Received: 30.04.25 | Revised: 05.05.25 | Accepted: 06.05.25

What can we learn about the Circular Economy from Cities?

Mugur Schuppler and Julian Kirchherr

Summary: This article explores the role of cities in advancing the circular economy (CE), drawing on insights from experts in five mid-sized European cities. While cities contribute significantly to global pollution, they also have the resources and influence to drive impactful CE initiatives. Key lessons include the importance of strong political and societal support, piloting circular practices internally, and integrating circular principles into urban planning. Collaboration with local businesses and research institutes, as well as adapting successful strategies from other cities, can further facilitate effective implementation. These insights offer actionable guidance for cities, policymakers, and other stakeholders seeking to refine and strengthen their CE efforts.

Keywords: circular economy, circular city, urban circularity, circular transition, sustainable development, circular learnings

Was können wir von Städten über die Kreislaufwirtschaft lernen?

Zusammenfassung: Dieser Artikel untersucht die Rolle von Städten bei der Förderung der Kreislaufwirtschaft (CE) und stützt sich dabei auf Erkenntnisse von Expertinnen und Experten aus fünf mittelgroßen europäischen Städten. Während Städte erheblich zur globalen Umweltverschmutzung beitragen, verfügen sie gleichzeitig über die Ressourcen und den Einfluss, um wirkungsvolle CE-Initiativen voranzutreiben. Zu den wichtigsten Erkenntnissen zählen die Bedeutung starker politischer und gesellschaftlicher Unterstützung, das interne Pilotieren zirkulärer Praktiken sowie die Integration kreislaufwirtschaftlicher Prinzipien in die Stadtplanung. Die Zusammenarbeit mit lokalen Unternehmen und Forschungseinrichtungen sowie die Anpassung erfolgreicher Strategien aus anderen Städten kann die Umsetzung zusätzlich erleichtern. Diese Erkenntnisse bieten praxisnahe Learnings für Städte, politische Entscheidungsträger und weitere Akteure, die ihre CE-Maßnahmen weiterentwickeln und stärken möchten.

Stichwörter: Kreislaufwirtschaft, Kreislaufstadt, urbane Zirkularität, zirkuläre Transformation, nachhaltige Entwicklung, zirkuläre Erkenntnisse

Cities and the circular economy

With more people moving to cities every year, urban areas have become significant contributors to global pollution. Cities are responsible for roughly 70 % of global greenhouse gas emissions, account for nearly two-thirds of global energy consumption, and generate

approximately half of the world's solid waste – projections indicate that by 2050, the global volume of municipal solid waste could double (OECD, 2025). At the same time, cities bring together a unique blend of resources, capital, talent, and data within compact geographic boundaries (Ellen MacArthur Foundation, 2019). This makes them powerful drivers of the transition to a circular economy (CE) (Kisser & Wirth, 2021; Lakatos et al., 2021). While the concept of the CE has gained increasing attention in recent years, its practical application at the macro or city level remains underexplored in academic literature.

In practice, however, an increasing number of cities are embarking on CE measures, supported by the development of dedicated circular strategies. For instance, the European Circular Cities Declaration (2020) has been signed by 86 cities across 22 countries; 142 cities and regions are participating in the Circular Cities and Regions Initiative (European Commission, 2022); 97 cities representing 22 % of the global economy participate in the C40 network with the aim to reduce carbon emissions (www.c40.org). Additionally, academic research has started to explore CE practices in a growing, yet still limited, number of cities (e.g., Petit-Boix & Leipold, 2018; Wang et al., 2018).

According to (Paiho et al., 2020), a circular city (CC) should give priority to measures like conserving resources, enhancing efficiency, promoting shared use, shifting to service-based models, and embracing digital alternatives. These foundational strategies should be pursued first. Only after their potential has been maximized should cities turn to techniques for closing, slowing, or narrowing material and energy flows. Any remaining demand should ideally be met through renewable resources sourced locally (Paiho et al., 2020). The typical CC has been found to focus on environmental, systemic, and cross-sectoral objectives, with implementation spanning sectors such as the built environment, energy, mobility, waste, water, industrial production, agri-food, and citizens and communities (Gravagnuolo et al., 2019). In addition to environmental gains, economic and social benefits may also emerge from the implementation of circularity in cities – for example, the CE could generate up to 2.5 million new jobs in the EU in sectors such as recycling, repair, and reuse (OECD, 2025).

We think that the CC of the future can and should encompass not only efficient material and energy flows but also the regeneration of natural systems and enhanced climate resilience. This can include the integration of green-blue spaces, such as parks, wetlands, and urban forests, which provide critical ecosystem services and improve urban biodiversity. Tree canopies, for instance, can reduce urban heat island effects, improve air quality, and enhance the overall well-being of residents (Ellen MacArthur Foundation, 2024). Additionally, CCs can prioritize the restoration of natural water cycles through sustainable urban drainage systems and the creation of permeable surfaces that reduce flooding risks. By incorporating these elements, cities can build resilience against climate change impacts, such as extreme weather events and rising temperatures (Ellen MacArthur Foundation, 2024).

It is important to note that the Global South is currently massively underrepresented in CC academic literature. We acknowledge this gap and recognize that, systemically, significant progress in resource-efficient development must occur in the next 50 years to achieve sustainable advancements in these regions. Furthermore, we do not believe that learnings from the Global North (e.g., Europe, North America) are necessarily directly replicable to Global South realities. Economic growth is vital for the Global South,

making it essential to identify circular strategies that support rather than undermine this growth. For example, tailored circular business models that align with the economic and social contexts of the Global South could be developed to make the concept of a CE more attractive and feasible in these regions.

To better understand the factors currently driving circularity in European urban contexts – a region where we have seen a relatively large number of CCs emerging in recent years – we conducted interviews with experts from selected European cities actively implementing circular strategies, all of which have been developed within the past five years. The five main identified learnings are presented in the following paragraphs.

Learnings from circular cities

Generate political and societal support: We found that having strong political and societal support is essential for making CE strategies work. For instance, in Leuven (City of Leuven, 2020), a city of ~100,000 in Belgium, the inclusion of the Green political party in the city coalition in 2019 provided a political basis to push for more ambitious CE measures. Additionally, grassroots movements and local NGOs played a significant role in advocating for circular practices – Leuven saw a grassroots push from local NGOs working on repairability and sustainability projects, which were already connected with the city's universities. Engaging with the community and building broad-based support for these projects was essential to ensure their progress. This involved organizing public workshops, bringing educational campaigns to life, and involving citizens in decision-making processes. A city that advocates for policies promoting circularity, facilitates public consultations, and fosters a culture of sustainability within organizations and communities can thus help drive the implementation of CE practices.

Pilot circular practices internally: Another key learning that emerged is the value of piloting circular solutions internally. In Gothenburg (City of Gothenburg, 2021), a city of ~600,000 in western Sweden, municipal departments were engaged in a process to test circular practices within their own operations, starting with furniture as a pilot product category. Six departments explored their own routines, organizational structures, knowledge levels, and potential roles needed to implement circular practices. This approach allowed each department to consider how circular practices could be integrated into their workflows, set local targets linked to broader city-wide objectives, and identify where support was needed. Piloting circular solutions internally helped uncover practical challenges and opportunities, enabling the city to refine processes before scaling up to additional product categories. This approach can further help build momentum for broader circular organizational change, set a positive example by positioning the city as a circular role model, and thereby encourage citizens to adopt circular practices themselves.

Leverage urban planning: We further found that integrating circular principles into urban planning could have strong potential to facilitate the implementation of CE in cities. In Espoo (City of Espoo, 2021), a city of ~300,000 residents in southern Finland, the municipality has embedded CE thinking into planning practices, designating dedicated CE development areas, notably Kera and Kiviruukki. There, the city is piloting initiatives such as biogas production, food production aligned with CE principles, increased use of recycled growing materials, and the reduction of food waste in municipal operations. By creating dedicated areas for CE development within urban planning, cities can therefore

accelerate the adoption of circular practices, demonstrate to stakeholders what is achievable, and provide testbeds for experimenting with innovative circular solutions.

Collaborate with businesses and research: Collaboration with local businesses and research institutes emerged as another key learning. In Prague (Prague Innovation Institute, 2021), the capital of the Czech Republic with a population of ~1.4 million, the city has established various diverse working groups, involving representatives from public authorities, private sector developers, architecture and design studios, farmers, social innovators, and businesses in agriculture and food. For instance, in the water sector, Prague has closely cooperated with private companies and universities on projects related to recycling water. In the waste segment, the city has collaborated with public NGOs and initiatives focused on reuse activities. Such partnerships can drive innovation and ensure that circular measures have a measurable impact. Fostering strong collaborations with academic institutions and local enterprises can lead to the development of innovative solutions and technologies that support CE goals. Such collaborations can also help bridge the gap between research and practical implementation, ensuring that theoretical advancements translate into real-world benefits.

Learn from other cities: Lastly, studying and adapting successful CE strategies from other cities can provide valuable insights and practical examples that can be tailored to local contexts. In Murcia (Municipality of Murcia, 2021), a city of ~460,000 in south-eastern Spain, the local government reviewed 60-70 strategies from around the world, including Amsterdam and Paris, and adapted the main learnings to fit their local context – this resulted for instance in the introduction of stakeholder "agoras", and the determination of their six strategic circular priority areas. This approach can therefore help cities avoid having to reinvent the wheel and speed up the implementation of effective circular practices. Being open to learning from others, participating in knowledge exchange networks, and adapting best practices to local challenges and opportunities can therefore help facilitate CE implementation in cities.

Conclusion

In conclusion, cities are crucial in driving the transition to a circular economy due to their unique concentration of resources and influence. Our discussions with experts from five mid-sized European cities highlight several key factors for success: strong political and societal support, piloting of circular practices, integration of circular principles in urban planning, collaboration with local businesses and research institutes, and learning from successful strategies in other cities. These insights offer practical lessons for cities, policymakers, and stakeholders looking to enhance their circular economy efforts. By adopting these best practices, cities can accelerate the implementation of CE measures, stimulate innovation within its own operations, embed circularity into urban planning, more effectively translate theoretical insights into practical applications, and tap into the wealth of existing CE knowledge.

References

Circular Cities Declaration. (2020). *Current Signatories*. https://circularcitiesdeclaration.eu/current-signatories

City of Espoo. (2021). *Carbon-neutral circular economy*. https://www.espoo.fi/en/sustainable-development/carbon-neutral-circular-economy#1-circular-economy-solutions-during-the-construction-life-cycle--48441

City of Gothenburg. (2021). *Environment and Climate Programme for the City of Gothenburg 2021–2030*. https://goteborg.se/wps/portal/enhetssida/miljo-och-klimat-goteborg/miljo-och-klimatprogrammet

City of Leuven. (2020). *Circular Leuven*. https://roadmap-en.leuven2030.be/pdf/Circular_Leuven.pdf

Ellen MacArthur Foundation. (2019). *Cities and the circular economy*. https://www.ellenmacarthurfoundation.org/cities-and-the-circular-economy-deep-dive

Ellen MacArthur Foundation. (2024). *Building Prosperity: Unlocking the potential of a nature-positive, circular economy for Europe*. https://content.ellenmacarthurfoundation.org/m/62e7613596a2d12f/original/Building-Prosperity-July-2024.pdf

European Commission. (2022). *Circular cities and regions initiative: Introduction to the initiative*. https://research-and-innovation.ec.europa.eu/document/download/0ba0e655-3932-413b-a54d-1d13d7936630_en?filename=ec_rtd_circular-cities-regions-initiative-report-initiative-summary.pdf

Gravagnuolo, A., Angrisano, M., & Fusco Girard, L. (2019). Circular Economy Strategies in Eight Historic Port Cities: Criteria and Indicators Towards a Circular City Assessment Framework. *Sustainability*, *11*(13), 3512. https://doi.org/10.3390/su11133512

Kisser, J., & Wirth, M. (2021). The Fabrics of a Circular City. In L. Liu & S. Ramakrishna (Eds.), *An Introduction to Circular Economy* (pp. 55–75). Springer Singapore. https://doi.org/10.1007/978-981-15-8510-4_4

Lakatos, E. S., Yong, G., Szilagyi, A., Clinci, D. S., Georgescu, L., Iticescu, C., & Cioca, L.-I. (2021). Conceptualizing Core Aspects on Circular Economy in Cities. *Sustainability*, *13*(14), 7549. https://doi.org/10.3390/su13147549

Municipality of Murcia. (2021). *Murcia's Circular Economy Strategy*. https://www.estrategiamurcia.es/upload/2021/11/Murcia-s-Circular-Economy-Strategy.pdf

OECD. (2025). *The Circular Economy in Cities and Regions of the European Union*. OECD Publishing. https://doi.org/10.1787/e09c21e2-en

Paiho, S., Mäki, E., Wessberg, N., Paavola, M., Tuominen, P., Antikainen, M., Heikkilä, J., Rozado, C. A., & Jung, N. (2020). Towards circular cities—Conceptualizing core aspects. *Sustainable Cities and Society*, *59*, 102143. https://doi.org/10.1016/j.scs.2020.102143

Petit-Boix, A., & Leipold, S. (2018). Circular economy in cities: Reviewing how environmental research aligns with local practices. *Journal of Cleaner Production*, *195*, 1270–1281. https://doi.org/10.1016/j.jclepro.2018.05.281

Prague Innovation Institute. (2021). *Circular Prague 2030*. https://klima.praha.eu/data/Dokumenty/circular-prague-2030-eng.pdf

Wang, N., Lee, J. C. K., Zhang, J., Chen, H., & Li, H. (2018). Evaluation of Urban circular economy development: An empirical research of 40 cities in China. *Journal of Cleaner Production*, *180*, 876–887. https://doi.org/10.1016/j.jclepro.2018.01.089

Mugur Schuppler is a PhD candidate in Urban Circularity at Utrecht University, The Netherlands, and Senior Consultant at McKinsey & Company in Vienna, Austria. His current research examines the conceptualization, implementation, and quantification of circularity in the urban environment.

Address: Copernicus Institute of Sustainable Development, Utrecht University, Princetonlaan 8a, 3584 CB Utrecht, The Netherlands.
E-mail: m.i.schuppler@uu.nl

Dr. Julian Kirchherr is an Associate Professor for Circular Economy at Roskilde University, Denmark, and Partner at McKinsey & Company in Berlin, Germany. His research focuses on sustainability transitions and the role the private sector can play in these, investigating the circular economy concept as a vehicle for such transitions. Julian holds a doctorate from the School of Geography and the Environment, University of Oxford, United Kingdom.

Address: Roskilde University, Universitetsvej 1, Roskilde, Denmark.
E-mail: juliank@ruc.dk