

Tools for Implementing Social Innovation in the Circular Economy: Learnings from the CSS Boost project

Cristina Alejandra Barahona Cabrera
0009-0000-7791-2276
Social CRM Research Center
Grimmaische Straße 12
04109 Leipzig Sachsen
Email: cristina.barahona@scrc-leipzig.de

Olaf Reinhold
0000-0003-1977-1641
Duale Hochschule Sachsen
Rittergutsstraße 6
01591 Riesa Sachsen
Email: Olaf.reinhold@dhsn.de

Abstract—Social innovation is a valuable enabler of feedback and collaboration among citizens and stakeholders in the development and implementation of Circular Economy solutions. This article explores the characteristics of current social innovation toolkits, their integration into digital platforms, and their suitability for application in the circular economy, through a literature review and drawing insights from a case, the CSSBoost project. Most toolkits concentrate on business-model ideation and provide little advice for policy or community practice. Only two target circular economy contexts, and just one combines a knowledge repository with an interactive platform.

Index Terms—social innovation, Circular Economy, innovation toolkits, digital platforms.

I. INTRODUCTION

CIRCULAR economy is often positioned as a strategic response to resource depletion and climate risk. A strong interest exists in the circular economy (CE) aspects of governance, transition, and implementation, consumption, and consumer behavior; however, cultural, political, and local practices are often overlooked [1]. This represents an existing gap between the technical solutions promoted and the accompanying social actions needed to implement the solutions.

Social innovation offers an alternative to reduce this gap. Through key actor engagement and incorporation of user insights, it supports the institutional and behavioral change to transform linear supply chains into circular ecosystems.

Systematic knowledge about social innovation tools suitable for circular economy projects is scarce. This limits organizations in their selection of methods to design, pilot, and scale circular solutions on national and international levels.

Therefore, the research goal of the paper is to explore what the characteristics of current social innovation toolkits are, their integration into digital platforms, and their suitability for application in the circular economy. For answering this question, the paper is structured into six sections. Section II summarizes the theoretical background of circular economy and social innovations, section III introduces the CSSBoost project, and section IV outlines the methodological approach. Section V presents the results, finalizing with

section VI, implications and highlights for future work are offered.

II. THEORETICAL BACKGROUND

A. Circular Economy

In the traditional economic model, goods are manufactured, used, and then disposed of. The circular economy proposes an alternative consumption lifecycle, in which products are shared, leased, reused, refurbished, and recycled, resulting in the minimization of environmental impact[2], [3], [4].

The principles of circular economy advocate for waste reduction and countering of premature obsolescence through the improvement of durability, reusability, upgradability, and reparability of products. Circularity not only supports environmental sustainability but also offers companies an opportunity to develop long-term competitiveness. With the adoption of circular practices, savings in materials can be achieved throughout the improved value chains[5].

B. Social Innovation

First introduced as the impact of innovation on society in 1989 [6], social innovation (SI) has evolved into a cross-disciplinary subject, closely linked to creativity, social transformation, technological advancements, and entrepreneurship [7], [8], [9].

The purpose of social innovation can be described as the creation of social change through innovative solutions to communities' pressing, unfulfilled social needs and challenges [10], [11]. Social innovation is driven by a diverse array of stakeholders, including community-based organizations, government entities, social entrepreneurs, academic institutions, as well as nonprofit practitioners[12] [13] [14] [15], [16]. Together, these actors develop initiatives that promote social and environmental wellbeing; such solutions can manifest as products, services, or models [17], concepts, strategies, and tools[18], business models or market innovations [9].

An influential framework that explains how social innovation emerges and unfolds is Mulgan's [19] spiral of social innovation. Beginning with the identification and description

of unmet needs, it progresses through ideation of solutions, which are tested through prototypes and pilots. Successful innovations are then sustained by social innovators, slowly escalating to increase their impact, in some cases, achieving systemic change in concepts, mindsets, or even economic systems.

III. THE CSS BOOST PROJECT

A. About the Project

The European Union, under the Horizon Europe Programme, supports the development of circular systemic solutions (CSS), demonstration projects that implement circular economy principles at a city and regional scale [20]. Funded by the Horizon Programme, the CSSBoost project contributes to this objective through the implementation of five CSS pilots across Europe.

Each pilot targets a different sector, responding to country-specific priorities. In Crete, Greece, the focus is on agriculture and livestock. In Lisbon, Portugal, the actions address the transportation sector. For the North Black Forest in Germany, activities are related to plastics and recycling. In Marche, Italy, it is centered on water recovery. Over the course of the project, targeted interventions are planned to increase value chains' circularity, accompanied by a feasibility analysis for establishing a circular integrated international value chain. In parallel, the development of a regional platform for virtualization, monitoring, and analysis of the value chains is projected (Regional CE/CSS Platform) [21].

B. Potential of Social Innovation

Redesigning value chains to increase their circularity, exploring new business models, and motivating stakeholders to adopt circular practices are all integral to the development of circular systemic solutions. Achieving this goal requires an understanding of stakeholders' dynamics, needs, and motivations to facilitate the proposal of new forms of collaboration and involvement. Within this context, social innovation serves as a facilitator of the circular economy, engaging stakeholders in the development of sustainable solutions. In the CSSBoost Project, the social innovations manifest as improved value chains and strategies guided by Circular Economy principles.

Identified requirements for the implementation of social innovation in systemic circular solutions include promoting collaborative processes, engaging stakeholders and experts, providing specific methods and tools for social innovation, with corresponding training resources for both implementers and participants. Additionally, alignment with the digital Regional CE/CSS Platform is considered; it could facilitate stakeholder engagement, results, and training materials' dissemination.[21] Ultimately, these requirements resulted in a practical need to identify which social innovation tools are

available and are appropriate for circular economy environments.

IV. METHOD

A scoping literature review was conducted to identify existing social innovation tools relevant to the circular economy context. This approach was selected given the aim to map available tools for social innovation.

The search was carried out in Google Scholar, EU project repositories, and project websites hosting social innovation tools. Search terms combined "social innovation" with "tool", "toolkit", "method", and, where possible, "circular". Retrieved resources were screened for addressing social innovation, description of at least one tool or method, and availability of a complete English text. Those lacking citations, a description of purpose and procedural steps, or evidence of applicability were excluded. This process resulted in eight sources suitable for analysis.

The sources were then further examined. First, the intended social innovation outcome was screened, whether the tools were oriented towards creating new business models, services, or community and social projects. Second, completeness was assessed by looking for applied examples, ready-to-fill templates or forms, and sufficiently detailed explanations. Third, each item was checked for relevance to the CSSBoost project, including links to circular economy contexts, support of collaboration among stakeholders, and whether it was supported by a digital platform.

The relevant tools for CSSBoost were organized based on their intended purpose in social innovation: finding or framing social challenges, creating or strengthening stakeholder networks, jointly imagining and creating solutions, planning pathways for implementation and monitoring, and escalating successful solutions. This grouping, aligned to the spiral of social innovation, produced the first draft of the CSSBoost social innovation toolkit for use in circular economy applications.

V. RESULTS OVERVIEW

From the explorative review, eight sources met the inclusion criteria. They differ in their intended social innovation outcome, level of completeness, and degree of digital support (see Table 1). Most resources explain the process for achieving social innovation and encourage the involvement of internal and external stakeholders, yet only in [22] is possible to find a complete practical example.

Brest, Roumani, and Bade [22] offer a guide for decision makers on integrating analytic problem solving, strategic planning, and human-centered design to create social change through projects and services. Progressing similarly to the spiral of social innovation, it references social innovation tools accompanied by a descriptive example but provides no templates or digital platform support.

SEED2SCALE [23] project provides resources for policy-makers and social actors to run collaborative and inclusive social innovation processes across four stages: investigation, ideation, implementation, and evaluation. Materials are distributed through an online knowledge repository.

Komatsu, Deserti, and Rizzo [24] organize the social innovation process around a modified business model canvas: understanding social problems, identifying beneficiaries and supporters, specifying revenue and cost structures, defining channels and relationships, and identifying social impact measures. Worksheets and detailed explanations are provided, but there are no applied examples and no digital platform support.

Lackas et al. [25] present a guide for entrepreneurs and intrapreneurs where the innovation flow begins with a needs assessment, continues with stakeholder analysis, moves into business idea development and prototyping, and concludes with impact analysis, resembling the spiral of social innovation. Tools from design thinking are introduced; however, applied examples or digital platform support are not available.

The Social Impact Academy Toolbox [26] is a training resource to develop social business models. It does not provide applied examples, templates, or support from a digital platform.

The NetZeroCities Social Innovation Toolkit [27] offers tools for participatory workshops to help cities transition towards climate neutrality through business models, social projects, and services. Its sequence parallels the social innovation

spiral, moving through context analysis, problem reframing, envisioning alternatives, prototyping and experimentation, and the evaluation and scaling of promising approaches. A knowledge repository is publicly available, offering basic support from digital platforms.

In Development Impact & You [28], an innovation flow aligned with the spiral of social innovation to support business models, services, social projects, and strategy development is presented. It recommends participatory workshops with clear instructions and printable templates; some tools include illustrative examples. All materials are downloadable from the DIY Toolkit online knowledge repository.

Created for circular economy contexts, the Circular Toolbox [29] focuses on developing socially innovative business models. It offers guided templates and partial examples for mapping opportunities, understanding the customer and the market, prototyping, and improving business model examples. Users can access a knowledge repository and an interactive set of Miro boards that make remote collaboration possible.

Across the reviewed sources, the strongest suggested common topic is the development of social business models through collaborative workshops that broadly reflect the social innovation spiral. However, explicit guidance for circular economy applications and full practical examples remain scarce. Digital platform support emerged as an improvement opportunity, with only one source providing knowledge repositories and interactive templates.

TABLE I.
RESULTS SUMMARY OF THE LITERATURE REVIEW

Source	Intended social innovation outcome	Completeness			Relevance		
		Applied examples	Availability of templates	Detailed explanation of tool usage	Developed for CE context	Promotes collaborative approaches	Supported by digital platforms
Problem Solving, Human-Centered Design [22]	Social projects, services	Yes	No	Yes	No	Yes	No
Seed2Scale [23]	Business models	No	Yes	Yes	No	Yes	Knowledge repository
SI Business Toolbox [24]	Business models	No	Yes	Yes	No	Yes	No
SI Method Toolbox[25]	Business models	No	No	Partial	No	Yes	No
SI Academy Toolbox [26]	Social business model	No	No	No	No	Yes	No
Net Zero Cities SI Toolkit[27]	Business models, social projects, services	No	Yes	Yes	Partial	Yes	Knowledge repository
Development, Impact, and You [28]	Business models, social projects, services, strategies	Partial	Yes	Yes	No	Yes	Knowledge repository
The Circular Toolbox [29]	Business models	Partial	Yes	Yes	Yes	Yes	Interactive Miro Boards

VI. DISCUSSION

A. Theoretical Implications

Overall, social innovation follows an iterative multilateral process, where stakeholders develop solutions to unmet social

needs. These challenges are present in diverse areas, including healthcare, education, economic inequality, social inclusion, and environmental sustainability.

The results of the review suggest that social innovation toolkits are heavily focused on business model development, resulting in a shortage of guiding alternatives for other types of innovation, such as policy concepts, public services, and community practices. Most sources are organized around the process described by Mulgans' spiral of social innovation, along the stages of need discovery, idea generation, prototyping, implementation, scaling, and eventual system change. Common tools described include empathy mapping, persona creation, brainstorming sessions, centering around ideation, and user profiling. Comparatively few instruments offer support for scaling and achieving systemic transformation.

When it comes to social innovation toolkits in circular economic contexts supported by digital platforms, a gap is suggested, with only two sources developed specifically for CE, and among them, only one offers both a knowledge repository and an interactive online workspace.

These findings highlight the opportunity for researchers and organizations to provide targeted platform supported social innovation toolkits for the circular economy.

B. Practical implications

Redesigning value chains and material flows to increase their circularity depends as much on social dynamics as on technical solutions. Social innovation provides mechanisms to align stakeholders, influencing user conduct towards circular behaviors. Involving communities can surface barriers to the adoption of CE principles or products and help organizations move from linear supply chains to ecosystem thinking. Social innovation practices and tools can support the institutional change required for the scaling of CSS through stakeholder networks and targeted education. Strengthening the link between the two fields would offer the opportunity to mobilize stakeholders to address environmental challenges.

CSSBoost implementors face two challenges, first, improving selected value chains to increase their circularity for agriculture, mobility, plastics, and water recovery. Second, the assembly, testing, and dissemination of social innovation tools relevant to CE contexts that support the Regional CE CSS Platform across the four pilots. Once the project comes to an end, learnings about how regional contexts influence social innovation tools adoption, user satisfaction, and contribution to circular economy outcomes constitute a valuable input for the creation of a CSS social innovation guide.

Future studies can broaden the search to include non-English literature and additional grey sources, which will enrich the evidence base. Data from the ongoing CSSBoost pilots can be analyzed once field activities mature, providing empirical insight into how social innovation tools perform in diverse circular economy settings and how digital collaboration features shape stakeholder engagement and learning.

VII. SUMMARY

This paper explored the current publicly available toolkits for social innovation, their suitability for a Circular Economy context, as well as their integration with digital platforms. The

results suggest that most sources concentrate on business model ideation and provide limited guidance for policy, public service, or community innovations; only two address circular contexts, and just one offers interactive digital support.

VIII. ACKNOWLEDGEMENTS

The authors gratefully acknowledge that this research was financially possible thanks to the funding for the Boosting Circular Systemic Solutions through Virtual Regional Circular Economy Spaces (Project number 101135275) from the European Research Executive Agency. The authors also wish to thank the anonymous reviewers for their constructive suggestions.

REFERENCES

- [1] S. Zavos, T. Lehtokunnas, and O. Pyyhtinen, "The (missing) social aspect of the circular economy: a review of social scientific articles," *Sustain. Earth Rev.*, vol. 7, no. 1, p. 11, Apr. 2024, doi: 10.1186/s42055-024-00083-w.
- [2] European Commission, "Circular economy: definition, importance and benefits," Internal Market, Industry, Entrepreneurship and SMEs. Accessed: Jul. 17, 2024. [Online]. Available: https://single-market-economy.ec.europa.eu/industry/strategy/innovation/social_en
- [3] M. Geissdoerfer, P. Savaget, N. Bocken, and E. J. Hultink, "The Circular Economy – A New Sustainability Paradigm?," *J. Clean. Prod.*, 2017, doi: 10.1016/j.jclepro.2016.12.048.
- [4] U. Jakubelskas and V. Skvarciany, "Circular Economy Practices as a Tool for Sustainable Development in the Context of Renewable Energy: What Are the Opportunities for the EU?," *Oeconomia Copernic.*, 2023, doi: 10.24136/oc.2023.025.
- [5] European Commission, "Circular Economy Action Plan." European Union, 2020. [Online]. Available: <https://www.eu2020.de/resource/blob/2429166/156d2d98b66b2ff28b6990161eed91e9/12-17-kreislaufwirtschaftsaktionsplan-bericht-de-data.pdf>
- [6] N. Ayob, S. Teasdale, and K. Fagan, "How Social Innovation 'Came to Be': Tracing the Evolution of a Contested Concept," *J. Soc. Policy*, vol. 45, no. 4, pp. 635–653, Oct. 2016, doi: 10.1017/S004727941600009X.
- [7] S. Guha, S. Majumdar, and N. Marakkath, Eds., *Technology and Innovation for Social Change*, 1st ed. 2015. New Delhi: Springer India : Imprint: Springer, 2015. doi: 10.1007/978-81-322-2071-8.
- [8] R. P. van der Have and L. Rubalcaba, "Social innovation research: An emerging area of innovation studies?," *Res. Policy*, vol. 45, no. 9, pp. 1923–1935, Nov. 2016, doi: 10.1016/j.respol.2016.06.010.
- [9] A. Havas, "Social and business innovations: Linked in practice – but two worlds apart in theorising?," in *Atlas of Social Innovation*, C. Kaletka, A. Schröder, and M. Zingiebl, Eds., oekom verlag, 2019. doi: 10.14512/9783962386887.
- [10] N. Choi and S. Majumdar, "Social Innovation: Towards a Conceptualisation," in *Technology and Innovation for Social Change*, S. Majumdar, S. Guha, and N. Marakkath, Eds., New Delhi: Springer India, 2015, pp. 7–34. doi: 10.1007/978-81-322-2071-8_2.
- [11] G. Mulgan, S. Tucker, R. Ali, and B. Sanders, *Social Innovation: What It Is, Why It Matters and How It Can Be Accelerated*. 2007. [Online]. Available: https://www.researchgate.net/publication/277873357_Social_Innovation_What_It_Is_Why_It_Matters_and_How_It_Can_Be_Accelerated
- [12] D. Chalmers, "Social innovation: An exploration of the barriers faced by innovating organizations in the social economy," *Local Econ. J. Local Econ. Policy Unit*, vol. 28, no. 1, pp. 17–34, Feb. 2013, doi: 10.1177/0269094212463677.
- [13] R. Grimm, C. Fox, S. Baines, and K. Albertson, "Social innovation, an answer to contemporary societal challenges? Locating the

- concept in theory and practice,” *Innov. Eur. J. Soc. Sci. Res.*, vol. 26, no. 4, pp. 436–455, Dec. 2013, doi: 10.1080/13511610.2013.848163.
- [14] H. Jiao, “A conceptual model for social entrepreneurship directed toward social impact on society,” *Soc. Enterp. J.*, vol. 7, no. 2, pp. 130–149, Aug. 2011, doi: 10.1108/17508611111156600.
- [15] P. G. Svensson, T. Q. Mahoney, and M. E. Hambrick, “What Does Innovation Mean to Nonprofit Practitioners? International Insights From Development and Peace-Building Nonprofits,” *Nonprofit Volunt. Sect. Q.*, vol. 49, no. 2, pp. 380–398, Apr. 2020, doi: 10.1177/0899764019872009.
- [16] L. Dryjańska, J. Košťálová, and D. Vidović, “Higher Education Practices for Social Innovation and Sustainable Development,” *Innov. Technol. Knowl. Manag.*, 2022, doi: 10.1007/978-3-030-84044-0_6.
- [17] Louise Pulford and Filippo Addarii, “This is European social innovation,” *Enterprise & Industry online magazine*, 2010, doi: 10.2769/825.
- [18] P. Dawson and L. Daniel, “Understanding social innovation: a provisional framework,” *Int. J. Technol. Manag.*, vol. 51, no. 1, p. 9, 2010, doi: 10.1504/IJTM.2010.033125.
- [19] R. Murray, J. Caulier-Grice, and G. Mulgan, *The Open Book of Social Innovation*. in Social innovator series: ways to design, develop and grow social innovation. 2010. [Online]. Available: http://temp.uefisc-di.ro/edigiregion_v2/the_open_book_of_social_innovationNESTA.pdf
- [20] European Commission, “Circular Cities and Regions Initiative (CCRI)’s circular systemic solutions.” Accessed: May 22, 2025. [Online]. Available: <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl6-2023-circbio-02-1-two-stage;callCode=null;freeTextSearchKeyword=CircBio;matchWholeText=true;typeCodes=0,1,2,8;statusCodes=31094501,31094502;programmePeriod=null;programCcm2Id=null;programDivisionCode=null;focusAreaCode=null;destinationGroup=null;missionGroup=null;geographicalZonesCode=null;programmeDivisionProspect=null;startDateLte=null;startDateGte=null;crossCuttingPriorityCode=null;cpvCode=null;performanceOfDelivery=null;sortQuery=sortStatus;orderBy=asc;onlyTenders=false;topicListKey=topicSearchTablePageState>
- [21] CSSBoost Project, “Boosting Circular Systemic Solutions through Virtual Regional Circular Economy Spaces.” Accessed: May 23, 2025. [Online]. Available: <https://cssboost-project.eu/>
- [22] P. Brest, N. Roumani, and J. Bade, “Problem Solving, Human-Centered Design, and Strategic Processes.” [Online]. Available: <https://pacscenter.stanford.edu/wp-content/uploads/2015/09/Download-the-full-article-here.pdf>
- [23] “SI Toolbox,” Seed2Scale. [Online]. Available: <https://www.seede-uproject.eu/learning-repository/toolbox/>
- [24] T. Komatsu, A. Deserti, and F. Rizzo, “Social Innovation Business Toolbox,” 2016. [Online]. Available: https://www.simpact-project.eu/tools/toolbox_business_web.pdf
- [25] M. Lackas, T. Zebahl, J. Thielen, M. Nägelsbach, P. Meyer, and A. Schröer, “Social Innovation Method Toolbox (for entrepreneurs and intrapreneurs in the field social service provision),” Center for Social Investment, Heidelberg University, Heidelberg. [Online]. Available: https://dtp.interreg-danube.eu/uploads/media/approved_project_public/0001/49/bc8b15f28fa323e973acb7dc279cd3404b750ded.pdf
- [26] Interreg, “Social Innovation Academy: How to innovate together for a better tomorrow.” 2020. [Online]. Available: https://socialimpact.eu/fileadmin/user_upload/social_impact/themen/international/Dateien/S_i_M_D.C.5.1_toolbox_ENG.pdf
- [27] T. Komatsu Cipriani, “Social Innovation Toolkit.” 2023. [Online]. Available: <https://netzerocities.app/resource-3121>
- [28] Theo Keane *et al.*, *DIY - development impact & you: practical tools to trigger & support social innovation*. London, 2014. [Online]. Available: <https://media.nesta.org.uk/documents/diy-toolkit-full-download-a4-size.pdf>
- [29] Circle Economy, “The Circular Toolbox,” The Circular Toolbox. [Online]. Available: <https://www.thecirculartoolbox.com/>