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Circular economy in cities: Reviewing how environmental research aligns with local practices

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Circular economy (CE) is gaining popularity at different levels with the promise of creating more sustainable processes. In this context, cities are implementing a number of initiatives that aim to turn them into sustainable circular systems. Whether these initiatives achieve their sustainability goals, however, is largely unknown. Nevertheless, as the application of CE strategies is actively encouraged by many policies across the globe, there is a need to quantify the environmental impacts and to identify the strategies that support urban sustainability. This paper analyses the extent to which research focuses on quantifying the environmental balance of CE initiatives promoted at the municipal level. To this end, the analysis scanned CE initiatives reported in cities around the globe and classified them into urban targets and CE strategies. In parallel, the paper conducted a review of the literature that uses industrial ecology tools to account for the environmental impacts of CE strategies. Results show a diverse geographical representation, as reported cities concentrated in Europe, whereas for environmental research, the main results came from China. In general, cities encourage strategies relating to urban infrastructure (47%), with and additional focus on social consumption aspects, such as repair and reuse actions. In comparison, research mainly addressed industrial and business practices (58%), but the approach to infrastructure was similar to that of cities, both with a special interest in waste management. Research has yet to assess social consumption and urban planning strategies, the latter essential for defining the impacts of other urban elements. Hence, there is a need to define the environmental impacts of the strategies that cities select in their quest for circularity. Research and practice can also benefit from working collaboratively so as to prioritize the CE strategies that best fit into the features of each urban area.