

Working Life in the Circular Economy: Taking Stock and Moving Forward

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Abstract

The circular economy (CE) has for long been an important strategy for sustainable development, promoting resource efficiency through reduction, reuse, and recycle. There is also a growing expectation that the CE may provide new jobs. However, working life dimensions of the CE are often treated separately from environmental and economic concerns. This is unfortunate given the impact that a transition to CE may have on salient issues in working life, including on job security, skills needed, occupational health and safety management (OHSM) and the cooperation between social partners. The lack of integration of environmental, economic and social concerns in CE also risks impeding goal achievement in several policy areas.

The present review article synthesises the existing scientific knowledge on a sustainable working life in the transformation towards a CE, and based upon the synthesis, critically explores the knowledge needs in relation to CE and working life: barriers and enablers; labour market changes; OHSM; skills requirements; the role for social partners; and policy challenges. A total of 2487 peer reviewed journal articles were identified, with 27 articles included in the review.

Future research should focus on creating and upscaling circular business models that promote transparency, collaboration, and value creation across supply chains, developing educational programs for stakeholders and the workforce. More research is required to evaluate existing policies, design effective policy frameworks, promote circular business models, and addressing employment opportunities and job security. Studies should also investigate how social partners can contribute to working life in the CE and identify necessary processes and agreements.

Keywords

Circular economy, Circular business model, Working Life, Policy, Training, Thematic analysis

Introduction

The quest for a circular economy (CE) is since at least two decades increasingly important in strategies and measures for sustainable development (Geissdoerfer et al., 2017; Ghisellini et al., 2016; Prieto-Sandoval et al., 2018). Instead of a linear production value-chain, the CE promotes resource efficiency through reduce, reuse, and recycle, thereby improving sustainability conditions, including climate mitigation (Allwood 2014).

The greening of the economy, including CE, has in recent years increasingly been seen as an opportunity to also enhance competitiveness and overall economic development (Loorbach, 2007; Loorbach & Wijsman, 2013). This double objective is reflected in the EU policy arena, including elements for circularity in the European Green Deal (EC, 2019), and the policy proposals following the 2020 Circular Economy Action Plan (EC, 2020, 2022). This also includes expectations for increasing employment (Bjerkesjö, 2021), not least for people far from the labour market (Brizga, 2022). However, in policy making, social concerns are often treated separately from environmental and economic ones, including working life conditions (Inigo & Blok, 2019; Jaeger-Erben et al., 2021; Mies & Gold, 2021; Padilla-Rivera et al., 2020; Schröder, 2020).

There are indications that this separation is the case also in the research context (Bjerkesjö, 2021). This is unfortunate since a transition to a CE may significantly affect e.g., the labour market (Aguilar-Hernandez et al., 2021), job security (Casano, 2019), skills requirements (Borms et al., 2023; Burger et al., 2019), occupational health and safety management (OHSM) (Galatti & Baruque-Ramos, 2022), and the cooperation between social partners (Bjerkesjö, 2021). Moreover, the transitions to green jobs represent complex processes, in CE involving a shift from linear models and value chains to network-based circular models. Therefore, the expansion of the CE requires new business models, markets and technologies. The lack of integration of environmental, economic and social concerns in the CE risks reproducing various goal conflicts and prevents the formulation of policies that foster goal synergies. Thus, there is a need to take stock of the current knowledge of working life in the CE and what is needed to promote sustainable development.

The present review article aims to i) synthesise the existing scientific knowledge on sustainable working life in the transition towards a CE, and based upon this, ii) explore the knowledge needs in relation to CE and working life concerns. To the best of our knowledge, no similar review has been published.

We delimit the review to two sectors: textiles and construction. These sectors are central from working life as well as environmental and economic perspectives, and due to high levels of greenhouse gas emissions and a potential for circular employment (Almasi et al., 2018; Leal Filho et al., 2019) they are targets for policy development that would benefit from a solid knowledge base. The exploration is limited to literature and circumstances that concern OECD countries, to facilitate a comparison across countries. The challenges and concerns

linked to working life in the CE lead us to focus the exploration on the following six themes: barriers and enablers; labour market changes; OHSM; skills requirements; the role for social partners; and policy challenges.

The synthesis is based on a review that began with 2487 peer reviewed journal articles identified in an extensive literature search in the Scopus database. The reviewed literature is organised around the referred themes.

Material and Methods

The review was conducted in line with the five steps of a systematic review proposed by Denyer and Tranfield (2009), namely: formulation of questions (see above), location of studies, selection and evaluation of studies, analysis and synthesis, and presentation of results. In order to retrieve relevant articles, a search string for the database Scopus was developed step by step, comprising alternate terms for circularity, plus varying concepts expressing working life parameters, plus phrases limiting the findings to the two focused sectors, all combined with a set of specifications concerning subject areas, year span and types of publication, as follows:

TITLE-ABS-KEY (circular* OR re-us* OR recycl*) AND TITLE-ABS-KEY (training* OR vocation* OR education* OR skill* OR employment OR job* OR labor OR labour OR "occupational health" OR "occupational safety" OR "health and safety" OR "value creat*" OR "value capt*" OR esg OR polic* OR "business model*" OR "gender*" OR "trade union*" OR "job security" OR "secure employment" OR "just transition") AND TITLE-ABS-KEY (construction* OR building* OR textil* OR cloth*)

We restricted the search to the six subject areas of engineering, environmental sciences, social sciences, business, management and accounting, multidisciplinary, as well as to final articles, reviews or chapters in English language, published in journals from 2009 up to the date for the search, September 26, 2023. Applying this search string resulted in 2487 articles. These were all scanned by one of the authors on title level for general relevance and OECD connection to increase relevance. In case of uncertainty of whether to include an article or not, abstracts were read. This selection resulted in 687 articles, of which one of the authors identified 41 articles based upon abstracts that convincingly showed that the article to a significant degree address the research aims. The 41 articles were then divided into four groups, one for each author to review fully and to describe systematically in a shared excel file (see below). As part of that process, a further 14 articles were deselected, resulting in the 27 articles reviewed here. The authors then explored the selected articles with a focus on content, focused area, methods, outcomes, proposed solutions, key terms used, research gaps identified and other aspects worth noticing.

Results

The results are presented below according to five of the themes in focus, since there were no articles addressing social partners' roles.

Barriers and enablers

Ten articles (Coscieme et al., 2022; Cruz Rios et al., 2021; Cuc et al., 2015; Harala et al., 2023; Illankoon & Vithanage, 2023; Kazancoglu et al., 2020; Shooshtarian et al., 2022; Singh et al., 2019; Wiebe et al., 2023) address barriers and enablers to circular business activities, focusing on the design of circular business models, involving innovation, novel assessment and information sharing methods, and tools for upscaling.

Traditional business models follow linear value chains, whereas circular business models operate within value networks and industry ecosystems (Singh et al., 2019). However, there is a scarcity of studies offering comprehensive insights into the entire value network. Moreover, the few studies that exist frequently neglect the holistic perspective integrating an overarching business model perspective with considerations of technology, skills, materials, and regulations as well as design, materials, manufacturing, distribution, reverse logistics, collection, sorting, and recycling (Kazancoglu et al., 2020). For example, Osobajo et al. (2022) find that CE research in the construction industry shows extensive focus on resource use and waste management. There are limited investigations in other areas of construction such as supply chain integration, building designs, policy, energy efficiency, land use, offsite manufacturing, whole life costing, risk, cost reduction, cost management, and health and safety management. Cruz Rios et al. (2021) discuss the most frequently mentioned barriers in the US, e.g., cost and schedule constraints, lack of clarity on what CE entails, existing regulations and codes that hinder reuse and repair, the belief that Design for Demolition compromises building durability and resiliency, conflicting goals between pre-engineered structures and future reuse, and the widespread use of nondurable building components.

Both technological and social innovation are essential for transformation to a CE, including its impact on working life. For instance, Illankoon and Vithanage (2023) highlight the importance of modern techniques, such as digitalization of the construction sector (including Building Information Modelling, virtual reality, digital twins, and offsite manufacturing), for optimizing material use, reducing greenhouse gas emissions, and minimizing waste. Digitalization can also facilitate collaboration and information sharing activities, which are crucial enablers for reuse (Harala et al., 2023).

The evolution of circular business models and their associated value networks has been studied in Finland and Sweden, focusing on the construction industry (Harala et al., 2023). The study concludes that industry ecosystem renewal towards circularity requires changes in roles, interactions, and perceptions to enable benefits across micro, meso, and macro levels, potentially leading to the emergence of new skills and jobs. Another example is provided by

(Shooshtarian et al., 2022), investigating value networks for recycled construction and demolition waste products, identifying both barriers and enablers for expansion. Moreover, the need for social innovations is emphasized, stretching beyond the mere traditional technological innovations (Coscieme et al., 2022).

Measurement and assessment of efficiency is also outlined in connection to circular businesses, such as thorough Life Cycle Assessments (LCAs) for textile end-of-life stages, highlighting a lack of research on clothing's environmental impacts. Research advocates for broader LCAs, suggesting a shift towards assessing reuse and recycling effectiveness in construction waste management facilities (Cuc et al., 2015). Transparency is a critical aspect connected to measurement and assessment, highlighting barriers to circularity stemming from the necessity of transparency and information sharing (Kazancoglu et al., 2020). In line with this, Wiebe et al. (2023) delve into the triple bottom line across five value chains, emphasizing the significance of transparency in generating multiple values. They interpret the social dimension through the lens of equity, particularly measured by employment opportunities, shedding light on the interconnectedness of economic, social, and environmental factors in value creation. Making new types of value creation and value capturing transparent is central. Initiatives such as textile repair, resource sharing, and product lifespan extension (value creation) not only align with a sustainable value proposition but also contribute to activities that enhance resource sustainability (value capture). This comprehensive approach addresses environmental concerns, ensures transparency in social values, and generates employment opportunities and understanding of equitable access to resources (Wiebe et al., 2023).

Moreover, for circular business models to come through, there is a need to achieve a comprehensive understanding of the upscaling of business models and the upcycling practices in value networks (Singh et al., 2019). In line with this, scholars underscore the current lack of practical tools available to facilitate the transition from linear to circular business models, highlighting the urgent need for the development of such tools to support the implementation of circular practices (Coscieme et al., 2022).

Labour market changes

Seven studies (Cuc et al., 2015; Econie & Dougherty, 2019; Gregson et al., 2016; Harala et al., 2023; Repp et al., 2021; Ross et al., 2023; Wiebe et al., 2023) offer insights into social aspects on how CE practices can influence employment dynamics, spanning from improved work satisfaction to alterations in employment trends and unsecure employment.

Circular practices have shown to enhance work satisfaction as employees are able to work in a more sustainable manner. This is beneficial for companies as it results in more engaged workers, ultimately boosting efficiency (Harala et al., 2023).

The transition from a linear to a circular economy is often viewed as a means to generate positive social impacts by increasing employment through labour-intensive activities such as reuse and recycling (Cuc et al., 2015). However, this shift can also result in reduced employment opportunities in low-income countries, in which primary production is predominantly situated. This is particularly the case in sectors like textiles. For example, Repp et al. (2021) note that a focus on CE within the EU could reduce employment in low- to upper-middle-income countries outside the EU while increasing domestic employment. This employment dynamic should be a key consideration when designing CE and environmental policies. Balancing these employment changes is crucial in global supply chains.

Similarly, Wiebe et al. (2023) demonstrate that transitioning from linear to more circular business models (repair, share, use longer) leads to increased domestic employment in Norway but may also result in decreased imports, potentially leading to lower emissions and also lower employment globally. For both textiles and construction, most of the new jobs will be low to medium-skilled (Wiebe et al. (2023). Ross et al. (2023) use an input output model for Germany that also considers second-order changes from a 15-percent decrease in intermediates-use in the construction industry. They conclude that an increase in jobs in the construction industry is accompanied by a fall in prices in the raw materials industry, which leads to increased exports when exchange rates fall.

CE may also enforce unsecure employment. Gregson et al. (2016) point out that recycling work in the EU relies heavily on migrant labour, which may be associated with issues related to work-life balance, racial disparities, gender stereotypes, and power imbalances. It is important to note that the study does not offer specific solutions but aims to raise awareness for policy discussions on these pressing issues. Similarly, Econie and Dougherty (2019) find that in the US, recycling workers are tightly controlled and have weak employment relations. Employment dynamics as an aspect of working life outline a critical part of circular business models, which need to be integrated with environmental and economic aspects in the CE.

Occupational health and safety management

Seven studies (Colmenero Fonseca et al., 2023; Cook et al., 2022; Delp et al., 2013; Engkvist et al., 2016; Harala et al., 2023; Powell et al., 2015; Vasconcelos & Junior, 2015) show how CE exposes worker to risks that have been eliminated from current linear production value changes or are unknown to employers, requiring improved OHSM programs, training and digital tools.

Health and safety issues might be the most significant and dominant barrier (Colmenero Fonseca et al., 2023) to achieve sustainable management of construction waste. A scoping review by Cook et al. (2022) addresses the risks to occupational and public health due to construction and demolition waste management, identifying risks due to exposure to accidents, asbestos, particulate matter, pesticides, damp and mould from wood products, dust from gypsum and flame-retardants during different variants of circularity, following the

waste hierarchy. They argue that, due to the informal character and the lack of unionization, most businesses in this industry underreport such risks and lack risk management capacity. Due to weak enforcement of legislation, this is particularly the case in low-income countries. Powell et al. (2015) provide complementary knowledge through an experimental study in which samples were taken from ten landfills across Georgia, USA, where construction and demolition waste had been discarded. The study focuses on asbestos-containing material and lead-based paint. Generally, they find that the US federal regulatory schemes for these materials are effective to limit indiscriminate disposal at landfills. The methods used can be replicated to other hazardous materials dumped at landfills, the authors conclude.

The lack of training could potentially contribute to the risks associated with accidents in the application of circular solutions. Vasconcelos and Junior (2015) report from fieldwork that analyses the causes of fatal accidents involving the use of mobile crushing equipment for recycling construction materials. Possible causes of these accidents included design flaws in the mobile crushing equipment, insufficient guidance from the manufacturers regarding bridge usage, inappropriate operating procedures, and a lack of training within the management team. To address these issues, corrective and preventive measures are proposed, with a specific focus on improving the design of the products involved in the accidents.

An internship occupational health training program in the US (Delp et al., 2013) address recycling jobs, whereas Engkvist et al. (2016) report from an intervention program to redesign Swedish recycling centres to improve occupational health and safety. Furthermore, digitalization is essential not only from a CE perspective but also for supporting workplace safety and ensuring the safety of reused materials (Harala et al., 2023). Occupational health and safety outlines one of the central components of working life, which is also a critical part of circular business models.

Skills requirements

Ten studies (Coscieme et al., 2022; Gillott et al., 2022; Illankoon & Vithanage, 2023; Katerusha, 2021; Kazancoglu et al., 2020; Mayer, 2020; Orsini & Marrone, 2019; Park & Tucker, 2017; Schumacher & Forster, 2022; Singh et al., 2019) show that lack of and insufficient knowledge, skills, training, education are among the most prominent factors impeding the growth of CE, specifically regarding working life aspects and integration of such aspects into circular business models.

In both the construction and textile sectors, lack of knowledge and insufficient skills, along with the need for training, are often referred to as significant barriers. Circular solutions, particularly in the textile industry, are often considered labour-intensive, especially in collection, sorting, and repairing processes (Kazancoglu et al., 2020). This labour-intensive nature can be a barrier to CE adoption, as it can reduce production efficiency, increase product prices, and extend the launching time to market (Kazancoglu et al., 2020).

Construction companies should prioritize investments in training programs to enhance the digital skills of their workforce and embrace digital technological applications in construction projects (Illankoon & Vithanage, 2023)

In the textile sector, areas requiring further attention include training in technical and business-management skills, and quality testing Coscieme et al. (2022); (Kazancoglu et al., 2020). Design knowledge hubs or similar knowledge sharing platforms have the potential to enhance the visibility of innovators in sustainable fashion, facilitating learning and sharing of successful approaches and practices for the CE. Similarly, Singh et al. (2019) identify key challenges and success factors related to upcycling in the textile industry in the UK. Among the challenges identified, lack of adequate resources is a crucial issue, including skilled labour. Conversely, success factors include the availability of critical resources, such as skilled personnel for upcycling designers and makers, as well as financial support for skill development and suitable work environments. To address the skills gap, Singh et al. (2019) suggest enhancing educational capacities and technical expertise in educational institutions and creating platforms for knowledge exchange, possibly through specialized organizations or collaboration opportunities with businesses.

In the construction sector, similar challenges related to knowledge and skilled workers are encountered. For example, Orsini and Marrone (2019) highlight the lack of skills for strategies like "use of natural resources" and "proper application methods during construction to minimize waste and enhance performance". Gillott et al. (2022) propose reviewing undergraduate civil and structural engineering courses to promote design for reuse and enhance the appraisal of existing structures. Training on the use of recycled concrete is also emphasized for Germany and Switzerland by Katerusha (2021).

Studies show a need to review and change existing educational programs to enhance awareness and knowledge among stakeholders. Park and Tucker (2017) explore institutional barriers to facilitate reuse in the Australian construction sector and identify a lack of awareness and knowledge among stakeholders. To overcome these barriers, sector-wide education and training programs are proposed to enhance awareness and knowledge of construction waste management, including the relationship between initial investment and lifecycle costs, as well as the benefits of reusing materials. Additionally, the study emphasizes the need for improved communication between architects and contractors. Similarly, Schumacher and Forster (2022) propose the review of undergraduate civil and structural engineering courses as a strategy to enhance the assessment of existing structures and encourage the adoption of design for adaptive reuse practices in the construction sector.

Mayer (2020) address the training issue with a well-defined program and certification tailored for construction professionals, emphasizing the importance of specialized training across the value chain and among different stakeholders. For instance, to enhance the reuse of building materials, construction workers need training that emphasizes assembly with future disassembly in mind. Disassembly workers need strategies for efficient dismantling. Reuse

retailers require training in areas such as procurement, storage, and the effective sales of reclaimed components. Similarly, reassembly workers need to acquire the necessary skills to construct reclaimed components under varying conditions. These targeted training efforts are crucial for overcoming barriers and promoting the implementation of CE solutions that integrate working life aspects with environmental and economic sustainability aspects.

Policy challenges

Nine papers (Colmenero Fonseca et al., 2023; Coscieme et al., 2022; Gillott et al., 2022; Illankoon & Vithanage, 2023; Katerusha, 2021; Kazancoglu et al., 2020; Schumacher & Forster, 2022; Shooshtarian et al., 2022; Wiebe et al., 2023) suggest policy development to support the transformation to CE and to strengthen the social sustainability in those businesses.

Coscieme et al. (2022) propose a framework that integrates key components for system transformation into a tool to analyze circular business models in a systemic context, supported by designed policy and consumer behavior-change strategies and initiatives across the life cycle. Schumacher and Forster (2022) suggest a broad set of clear recommendations, from collaboration and labelling to policy and education. Colmenero Fonseca et al. (2023) list various policy points for improving circularity, including C&D waste management, and increasing export fees. Likewise, Illankoon and Vithanage (2023) suggest the need for regulatory bodies and construction businesses to step in to promote circularity in construction. Katerusha (2021) finds that a mix of instruments is required to address the factors that inhibit increased recycling and the use of secondary building materials (see also Kazancoglu et al., 2020). Shooshtarian et al. (2022) also suggest government policies, such as preventing illegal dumping, defining waste clearly, implementing well-designed landfill levies, setting targets for the use of recycled products, and promoting consistency among public organizations in valuing and using recycled products.

Wiebe et al. (2023) use modelling to explore how increased textile repair, share and long use, as well as building materials reuse, repurpose and recycle point towards increased employment. The results are useful for identifying both potentially stranded jobs and job opportunities, of which the latter may be stimulated by e.g., stricter waste sorting requirements, tax system reform, and market and design regulations, including for product longevity. In a more specific study, focusing on so-called vertical extension of buildings, by adding new stories, Gillott et al. (2022) describe barriers and enablers for such adaptation and reuse of technically embedded carbon. Based on interviews, they find that, in the U.K., planning requirements and biased VAT schemes constitute barriers, which after reform could be turned into enablers. Besides the need for improving engineering education, however, no policy-related proposals for the social and working life-dimensions are presented in the article. Finally, Gregson et al. (2016) explore what they call the “dirty” side of the recycling coin, showing that resource recovery still requires manual labour, often from secondary labour markets dependent on migrant workers, which is hardly considered in policy and clean and green waste related rhetoric. Again though, no clear policy proposals are discussed.

Discussion

We have reviewed literature on CE and working life concerns, revealing a significant gap where research fails to integrate environmental and economic aspirations with the social dimensions effectively. In the following, we first highlight the limitations of the study, followed by a discussion on the practical implications and, finally, topics identified for further research.

Limitations

The selection of terms in the search string played a critical role in determining the pool of articles considered for analysis. This process involved a delicate balancing act: on the one hand, it aimed to retrieve a manageable number of articles, while on the other, it aimed to prevent the inadvertent exclusion of relevant studies. We consider the final selection providing sufficient material, except for the topics of social partners roles, in relation to the aims of the study. However, it is important to acknowledge that alternative search terms and selection filters could have yielded a somewhat different set of articles for review. Furthermore, there is a possibility that some pertinent search terms were overlooked altogether.

Practical and policy implications

The transition to a CE impacts working life by creating new jobs, particularly in reuse and recycling, but also introduces challenges such as job insecurity and health risks. This necessitates workplace innovation, collaboration between social partners, and government engagement. A significant barrier to CE adoption is the lack of knowledge and skills. Industries must develop targeted training programs to equip workers with the necessary skills for circular practices, including technical and business-management skills, and quality testing. Companies need to innovate, collaborate, and adopt digital tools to optimize material use and ensure safety. Effective CE practices rely on transparency and information sharing to build trust and ensure efficient reuse and recycling of materials. Collaboration across value networks is crucial to overcome barriers and create synergies.

To secure a just transition in the CE there is a need to ensure job quality and security, addressing skills gaps through training, and improving occupational health and safety. Effective policy frameworks are needed to support the transition to a CE, including incentives for circular business models, OHSM regulations, and support for job creation. Education and training programs must be updated to include CE principles. Social partners should collaborate to ensure just transition for all workers. Policymakers need to develop integrated policies that address environmental, economic, and social dimensions to support a sustainable and inclusive CE.

Identified research needs

Based on the reviewed articles, we identify six areas of future research inquiries. First, there is a need for research addressing the promotion of CE jobs through sustainable business models and the provision of necessary skills. This includes the development, scalability, and implementation of effective circular business models that foster transparency, collaboration, and value creation across supply chains. Additionally, research ought to target the development of educational programs and training initiatives to address knowledge and skills gaps among stakeholders in various sectors, thereby helping to overcome barriers and facilitating a successful implementation of circular economy solutions.

Second, research is needed on technical solutions and processes for developing sustainable jobs in the CE. This includes integrating digital technologies to optimize material use, reduce greenhouse gas emissions, minimize waste, improve workplace safety, and promote safe material reuse. Technological innovations and digitalization are crucial for enhancing the CE by improving resource efficiency, mitigating environmental problems, fostering collaboration, and sharing information, while also minimizing workplace safety risks and improve the safety of reused or recycled materials. Further research is required to accelerate the practical application of digital technologies, integrate education into training programs and enhance workforce digitalization skills through various means.

Third, while some policy recommendations have been given for promoting consideration of the work-life dimension of CE, more research is needed to evaluate the effectiveness of existing policies, regulatory frameworks, and incentives in driving the transition to a CE, and for overcoming identified barriers. Research is needed on the design of effective policy frameworks, promoting circular business models across different sectors, considering factors like collaboration, labelling, and taxation, while also addressing social dimensions such as employment opportunities, job security and OHSM. In line with this, further studies are needed on measures guiding the transition. The new Corporate Social Reporting Directive (CSRD) has the potential to generate fresh insights into measuring social dimensions such as employee relations, human rights, community engagement, product responsibility, anti-corruption initiatives, and board diversity. However, further empirical studies are needed to explore its practical application and impact.

Fourth, studies are also needed on how social partners along companies' value chains may contribute to working life in the CE and what processes and agreements that would be needed, as this aspect was entirely absent from the findings. Inclusivity and equality are important aspects to explore in this context.

Fifth, further research examining multiple sectors and countries beyond those in the OECD is also valuable; we see a severe shortage of such studies.

Finally, studies are warranted on how to conceptualize and theorize the work-life aspects within the CE, further integrating economic, environmental and working life dimensions. We observe a noticeable gap in success stories showcasing the practical implementation of socially inclusive circular economy (CE) initiatives. This highlights the need for further empirical research to address this deficiency.

Conclusion

The present literature review has focused on five themes in two sectors. As stated, additional research is needed to take on additional perspectives, and in-depth studies are needed in other sectors as well, to address sector-specific aspects. We still argue though, that some of our findings are relevant also for other industries. For example, developing circular business models for remanufacturing and recycling vehicle components would be important in the automotive industry, and repair and refurbishment could create new jobs in the electronics industry, but in both cases, new practices and policies are needed to ensure fair working conditions and management of health and safety risks. Similarly, reducing food waste and recycling organic waste could create new jobs also in the food and beverage industry but would require targeted training programs. Thus, the practical implications observed in the construction and textiles sectors could be valuable beyond these industries in order to create new job opportunities, improve working conditions, and address health and safety risks through practices such as remanufacturing, recycling, and waste reduction.

In closing, we conclude that it is high time to give a much stronger attention to working life issues in the rapidly expanding CE, in practice and policy, but also in research. Compared to many other aspects of the CE, such as associated climate challenges and opportunities, the various working life dimensions have so far received way too little interest.

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