder that participation (Bouzuenda et al., 2019; Lekan & Rogers, 2020).

Furthermore, this review shows that from a sectoral perspective, the CE concept as applied to city levels has not moved on from focusing on waste management, as commented on also by Kirchherr et al. (2017). Kębtowski et al. (2020) found that “circular” projects developed in European cities are usually limited to waste management”; however, the evidence from this review shows a similar sectoral focus in low and middle income countries.

The social impact categories that have not been covered by past research also are interesting to note. Within the 14 articles that discuss social impacts, the results indicated that culture (social impact category 2), health and wellbeing (category 6), and fears and aspirations (category 8) did not receive sufficient attention in comparison to the other impact areas. It is unclear why this is so, though it could be connected to the nascent nature of research on indicators and metrics for assessing CE in general and for social impacts specifically (Banaité, 2016; Corona et al., 2019; Veleva et al., 2017). Assessing and understanding the impacts of the transition to circularity requires robust indicators (Geng et al., 2012; Pauliuk, 2018), but the focus of the work in this area so far is on products and services (Corona et al., 2019; Saidani et al., 2017), which may not be applicable to city level assessments.

Furthermore, the nature of social impacts is typically contextual and

hence may not be easily applied to quantitative assessment methods that are commonplace for, e.g., environmental impacts (Pauliuk, 2018). Attempts are being made to adapt indicators from social life-cycle assessment (LCA) approaches (Corona et al., 2019), but this work is in its infancy and therefore its applicability remains to be seen. Calisto Friant et al. (2020) analysed the CE discourses in the academic literature and suggested that governance, social justice and cultural change is an important, under-addressed challenge.

For health impacts (category 6), the World Health Organization (WHO, 2018) identified a series of positive and negative impacts from a CE (e.g., reduced consumption could lead to better health, yet keeping products 'in the loop' could reduce energy efficiency and keep hazardous materials in use). In its report, the WHO noted a lack of studies on the impacts of a CE on health. We confirm that finding and call for more research insights to be generated in this field.

Related to fears and aspirations (category 8), Cherry and Pidgeon (2018) found substantial concerns from consumers in their research on "products as a service", where consumers no longer own products but instead enter into agreements or contracts with a manufacturer or seller that retains ownership of a product and provides it as a service. Leipold et al. (2021), in their analysis of narratives on CE and food waste, uncovered fears that framing food waste as an "economic activity" could undermine charities that "harvest" food waste to distribute to people in need, and that would increase food injustice.

Regardless of challenges with indicators, for "CE to truly be transformative, issues of trust, social capital, power and belonging are integral issues" (Hobson & Lynch, 2016, p. 22), and we would therefore expect researchers to give all eight social impact categories a more prominent role in the study of CE and cities. Like Kębłowski et al. (2020), we call for further research to "address the fundamental question of who ultimately is set to benefit or lose from the anticipated transition towards the CE" (p. 154). If we understand that, we will be able to create "just cities" and achieve what proponents claim a CE can accomplish.

## 5. Conclusions

Given that adopting CE policies is a political priority in some places, and more cities are embarking on CE trajectories, we performed a scoping review of the scientific and grey literature concerning the social impacts of urban transitions towards a CE. We used an extensive search strategy to ensure inclusion of a broad range of sources to classify and organise the body of literature and assess how social impacts are addressed and accounted for. Our results show that the current discourse on circular cities is quite limited in that it centres on informal sector workers in low and middle income countries and on governance issues related to legal frameworks for and citizen participation in waste management systems, mostly. Overall, the social impacts remain largely unaddressed, with only several impact areas — people's way of life (employment opportunities), community cohesion and political systems — discussed in 8% of the articles we included in our assessment.

Overall, the limited empirical evidence of how CE strategies address inequality and social justice in cities can hinder effective decision-making in policy and practice. Understanding how CE strategies affect people holistically allows assessment of who will lose and who will win from a transition process, and allows governments to develop redistributive policies that would address imbalances and result in a more just society. If established correctly, the CE has the potential to unlock not only environmental benefits, but also provide a myriad of opportunities for all stakeholders.

The limitations of our research are that we focused on CE at the city level, thereby excluding national, regional and business levels. However, those levels have been dealt with more broadly by other reviews, such as from Padilla-Rivera et al. (2020). Another limitation is that we utilised only one academic database (Web of Science), whereas carrying out a search in Scopus as well could have resulted in additional papers captured by our search terms. In addition, other institutions may have

published reports on circular cities, as well as studies published in languages other than English.

Our work illuminates the need to better assess the social impacts of a transition toward circular cities; addressing this gap in research is critical to understanding how transitions towards circular cities can work for a wide range of stakeholders. We therefore call for cities and researchers to undertake baseline assessments and social impact evaluations to understand both intended and unintended positive and negative consequences of the transition towards circular cities.

It is imperative that the research community contributes towards developing relevant methods, frameworks and indicators that can be applied to the assessment of social impacts in circular cities, to ensure that the positive social impacts of the transition to circularity are recognized and any negative impacts mitigated. In particular, we suggest future use of the social impact assessment framework described in this paper, as it provides a holistic and extremely comprehensive overview of social consequences, both intended and unintended; however, further work is needed to define and prioritise indicators that can measure social impacts of CE at city level to make this framework more effective.

## Data statement

The research data for this article are available in the associated data package in Zenodo at [<https://doi.org/10.5281/zenodo.5207331>].

## CRedit author statement

FV: Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Writing – review and editing

EF: Methodology, Data curation, Formal analysis, Investigation, Visualization, Writing – reviewing & editing

DD: Methodology, Data curation, Formal analysis, Investigation, Writing – original draft, Writing – reviewing & editing

MH: Methodology, Investigation, Writing – original draft, Writing – reviewing & editing

## Declaration of Competing Interest

The authors declare no competing interests.

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