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# Transitioning to a circular economy: Insights from the Social Sciences & Humanities on motivations and opportunities



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## ABSTRACT

Circular Economy is a complex concept that requires a careful and multidimensional approach. The complexity of circular economy is shown in vast number of different definitions for circular economy within peer-reviewed articles, policy papers and consultancy reports. circular economy draws its influence from various disciplines [5]. As circular economy not only analyses material flows, rather it also considers how social phenomena influence the transition to circularity, it shows the need to engage with Social Sciences and Humanities (SSH) disciplines.

## SUMMARY

- Circular economy is considered as an important priority in EU Green Deal, with the second Circular economy Action plan in force.
- Whilst circular economy is generating new business models, it is most often used in a consolidated manner by market participants.
- When implementing circular economy, it is important to think across territorial scales and acknowledge different socio-cultural societies.
- Shifting a community towards circularity and increasing people's sensitivity towards resource use is essential to achieve circularity.
- Material depletion can draw attention to the shortcomings and accelerate the transition towards circularity.
- STEM-created and visualised data can support decision-making in circular economy-related strategic planning.

## Introduction

A key theme of the environmental movements of the 1960s and 70s was the overuse of the Earth's resources, with circular economy also emerging at this time. Yet, increasing focus and use of the concept has emerged over the past decade in

## KEY DEFINITIONS

**Circular Economy:** "The economy in which products, materials, and resources last as long as possible and waste is kept at the possible lowest level" [1].

**Eco-innovation:** "Eco-Innovation refers to all forms of innovation – technological and non-technological – that create business opportunities and benefit the environment by preventing or reducing the environmental impact, or by optimizing the use of resources" [2].

**Material Flow Analysis (MFA)** - The material flow analysis maps overall waste movements and management procedures [3].

response to sustainability challenges, including population growth and resource depletion [4, 6]. The drive for resource efficiency has been heightened through global geopolitics and crises such as the Covid-19 pandemic, emphasising the value in transitioning towards a circular economy.

Often associated with the R-imperatives of recycle, reuse, recover and repair, circular economy is considered an approach to support more appropriate waste management [6]. Yet, circular economy not only relates to material and/or energy recovery [RS], rather it extends to the entire living and economic model helping “society reach increased sustainability and well-being at low or no material, energy and environmental costs” [9].

Many institutions engage with the concept of circular economy, including, the United Nation Environment Programme (UNEP), the Organisation for Economic Cooperation and Development (OECD) and the Ellen McArthur foundation. These institutions have launched programmes and conducted research which provide insight into the benefits of a circular economy. The European Commission has promoted resource efficiency and the closure of material loops within its policy priorities - in 2015, the EU introduced its first Circular Economy Action Plan and adopted a new one (COM/2020/98) in March 2020, resulting in – among others – the ban on some single-use plastic. The basic goal of the Green Deal presented by the European Commission in 2019 is to “transform the EU into a modern, **resource-efficient** and competitive economy, ensuring... economic growth decoupled from resource use”<sup>1</sup>, hence, circular economy is one of the central elements of it. The Green Deal – and its associated regulations – has created new goals, and stricter expectations, in material use at every scale.

Reducing waste production by eco-innovating longer-lasting products that can be repaired, recycled, and re-used is an important practice that supports a more circular economy. However, the introduction (or transfer) of eco-innovative solutions cannot occur without understanding the socio-cultural and governance context in which these solutions are to be implemented. The transfer of (best) practices from “place A” to “place B” may lead to suboptimal outcomes due to the different place-specific characteristics, including cultural, institutional, legislative or governance differences [10], with this hampering the achievement of an efficient circular transition<sup>2</sup>. Insights from SSH research can support the understanding of these place-specific characteristics to support the transition to a circular economy transition.

This literature brief provides an introductory overview of the circular economy concept, drawing upon a selection of SSH literature and insights from two expert interviews. Focus is placed on the importance of considering governance and socio-cultural differences when transitioning to a circular economy.

## Current Understandings

### Significant Findings to Date

The sustainability movement has received increased attention, in part due to increasing awareness of the damage to the natural environment, the limitation of growth and carrying capacity. Alongside the concepts of green economy and blue economy, circular economy has received a large amount of policy attention in the past decade. **Circular economy attracts great interest from scholars, practitioners, and business as it is seen as a novel opportunity for creating new business models** [4]. The efficient use of natural resources and the process of transition from a linear to a circular economy – as an alternative to the dominant economic development model [9] – became at the forefront after the financial crisis of 2008 [12] resulting in the creation of action plans in the European Commission.

Using product case studies and an economy-wide analysis, an Ellen Macarthur Foundation report outlined the potential benefits of transitioning to a circular economy. The report highlighted how a subset of the EU manufacturing sector could realise net materials cost savings worth up to US\$630 billion per annum by 2025—stimulating economic activity in the areas of product development, remanufacturing, and refurbishment [13].

Transitioning to a circular economy would not only bring savings, but also reduce the negative impact on the natural environment, however, the shift is challenging [14]. To transform a business, there is the need to redesign the use of materials and energy and to change the current sales model<sup>3</sup>. There is also the need to adopt system thinking [15].

Many advantages of the transition to a circular economy can be identified through indicators. For example, the decoupling of economic output and the use of resources. However, **the development of indicators that measure and monitor circular economy is challenging, with a range of stakeholders developing indicators to assess progress towards circularity**. The European Academies’ Science Advisory Council (EASAC) listed several circular economy related indicators, such as material flow analysis, societal behaviour, and economic performance [16]. Reflecting the indicators established, an aspect of circular economy research focuses on the topic of resource productivity. Resource productivity shows the effectiveness with which an economy, or a production process, is using natural resources and it reflects the output, or added value generated, per unit of used resources [16].

Increasingly circular economy research is focused on micro and meso levels [18], with this revealing the characteristics of material flows in more detail. Undertaking research at these finer-grained levels is important as this **research not only focuses on technological aspects and questions of material scarcity, but also on the governance process showing that management, political aspects and local legislation can have a significant impact on circular transition** [RS]. This highlights where the SSH disciplines have a role to play.

1 [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en)

2 A bad example can be seen in Varjú and colleagues’ work who argue that centralised governance arrangement hampers the local (secondary) resource use, resulting in a negative impact on the environment [11].

3 A shift from selling volumes of products towards selling services and retrieving products after first life from customers [17]



## Emerging Practices

In transitioning to a circular economy, the first step in building new business models is usually the creation and integration of new eco-innovative solutions into company production. This can happen when, for example, a company producing PET bottles creates a bottle made exclusively of one type of plastic. These types of innovations will be followed when the company gradually transforms its entire management system and all its processes into circular ones. However, this takes a long time.

**Eco-innovations need to cross the borders between policy sectors and bundles of industry.** Based on the theory of transition management, socio-technical transitions – such as the circular transition – need strategic, tactical, operational, and reflexive activities [19].

The results of EU-supported research (e.g., H2020) typically include the latest research results representing the state-of-the-art. In the H2020 EU research call relating to circular economy (H2020-WASTE-2014-2015<sup>4</sup>), it was not only STEM-related innovation projects that were tendered, but the EU also called for SSH related research and innovation action. For example, the H2020 REPAiR project explored and classified the governance barriers for transition experienced by the Amsterdam Metropolitan Area (AMA), with this providing lessons for policy. As the results shows, **what is challenging in the circular economy transition is the need for “all hands-on deck” to close the loop. It means, that to implement a strategic change, there is the need for multiple stakeholders including local government, sectoral institutions (e.g., waste management, water management, energy producers), NGOs, and citizens, to engage with, and participate in, actions.** The analysed AMA case illustrated “the complexity of this regional challenge and the need for an extensive cross-sectoral, cross-scale and cross-boundary partnership to agree on shared strategic, tactical and operational goals and means” [19, p. 26].

Different indicators of circularity can indicate how well the circular economy concept is applied. However, **most of the published indicators do not represent the systemic and multidisciplinary nature of a circular economy** [20]. Indicators are either material-focused (e.g., Domestic Material Consumption) and approached from the side of economics (e.g., Resource Productivity) [16], or they take environmental effects into account (e.g., Life Cycle Assessment). As such, this research typically bypasses the peculiarities of circularity and the multidimensional aspect of sustainability (i.e., environmental, economic and social aspects) [18]. One of the outputs of the H2020 REPAiR project<sup>5</sup> is the elaboration of a complex indicator system to assess the shift of a city or city region towards circularity. This concept (that assesses cities transition towards circular economy) is not focusing – for instance – on the concrete composition of material flows but, on the decision supporting processes going on in the cities. This measurement tool (or indicator system) includes five main indicators (and sub indicators within them) - governance, the tools in use, the awareness, the use of sustainability assessment and the built environment. These five indicators show important elements of an enabling environment for the circular transition.

4 H2020-WASTE-2014-2015

5 <https://h2020repair.eu/>

The H2020 research FORCE<sup>6</sup> aimed at evaluating tools and instruments for citizen involvement and engagement, providing recommendations of good practices in municipal waste management and circular economy in four European cities. The evaluation framework of the project assessed the process of citizen involvement, focusing on strategic planning, inclusivity, transparency, continuity, and resources dedicated as five key elements of waste management and circular economy. The research showed that not all of the analysed cities applied these five elements to the same extent. The reasons for the variation between cities included a lack of a strategic plan for citizen engagement activities, and the limited personal and financial resources of citizens [21].

Geofluxus<sup>7</sup>, a spin-off company of a TU Delft led H2020 project, is a good example of the SSH-STEM interface. Geofluxus is a sustainability-driven tech company, which collects and visualises material flows for city regions and for companies. By monitoring and visualising the resource flows of cities and companies, Geofluxus can identify ways to reduce the demand for resources to the point where consumption and regeneration happens. The company combines knowledge and methods coming from multiple disciplines within a single platform. Data visualisation can support the decision making of businesses and local governments towards a circular economy.

## Future SSH Priorities

Circular economy, as a new business model requires balanced and simultaneous consideration of economic, environmental, technological, and social aspects [9, 22]. An SSH-STEM collaboration, the Interreg HUIR CBC RURES<sup>8</sup> project focused on the geographical, technological, economic and social potentials of renewable energy and energy efficiency. The research showed – as also emphasised by [RS] – that attitude, and especially pro-environmental (or pro-circular economy) behaviour, is essential to shift towards a circular society [23]. **It is also important to analyse why the current economy is linear and not willing to use circular strategies [RS] or is not willing to adopt new eco-innovative solutions** [10]. There is the need to consider both the personal and geopolitical level when transitioning to a circular economy, taking into account several dimensions, like distrust, safe or high-quality materials [RS].

Many companies are, by nature, profit-oriented. As such, these companies carry out activities and use materials that are cheap - currently, these cheaper materials are fossil fuels and virgin materials, with recycled materials being more expensive. Therefore, attitude formation in companies will not achieve resounding success. **Regulation from above is necessary in order to prioritise recycled materials, with the role of policy makers, regulation makers, lawyers essential in this process** [24].

The H2020 REPAiR project also had another impact, namely on education. TU Delft has launched several paid courses related to the circular economy. Some teach students how to contribute to a sustainable economic system by implement-

6 FORCE project

7 <https://www.geofluxus.com/>

8 <https://programme2014-20.interreg-central.eu/Content.Node/RURES.html>



ing novel business and design approaches<sup>9</sup>. Another course is for those working in spatial development and teaches how to use appropriate tools to develop spatial strategies, plans and actions to support the transition towards circularity of a city or region<sup>10</sup>. In other countries, Bachelor and Master programmes have just started training people not only in circular engineering or in material flow analysis, but in economics and management studies as well. Training for decision makers in government sector is considered essential as well as they do not have enough information about circular economy [KN].

## Takeaways

### Takeaways for the European Commission

- Circular economy has to be focused not only on material or energy recovery, but it has to improve the entire living and economic model helping society reach increased sustainability and wellbeing at low or no material, energy and environmental costs.
- Emphasising proper tools (financial and personal capacities) for citizen engagement can help circular economy transition. Integration of citizen engagement as a must in all types of EU funding can be an important step.
- Multidisciplinary, SSH-STEM cooperation should be facilitated through funding calls. The insights from this research can support decision-making processes.
- Transition towards circularity, resource efficiency can also stimulate economic activity in the areas of eco-innovative product development, remanufacturing, and refurbishment.

### Emerging Practices Takeaways for Stakeholders and Businesses

- There is a need for visualisation of the current material flows in order to support decision-making and to find the best ways shifting a society towards circularity.
- Complex indicator system should be used (by decision makers) to understand better the complexity of circular transition. Transition does not only depend on change of material use but on proper governance processes, but also on the use of proper decision-supporting tools.
- Instead of only focusing on circular products in business sector, there is a need for redesign the use of materials and the energy, the change of sales model, but what is the most important is the system thinking. Converting a business from linear to circular, business can realise net materials cost savings. Small scale research is important, as this can show the processes in more detail.
- Circular economy education for local decision makers is essential to ensure they understand its meaning and

incorporate the concept into both policy and practice. Visualisation (based on SSH-STEM cooperation) makes easier the decision making on all scales.

### Takeaways for the SSH CENTRE project

- Interdisciplinary understandings of circular economy can be developed through the collaborative projects contributing to the WP2 books. SSH-STEM cooperation can provide new decision-supporting tools.
- For circular economy transition, there is an essential need for understanding local communities, their trust, beliefs and values [25].
- Research has to focus not only on the technological aspects and material scarcity but on the governance, process showing that management, political aspects or local legislation can have significant impact on circular transition. These ideas can be explored in the knowledge brokerage projects undertaken as part of WP3.

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<sup>9</sup> <https://online-learning.tudelft.nl/courses/circular-economy-design-and-technology/>

<sup>10</sup> <https://online-learning.tudelft.nl/courses/spatial-circularity-strategies-for-sustainable-regional-development/>





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