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► To cite this version:

Sébastien Bourdin, Nicolas Jacquet. Closing the loop at the local scale: Investigating the drivers of and barriers to the implementation of the circular economy in cities and regions. *Ecological Economics*, 2025, 231, pp.108542. <10.1016/j.ecolecon.2025.108542>. <hal-04991196>

HAL Id: hal-04991196

<https://hal.science/hal-04991196v1>

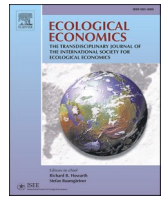
Submitted on 14 Mar 2025

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Closing the loop at the local scale: Investigating the drivers of and barriers to the implementation of the circular economy in cities and regions

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ARTICLE INFO

Keywords:

Circular economy
Local authorities
Interviews
Barriers
Drivers
Stakeholders
Content Analysis

ABSTRACT

Transitioning to a circular economy (CE) at the local level is important for addressing the strain on natural resources caused by population growth and climate change. This study aims to investigate the factors that influence or impede the adoption of CE practices in French cities and regions. To achieve this goal, 47 interviews were conducted with practitioners from local authorities to identify the key elements that facilitate or hinder the implementation of CE. The findings highlight the crucial role of local authorities in enabling the transition to a CE, with critical support from political endorsement, strategic foresight, and effective leadership. However, obstacles such as organizational inertia, financial constraints, and a limited understanding of a CE present challenges to a CE's broader adoption. The study also emphasizes the critical role of partnerships and collaborative networks in overcoming these barriers and promoting the advancement of CE initiatives.

1. Introduction

The urgency of addressing climate change is becoming increasingly pressing on a global scale. According to United Nations estimates, the world population is expected to reach nearly 10 billion people by 2050, which will significantly increase the pressure on natural resources in terms of both consumption and use. In response to this situation, developing strategies and policies for the sustainable and efficient management of resources is essential (United Nations, 2020). Within this context, numerous supranational and national institutions are formulating strategies and action plans to achieve carbon neutrality by 2050. For instance, through its European Green Deal, the EU aims to transform the EU economy into a modern, competitive, low-carbon, and resource-efficient entity (European Commission, 2019).

A circular economy (CE) is regarded as one of the strategic levers for the transition toward sustainable development. This alternative economic paradigm to the linear economy advocates for the reduction of primary material usage and its associated environmental impacts through various strategies that transform the conventional product life cycle. Such strategies include the reduction, reuse, and recycling of materials within production and consumption processes (Ellen MacArthur Foundation, 2013; Kirchherr et al., 2017). A CE is conceptualized as a strategic response to escalating environmental challenges, providing an alternative framework in which economic growth can be

decoupled from excessive resource consumption and waste generation (Schröder et al., 2019). It promotes a model in which material loops are closed, and products and materials are retained in circulation for extended periods, thereby mitigating their environmental impact and contributing to a resilient and sustainable economy (Millar et al., 2019). However, a CE should not be perceived solely as an environmental and economic framework; it constitutes a socioeconomic paradigm that stresses the critical role of social and institutional transformations in facilitating a successful transition. According to Moreau et al. (2017), a CE necessitates a redefinition of governance systems, labor structures, and societal norms to effectively address current material and energy throughputs. These changes are central to fostering societal acceptance and ensuring the long-term viability of circular practices.

In the shift toward sustainable economic systems, a CE relies on guiding principles aimed at transforming production and consumption methods. Initially, a CE revolved around the three fundamental pillars known as the 3Rs: reduce, reuse, and recycle (Hachaichi and Bourdin, 2023). Thus, the implementation of a CE aims to maximize efficient resource use while minimizing waste production. Researchers, such as Kirchherr et al. (2017, 2023) and Blomsma and Brennan (2017), have deepened the understanding of a CE; their work highlights that a CE extends beyond waste management and involves a comprehensive transformation of industrial processes, business models, and consumption habits. However, this complete transformation entails numerous

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challenges for stakeholders, including cultural, market, technological, legislative, financial, and political barriers (Kirchherr et al., 2018a, 2018b). Increasingly, studies have focused on identifying enablers and obstacles, whether in studies centered on businesses (Tura et al., 2019; Neves and Marques, 2022) or specific industries (Upadhyay et al., 2021; Munaro and Tavares, 2023).

Local authorities play a pivotal role in the implementation of a CE, primarily through resource allocation and substantial financial support (Ellen MacArthur Foundation, 2017; Prendeville et al., 2018a, 2018b; Wang et al., 2018). This critical involvement by the public sector is closely tied to the generation of co-benefits for businesses and local governments while concurrently addressing significant global challenges, such as climate change (While and Whitehead, 2013; Bourdin et al., 2022). However, as noted by Chembessi et al. (2024), the implementation of a CE at the local level entails a considerable degree of complexity because of the interplay of governance, economic, and social factors. Research conducted by Russell et al. (2020a, 2020b) examined the barriers to CE adoption in cities such as Amsterdam and Rotterdam; however, their analysis was limited to a small number of cases, offering only a partial perspective on the broad challenges involved. Similarly, Campbell-Johnston et al. (2019), in their examination of CE practices in Amsterdam, Utrecht, and the Hague, primarily focused on municipal instruments—including public procurement, zoning laws, and capacity-building measures—while placing significant emphasis on the construction sector. These studies, along with others focusing on specific aspects, such as local governance (Montenegro Navarro and Jonker, 2018; Turcu and Gillie, 2020a, 2020b) or strategic planning (Bolger and Doyon, 2019), are often constrained to single or limited case studies, thus providing fragmented insights into the systemic nature of CE implementation. The narrow scope and sector-specific focus of these investigations underscore a critical research gap in comprehending CE practices at an urban scale.

Furthermore, when comprehensive analyses have been undertaken, they have frequently relied on literature reviews without incorporating empirical data. For instance, Paiho et al. (2020) proposed a conceptual framework for circular cities, identifying the key enablers, challenges, and characteristics of circularity; however, their work lacked empirical case studies or in-depth analyses of real-world applications. Similarly, Williams (2019) provided an extensive overview of the challenges associated with implementing CE actions in cities, drawing insights from expert interviews but without exploring the application of these findings in diverse urban contexts. Arsova et al. (2022) also examined the drivers of and barriers to CE adoption at the regional level, but they did not account for the specific dynamics and synergies essential for urban implementation. Vanhuysse et al. (2021) offered a valuable research mapping of circular cities, identifying geographic and thematic clusters; however, their emphasis on low-level strategies, such as recycling and recovery, did not adequately address the systemic, cross-sectoral challenges of a CE at the city level. These limitations highlight the necessity for empirical, multicity studies that investigate the interplay of governance, stakeholder collaboration, and systemic barriers within diverse urban contexts.

In light of this context, our contribution addresses these gaps through an empirical, multicity analysis of local CE implementation practices. This research investigates a range of urban and regional contexts, with a focus on cross-sectoral interactions, to provide actionable insights into the application of CE principles. Additionally, it explores the interplay between local governance, stakeholder collaboration, and systemic barriers to provide a comprehensive analysis of the factors that enable or hinder urban circularity. The research questions addressed by the current study are as follows. What are the main obstacles that cities and regions encounter when deploying a CE? What drivers contribute to the successful implementation of a CE? To explore these questions, we select France as a case study because of its notable commitment to this area through specific legislative initiatives and substantial support for businesses and communities in promoting CE, particularly through the

National Agency for Ecological Transition (ADEME). We conduct a qualitative study based on 47 interviews with individuals responsible for CE missions. We choose to study both cities and regions because their levels and forms of interventions differ according to their respective prerogatives (Torre and Bourdin, 2023).

From a theoretical perspective, this research advances the understanding of the role of local authorities in the deployment of CE strategies. It identifies the key factors that facilitate or hinder the implementation of a CE at the local level (Ellen MacArthur Foundation, 2017; Kirchherr et al., 2018a, 2018b; Prendeville et al., 2018a, 2018b). Our multidimensional approach incorporates legislative, economic, social, cultural, and governance-related dimensions to provide a comprehensive explanation of the limited adoption of a CE at the local level (Bolger and Doyon, 2019; Turcu and Gillie, 2020a, 2020b). These findings are particularly relevant considering data from the Circular City Centre (C3), which reveals that, among 800 European cities with populations exceeding 50,000 inhabitants, only 40 have developed dedicated CE strategies. From an empirical perspective, our analysis addresses existing gaps by proposing practical recommendations for policymakers and practitioners. Our study builds on prior research that has explored the enablers of and barriers to a CE in specific sectors, such as construction (Munaro and Tavares, 2023), and extends its applicability to diverse urban and regional contexts (Hachaichi and Bourdin, 2023; Rajaonson and Chembessi, 2024).

In summary, this research aims to explore the drivers of and barriers to the implementation of CE practices in French cities and regions. The rest of the paper is structured as follows. Section 2 reviews the literature, and Section 3 outlines the methodology. Section 4 presents the findings, and Section 5 discusses the implications and recommendations.

2. Literature review

This literature review assesses the role of local authorities in facilitating the transition to a CE, highlighting their distinct capacity to mobilize both tangible and intangible resources to promote circular practices at the local level. The analysis further investigates the key factors influencing the implementation of a CE, categorizing these factors into financial support mechanisms, regulatory frameworks, and cultural or institutional barriers. These dimensions are examined across various urban and regional contexts to evaluate their impact on the adoption and diffusion of CE strategies.

2.1. The role of local authorities in implementing a CE

To understand the factors influencing the implementation of a CE, we first need to examine the role of local authorities, who act as key enablers of this transition. An increasing number of researchers have emphasized the central role of local authorities in implementing a CE (Bolger and Doyon, 2019; Rajaonson and Chembessi, 2024). Bourdin and Torre (2024) argued that circular initiatives must be rooted in the local context in order for a CE to be truly virtuous and contribute to sustainable development. This is especially evident because a CE creates local employment opportunities (Niang et al., 2023). In the context of the European Green Deal reshaping production and consumption, the role of cities and regions has become increasingly central (Cerutti et al., 2021). Bourdin and Torre (2020) supported this view, explaining that European policies are increasingly focusing on both the location-based nature of economic activities and environment-friendly practices.

In this regard, cities and regions are being called upon to play a prominent role in implementing a CE (OCDE, 2020) because they are best positioned to mobilize their unique tangible and intangible resources (Geissdoerfer et al., 2017). Cities can achieve this through the implementation of place-based policies (Barca et al., 2012; Bourdin, 2024) that tailor strategies and circular roadmaps to the specific characteristics of each territory. Additionally, Rajaonson and Chembessi (2024) noted that the implementation of these roadmaps is influenced

by factors specific to each territory. Leveraging the geography of transitions, they highlighted different paths toward circular models at the local level. Binz et al. (2020) emphasized the importance of aligning local policies and territorial conditions to facilitate effective ecological transitions. Among the factors influencing the implementation of circular initiatives at the local level, the importance of close cooperation between local players, such as businesses, local authorities, and citizens, was explained by Niang et al. (2023). Similarly, Chembessi et al. (2024) highlighted how the dynamics of local networks and the engagement of local players have contributed to the success of circular initiatives.

To foster these collaborative dynamics, several authors have emphasized the significance of geographical proximity among stakeholders because it facilitates coordination and the exchange of resources (Jambou et al., 2022; Chembessi et al., 2024; Arfaoui et al., 2024). However, geographic proximity alone is often insufficient, thereby requiring third parties to act as facilitators and intermediaries (Bourdin, 2024). In this context, decision makers act as catalysts for the adoption of CE practices at the regional and subregional levels, enabling companies to complete their material cycles and exchange resources with other actors (Aranda-Usón et al., 2020; Jambou et al., 2022). Using the example of London, Tura et al. (2019) demonstrated that knowledge transfer between local actors has also played a crucial role in the application of CE principles. In this context, local authorities act as intermediaries, aiming to translate circular principles into practical and feasible solutions within their communities.

Beyond geographical proximity among stakeholders, the commitment and active involvement of actors—particularly elected officials and political leaders—are essential for effective implementation. A central element in this process is the *agency* of actors within local political institutions (Bourdin, 2024). Agency can either maintain or transform regional structures (Grillitsch et al., 2022). The concept refers to the capacity of actors to influence new path development, leveraging their skills, networks, and resources to shape local trajectories over time (Grillitsch et al., 2022). Examining political agency sheds light on how officials can effect transformative change at various scales, from small communities to major cities and regions. Drawing from agency theory, political leadership can be framed as a form of place-based leadership (Grillitsch and Sotarauta, 2020), which focuses on transforming specific places through collaboration with local actors. As place-based leaders, political leaders must actively seek out and engage stakeholders, establish a shared vision, and coordinate collective efforts to advance both individual goals and regional development. Their agency—and consequently their influence—is demonstrated through their ability to mobilize stakeholders, advocate shared solutions beyond individual interests, and guide efforts toward strategic objectives (Sotarauta et al., 2022; Grillitsch and Sotarauta, 2020). Importantly, these leaders must prioritize long-term development objectives and foster alignment among diverse actors while moving beyond short-term gains.

Finally, a key argument presented in the literature regarding the involvement of local authorities in implementing a CE pertains to environmental concerns. With the escalating ecological crisis, an increasing number of cities and regions are devising strategies to mitigate the impact of climate change (Frantzeskaki et al., 2017). The rationale is that the environmental effects of economic activities tend to be localized (Kirchherr et al., 2018a, 2018b), making local circular initiatives valuable for reducing global environmental impacts (European Commission, 2019; Cerutti et al., 2021). Similarly, Towa et al. (2021) advocated an integrated approach to local CE initiatives that considers resource inputs, waste outputs, and related emissions to prevent new environmental issues from arising with the adoption of CE practices. While local authorities play a vital role, their success is influenced by broad drivers and barriers, as will be detailed in the next subsection.

2.2. Drivers of and barriers to the implementation of a CE

An increasing amount of academic literature has examined the obstacles and levers involved in the transition toward a CE (Table 1). However, literature on the specific drivers and limitations of CE implementation in cities and regions remains limited.

2.2.1. Drivers

The transition to a CE requires financial support, incentives, a suitable regulatory framework, strong collaboration, leadership among stakeholders, and consumer awareness.

The business literature indicates that public financial support and tax incentives are crucial in promoting a CE. Munaro and Tavares (2023) identified the importance of public financial support and fiscal and regulatory actions in stimulating circularity. The key drivers include subsidies for storage facilities, circular criteria in public procurement, and tax exemptions for goods made from secondary materials. Additionally, the effective management of resource flows at construction sites, as well as the use of adaptable and reconfigurable materials, has been identified as the most frequently mentioned technological drivers in the literature. Similarly, Ikiz Kaya et al. (2021) showed that public funding is a key facilitator of adaptive resource reuse; they found that national subsidies and market-based incentives, while moderately feasible, are also important drivers for supporting CE initiatives at different levels. Fang et al. (2017) demonstrated that green finance significantly and positively affects companies' engagement in circular practices. In particular, support for small- and medium-sized enterprises

Table 1
Drivers and barriers identified from the academic literature.

Category	Drivers	Barriers
Political and Regulatory	<ul style="list-style-type: none"> - Clear roadmaps and visions guide actions and investments. - Formalized CE goals through charters and agendas align stakeholders. - Political backing drives CE policies and initiatives. - Standards ensure consistency, transparency, and accountability. - Regulations support efficient waste treatment and material reuse. 	<ul style="list-style-type: none"> - A lack of clear regulations for reclassifying waste hinders recovery and reuse. - Interagency conflicts cause inefficiencies. - Short-term politics undermine long-term sustainability goals. - Current standards do not always promote repairable or recyclable product designs.
Economic and Financial	<ul style="list-style-type: none"> - Funding projects incentivize CE adoption. - Financial support helps businesses implement circular practices. - Subsidies encourage circular investments. - Deposit systems incentivize product return and reuse. - Tax reductions are made on circular products and services. - Public procurement favors circular products with clear guidelines. 	<ul style="list-style-type: none"> - High investment costs are challenging for small entities. - Financial institutions view circular models as risky, thus limiting funding. - Recycled materials often have unstable and low prices, discouraging usage.
Social and Cultural	<ul style="list-style-type: none"> - Advocacy campaigns raise awareness and support for CE practices. - Educational activities and training facilitate knowledge transfer. - Shifting societal values prioritize waste reduction and resource efficiency. - Effective leadership clarifies roles and drives CE initiatives. - Consumers increasingly demand sustainable, long-life, low-waste products. 	<ul style="list-style-type: none"> - There is a lack of awareness of CE principles and benefits. - Consumers prefer convenience and low prices over sustainability. - There is limited training in circular design, life extension, and waste reduction. - Recycling practices are poor, and item disposal is improper. - Stakeholders are concerned about profitability, market demand, and operational changes.

(SMEs) is crucial because SMEs lack sufficient resources. For example, [Bowen et al. \(2024\)](#) revealed that post-COVID-19 community engagement and local collaboration played a crucial role in helping hospitality SMEs adopt CE activities, despite increased financial constraints. [Ghi-setti and Montresor \(2020\)](#) added that traditional financing approaches, often termed *financing-as-usual*, play a critical role in enabling SMEs to adopt CE practices. Their study highlighted that self-financing and debt financing are significant enablers, while the availability of alternative financing sources does not necessarily support CE adoption and may even detract from it.

Collaboration and leadership are also essential factors for implementing a CE, as mentioned in the literature. [Hart et al. \(2019\)](#) identified leadership as a crucial factor, although there is ambiguity about who should take the lead. [Cherrington et al. \(2024\)](#) used [Miles's \(2017\)](#) typology to analyze stakeholder relationships in a circular context and found that influencers, such as the representatives of CE companies, could play a leadership role. These influencers act as central hubs, connecting all the other groups and establishing relationships based on the adaptability of each group in the CE. Elected politicians can also play the role of local leadership. The literature emphasizes the importance of agency in the ability of local political actors to influence environmental policies. [Haupt et al. \(2023\)](#) defined these individuals as local actors capable of determining or influencing the climate policy trajectory of a city. These actors do more than just provide information. They initiate, accelerate, and support change processes within local administrations. [Bourdin and Nadou \(2020\)](#) offered a typology of these key actors, categorizing them into four groups based on their role in policy development: informants, supporters, initiators, and accelerators. These distinctions help us understand how different types of actors can influence ecological transition policies at the local level, particularly the role that local political leaders can play.

Several authors have also shown that collaboration between influencers has a significant impact on the practice of a CE and that the interaction between influencers and applicants is guided by the ability of actors to connect with one another ([Cherrington et al., 2024](#)). Additionally, [Hart et al. \(2019\)](#) highlighted the importance of fostering long-term relationships and partnerships to improve value chain engagement and counter short-term thinking. Many authors have also noted that having specific legislative frameworks in place facilitates experimentation and the subsequent implementation of circular initiatives ([De Jesus and Mendonça, 2018](#)). For example, in the building sector, [Hart et al. \(2019\)](#) showed that the development of specific standards and insurance schemes eases the use of recycled materials and the incorporation of recycled content into new buildings.

Finally, consumer awareness and behavior regarding the purchase of circular products are other crucial factors for the adoption of a CE. For instance, [Szilagyi et al. \(2022\)](#) showed that consumers' environmental concerns significantly impact their purchasing behavior for circular products. Promoting proenvironmental knowledge and behavior among young people and local communities is also essential in supporting the principles of circularity. [Solano-Pinto et al. \(2020\)](#) found that awareness of waste management and a CE, as well as beliefs about environmental behavior, is linked to consumer commitment to adopting circular practices.

2.2.2. Barriers

While the drivers of a CE provide essential insights into the factors enabling its implementation, the barriers that hinder progress and challenge the transition from linear to circular systems also need to be examined. A CE faces various obstacles that impede its widespread adoption. The transition from a linear to a circular business model necessitates overcoming the barriers associated with the linear economy while simultaneously reevaluating traditional approaches ([Schröder et al., 2019](#)).

In their examination of the primary drivers and barriers influencing the implementation of bottom-up CE initiatives in Amsterdam and

Rotterdam, [Russell et al. \(2020a, 2020b\)](#) underscored a broad array of factors across five distinct categories: (i) financial, (ii) institutional, (iii) policy and regulation, (iv) technological and skills, and (v) social. Their analysis established 18 critical factors, ranging from the availability of appropriate technology and the commitment level of stakeholders to media coverage of the initiative and the scale of investment costs. Expanding on research focused on the EU, [Kirchherr et al. \(2018a, 2018b\)](#) showed that the most significant barriers to the transition toward a CE are cultural. Specifically, the lack of consumer interest and awareness, along with the prevailing company culture of hesitance, was found to be the most significant CE barrier slowing the transition toward a CE. With stakeholders citing cultural barriers as the primary obstacle, the concept of a CE has clearly not yet gained widespread recognition among businesses and local authorities ([Grafström and Aasma, 2021](#)). Similarly, [Campbell-Johnston et al. \(2019\)](#) provided further insights into city-level circular transitions, focusing on Amsterdam, Utrecht, and the Hague. They highlighted barriers related to political fragmentation, misaligned incentives, and the challenges of fostering collaboration across diverse stakeholders. Their findings emphasize that despite city-level ambitions, structural and systemic constraints often impede progress toward urban circularity.

Furthermore, [Prendeville et al., 2018a, 2018b](#) examined how city managers are implementing circular city initiatives using a set of common policy approaches, concluding that city policymakers are eager to incorporate a CE into their agendas. However, the study revealed that policymakers are unsure about the definition of a circular city, and they expressed the challenge of creating a clear understanding of what a circular city entails in practice. As a result, policymakers struggle to develop an effective strategy that includes all stakeholders and to design a circular city planning policy. Thus, a lack of knowledge about urban circularity can hinder the implementation of circular roadmaps ([Rajaonson and Chembessi, 2024](#)). [Arsova et al. \(2022\)](#) extended the discussion by evaluating the drivers of and barriers to CE implementation within a regional context. Their systematic review underscored the importance of addressing governance challenges, particularly in regions with decentralized responsibilities. They argued that insufficient coordination among regional actors and inadequate policy frameworks could stall the development of CE initiatives.

The lack of effective legislation is also cited as a barrier to SMEs' compliance with environmental laws. In their study, [Rizos et al. \(2016\)](#) explored the facilitating factors and obstacles that SMEs face when implementing their CE business models. It seems that SMEs struggle to understand the policies related to a CE. The authors highlighted the absence of regulation support as a key barrier to achieving a CE, pointing to ineffective legislation and a lack of support from public authorities. Using the case of Hungary, [Varjú et al. \(2022\)](#) showed that regional waste management companies cannot sell separately collected materials as secondary raw materials to local partners because of the property rights transferred to the centralized national body. [Williams \(2023\)](#) also explained that a lack of a clear and favorable political and regulatory framework at various levels (local, regional, and national) could pose a risk to the adoption of circularity. He noted that short political cycles impede long-term transformations and the execution of long-term planning.

Similarly, [van Keulen and Kirchherr \(2021\)](#) examined business model experimentation in the value chain of a specialty coffee importer based in Amsterdam, identifying the barriers to implementing circular practices. They found that a lack of knowledge, particularly of fact-based communication, in correcting misconceptions about a CE can impede its implementation. It also highlights that a lack of clear and shared values among different stakeholder businesses is a crucial barrier to implementing CE initiatives. In a study focusing on the Dutch logistics industry, [Van Buren et al. \(2016\)](#) also identified barriers, such as knowledge dissemination or vested interests, as significant obstacles.

3. Methodology

This study employs a comprehensive methodology to investigate the drivers and barriers that local authorities encounter in the implementation of CE strategies. It integrates document analysis, semi-structured interviews, and qualitative content analysis to facilitate a thorough evaluation of both the theoretical foundations and practical applications of CE initiatives across various French territories. In this section, we first articulate the rationale for our case study and outline the overarching context. Subsequently, we present the materials and methods employed in this research.

3.1. Justification and context of the case study

France has made significant progress in implementing CE principles through various strategies and policies. The country has demonstrated its commitment by establishing legal frameworks to achieve its CE objectives. According to Eurostat,¹ in 2022, the Netherlands had the highest circularity rate (27.5 %), followed by Belgium (22.2 %) and France (19.3 %). One of the most influential laws in this area is the 2020 Anti-Waste and Circular Economy Law, which includes concrete measures to extend the lifespan of products and reduce their environmental impact. For instance, the law introduces a repairability score for consumer electronics and electric products, as well as a repair bonus for products that are no longer under warranty. From this perspective, France represents an interesting case study because the country is actively involved in this field through several regulatory initiatives and its strong support for companies and local authorities in implementing CE.

That same year, a national Law decentralized waste management by assigning waste prevention planning and management responsibilities to regional authorities (Torre and Bourdin, 2023). This law mandated that intermunicipalities establish their own public services for household waste collection and treatment or outsource these services to private providers. Regions were also required to create comprehensive waste management plans and implement a regional action plan for the CE, as specified by Decree No. 2016–811, which was issued on June 17, 2016. This approach places the CE within the framework of waste management, positioning it as a pivotal strategy for achieving carbon neutrality. As a result, the focus has shifted from traditional economic development issues to sustainability and resource efficiency.

In 2018, the Roadmap for the Circular Economy was introduced to facilitate a shift from a linear to a circular economic model. This strategic plan includes 50 measures divided into four key priorities: better production, better consumption, better waste management, and engagement of all stakeholders. In 2020, the Anti-Waste and Circular Economy Law reinforced the role of regional authorities as coordinators and facilitators of stakeholder activities within their jurisdictions, as outlined in Article L 4211–1. This legislation also sets ambitious targets, including the elimination of single-use plastic packaging by 2040. An initial decree established the 3Rs strategy for 2021–2025 in an effort to help reach this goal, which aims to reduce single-use plastics by 20 % by 2025, with 50 % of this reduction achieved through reuse. The regulation also encourages local authorities to prioritize the procurement of reused goods or products made from recycled materials. Finally, in terms

¹ https://ec.europa.eu/eurostat/databrowser/view/env_ac_cur/default/table?lang=en

of planning, the implementation of a CE is demonstrated through the establishment of contracts between the state and local authorities. These contracts enable local authorities to structure their public policies and further emphasize the importance of their commitments.²

3.2. Materials and methods

This research uses a three-phase methodology to investigate the drivers and barriers encountered by local French authorities in implementing CE initiatives. The study applies qualitative content analysis, combining document review, semi-structured interviews, and a coding process, to provide a comprehensive exploration of CE implementation.

3.2.1. Phase 1: data collection of circular roadmaps

We initially gathered and analyzed a comprehensive array of planning documents, including strategic plans, action frameworks, roadmaps, and annual reports from local French authorities. The objective was to gain insights into the visions, priorities, and conceptualization of circular strategies across diverse territories, thereby establishing a foundation for identifying the drivers of and barriers to the practical implementation of these strategies.

The territories were selected using the ADEME-funded circular certification process, a star-based evaluation system that assesses levels of CE engagement. This scheme allowed us to target territories at various stages of CE adoption, including metropolitan and overseas territories, rural areas, and regions. To ensure additional representativeness, we expanded the sample through a targeted press review to identify territories demonstrating active CE engagement. This combined approach enabled us to capture a broad range of implementation, with coverage of territories with both advanced and emerging practices (Appendix 3 provides the full list of surveyed territories).

These documents served as a foundation for understanding territorial priorities and illustrated how local governments prioritized critical aspects of the CE, such as waste reduction, resource efficiency, and sustainable consumption. They also provided valuable insights into practical implementation through mechanisms that included policy instruments, public–private partnerships (PPPs), awareness-raising initiatives, and capacity-building programs, which showed how these strategies were translated into action at the local level.

3.2.2. Phase 2: data collection based on semi-structured interviews with roadmap investigators

From February 2024 to May 2024, 47 semi-structured interviews were conducted across the selected territories to gain in-depth insights into CE implementation. The respondents were carefully chosen to represent individuals with direct involvement in CE initiatives, such as circular task officers, project managers, and CE heads, ensuring that the insights collected reflected practical, day-to-day realities (Appendix 2 provides the full list of interviewees). The job titles and responsibilities of the participants reflected the cross-disciplinary nature of CE initiatives, as they drew on expertise in waste management, economic development, and territorial planning. Specialized roles, such as industrial symbiosis officers, energy and climate officers, and waste management managers, further illustrated the diversity of skills and knowledge required for effective CE implementation. Specifically, we interviewed the following:

² The Contrat d'Objectifs Territorial and the Contrat d'Objectifs Déchets Économie Circulaire are initiatives by the National Agency for Ecological Transition to fund and support local waste reduction and circular economy projects. They include annual evaluations and facilitate financing for studies, project managers, and waste prevention measures. Over 500 French local authorities have participated in these programs. For more information, visit <https://www.territoiresentransitions.fr/programme#carte>.

- **11 regional authorities:** Officers responsible for overarching CE strategies at the regional level
- **2 municipalities:** Officers managing localized CE initiatives in urban centers
- **34 intermunicipal entities:** Coordinators of CE efforts among intermunicipalities

Interviews were conducted across a wide range of territories, including regions (e.g., Normandie, Occitanie and Pays de la Loire), overseas territories (e.g., Martinique and Réunion), rural areas (Communauté de communes du Clunisois and Communauté de communes du Sisteronais Buëch), and major urban centers (e.g., Métropole de Lille, Eurométropole de Strasbourg, and Toulouse Métropole).

An interview guide, based on insights from the literature review (Appendix 2), was designed to examine the factors affecting the effective implementation of circular policies, with a focus on obstacles and facilitators. It covered key dimensions, such as political support, encompassing resource allocation and policy endorsement; awareness of the CE concept among stakeholders and citizens; stakeholder engagement; and the ability of local authorities to advance CE initiatives through collaboration, resolution of operational challenges, and alignment of strategies with local needs and capacities.

To ensure consistency and depth, the interviews followed a structured protocol. The average interview lasted 53 min, ensuring sufficient depth for comprehensive data collection. The interviews ranged from 37 min (Valenciennes Métropole) to 1 h and 20 min (Ville de Roubaix), with 30 % of the interviews lasting over 1 h. Interviews were conducted either in person or online to facilitate participation from overseas territories. All interviews were recorded (with consent) and transcribed verbatim for analysis. Anonymity was ensured for the respondents to provide them with a secure environment conducive to candid and impartial responses (Lancaster, 2017). This methodological approach made it possible to collect authentic insights from practitioners directly involved in the daily implementation of CE strategies, as the participants felt at ease when addressing sensitive issues related to these initiatives.

3.2.3. Phase 3: data analysis

The transcribed interviews were analyzed using qualitative content analysis techniques, following the methodological guidance provided by Flick (2013). Data organization and systematic coding were performed using MAXQDA software, a tool specifically designed to enhance the rigor and efficiency of qualitative data analysis. Our approach employed a dual coding strategy, drawing on both deductive and inductive methods, as suggested by Blair (2015). First, a top-down coding approach, anchored in our preestablished theoretical framework, was applied. This deductive phase provided a structured lens for examining the data to ensure alignment with existing literature. Second, a bottom-up coding approach was incorporated, allowing for the inductive identification of emergent themes and insights. This exploratory phase ensured that novel patterns and contextual factors not previously addressed in the literature were adequately captured and analyzed (Blair, 2015).

This comprehensive coding process allowed for the identification of 1281 text segments, which were analyzed using a coding framework focused on the drivers of and barriers to a CE (see Appendix 3). The entire analytical process was carefully documented and organized to ensure that each pertinent text segment was systematically evaluated and assigned to the appropriate category within the coding framework. This rigorous methodology ensured consistency and transparency throughout the analysis.

4. Results

The implementation of a CE in French cities and regions has been influenced by a diverse set of drivers and barriers. This section outlines the key factors that either promote or hinder the adoption of CE

practices at the local level. This section explores five key themes: (i) the role of political leadership and strategic vision, (ii) the importance of partnerships and collaborative networks, (iii) challenges in engaging businesses and overcoming cultural divides, (iv) risks of excessive dependence on public funding, and (v) difficulties in evaluating circularity within local policies. These themes are summarized in Table 2 at the end of the Results section.

4.1. Leadership agency, political support, and strategic vision as key drivers

Our findings indicate that establishing a clear long-term vision is crucial for successfully implementing a CE at the local level. Strong political support significantly aids in prioritizing the CE on local agendas. However, such support often lacks continuity and operational depth, creating gaps between strategic intentions and actual implementation. Elected officials who act as initiators and accelerators play a key role in articulating and championing circular initiatives, even if they are not always the primary drivers of these changes. This highlights the importance of committed political leadership and underscores the challenges associated with establishing a solid strategic vision for the CE. A significant limitation is the sporadic involvement of political leaders, who may prioritize other pressing local issues over the CE, revealing a lack of integration of the CE into broad policy frameworks. Nevertheless, an interviewee confided that their schedule does not always allow them to follow up on these issues: *“The elected officials are not opposed to the topic at all; they simply do not have the time to champion projects themselves or to make themselves available”* (Interviewee 6).

Furthermore, our analysis distinguishes between two types of elected officials: drivers, who are at the forefront of their knowledge of the CE and its implications for territorial development, and followers, who rely more on technical staff and act as effective intermediaries between local stakeholders and businesses. This dichotomy highlights a structural weakness in the leadership framework, in which only a minority of officials proactively embrace the CE agenda, leaving the majority dependent on external influences. Followers often find it difficult to fully grasp and take ownership of the CE. This reluctance is partly attributed to systemic issues, such as insufficient professional development opportunities and an overemphasis on traditional administrative roles. According to the interviewees, a CE remains a difficult concept to master and is often reduced to the issue of waste: *“For our elected officials, the main obstacle remains the jargon used to explain a CE, which is still very abstract and complex [...] so they remain focused on traditional competencies in household waste management, such as collection and waste reduction.”*

Because of their lack of specific internal expertise, some elected officials tend to rely on external consulting firms for guidance. However, these firms do not always possess sufficient specialization in CE practices, which can result in recommendations that lack reliability or alignment with local needs. This reliance on external expertise stresses a systemic failure to build internal capacities within municipalities, creating dependency on potentially misaligned external actors. In several cases, local authorities have expressed concerns about the necessity of independently validating or correcting the work of these consultants, despite their funding being supported by national agencies. This highlights the importance of establishing clear conditions and expertise requirements for consulting firms engaged in CE projects. Moreover, it reflects a broad challenge—the limited ability of local governments to critically assess external advice because of internal knowledge gaps. It also emphasizes the need for targeted training programs for elected officials and municipal employees to enhance their understanding of CE principles. Such initiatives would reduce reliance on external consultants and enable local authorities to adopt more effective and technically sound approaches.

Successfully implementing circular practices, even with political support, necessitates the development of a forward-looking vision

Table 2
Drivers of and barriers to CE deployment at the local scale.

Theme	Drivers	Priority	Barriers	Severity	Identified Gaps
Leadership Agency, Political Support, and Strategic Vision	<ul style="list-style-type: none"> - Strong political commitment enables the prioritization of CE initiatives. - A long-term strategic vision facilitates targeted actions. - Elected officials acting as CE champions foster implementation. 	High	<ul style="list-style-type: none"> - The limited expertise and availability of elected officials reduce leadership consistency. - Overreliance on underqualified external consultants undermines progress. - Complex CE jargon reduces stakeholder engagement. 	High	<ul style="list-style-type: none"> - A lack of adequate training on the CE for political leaders and municipal staff - Poor alignment between technical guidance and political decision making
Building Partnerships and Collaborative Networks	<ul style="list-style-type: none"> - Proximity fosters collaboration among stakeholders. - Formal agreements strengthen shared goals and responsibilities. - Intermunicipal collaboration facilitates knowledge sharing and alignment. 	High	<ul style="list-style-type: none"> - Geographic dispersion in rural areas hinders industrial symbiosis. - Departmental silos within local authorities prevent cohesive planning. - Poor communication leads to delays and misunderstandings. 	Moderate	<ul style="list-style-type: none"> - No mechanisms to institutionalize cross-departmental collaboration - A lack of structured frameworks for regional and intermunicipal partnerships
Overcoming Legitimacy and Cultural Barriers in Businesses	<ul style="list-style-type: none"> - Financial incentives encourage business participation. - Including businesses in governance builds trust and long-term partnerships. 	Moderate	<ul style="list-style-type: none"> - Cultural gaps between businesses and authorities lead to mistrust. - A perceived lack of credibility of project leaders discourages involvement. - Businesses struggle to see immediate economic benefits. 	High	<ul style="list-style-type: none"> - Low awareness among businesses about the economic benefits of a CE - A lack of consistent engagement practices to foster trust and long-term collaboration
Overreliance on Public Funding	<ul style="list-style-type: none"> - Subsidies and grants provide initial momentum for CE projects. - Public procurement stimulates the demand for circular products and services. 	High	<ul style="list-style-type: none"> - Excessive reliance on public funding creates financial instability. - Shifts in government priorities disrupt funding continuity. - Social and solidarity economy actors struggle to meet procurement requirements. 	High	<ul style="list-style-type: none"> - Limited development of diversified funding models - A lack of strategies to mitigate dependency on unpredictable public budgets
Evaluating Circularity in Local Policies	<ul style="list-style-type: none"> - Innovative tools, such as financial diagnoses, align the CE with broad development goals. - Simplified calculation tools assist in basic evaluations. 	Low	<ul style="list-style-type: none"> - The lack of a culture for systematic evaluation prevents monitoring and improvement. - Poor data collection hinders impact assessments. - Small- and medium-sized enterprises face challenges because of inadequate waste sorting and data. 	Low	<ul style="list-style-type: none"> - Absence of standardized evaluation frameworks and indicators. - Limited technical knowledge and tools among SMEs for effective waste management

accompanied by clear long-term goals. This process involves identifying priority areas, setting achievable objectives, and taking practical, targeted actions. The persistent challenge, however, lies in translating high-level political rhetoric into operational commitments that yield tangible outcomes. This also requires effective communication of the circular vision in a compelling and accessible manner to diverse audiences, including policymakers, business leaders, residents, and community organizations. The difficulty in communicating the CE vision stems from a lack of standardized definitions and frameworks, which can confuse stakeholders and dilute their engagement.

Conversely, the lack of consistent political support evidently hinders progress. While some projects benefit from the technical backing and funding opportunities provided by national agencies, the absence of unified political commitment and clear guidelines can create challenges. This lack of coherence results in fragmented decision making, in which certain initiatives may be deprioritized or contradicted by competing agendas. For instance, when key decisions, such as those related to business park development, are not aligned with CE principles, they undermine the coherence and effectiveness of these initiatives. Such inconsistencies not only slow progress but also reduce trust among stakeholders, who may perceive the CE as an abstract or secondary concern. These observations underline the essential role of engaged and consistent political leadership in advancing CE initiatives. Political support must go beyond endorsement to ensure the translation of circular principles into actionable and coherent policies that reflect long-term goals. Without such alignment, CE initiatives risk remaining symbolic, failing to achieve their intended transformative impact.

4.2. Building partnerships and collaborative networks for long-term, successful project implementation

Promoting a culture of collaboration is essential for advancing

circular initiatives. The close geographical proximity of businesses, residents, and institutions in urban areas makes it easier to facilitate face-to-face interactions and partnerships. However, this advantage often remains underutilized because of insufficiently formalized mechanisms for stakeholder engagement. This physical closeness can enhance trust, understanding, and cooperation among stakeholders (Interviewees 17, 25, 35, and 36) but only when clear strategies exist to capitalize on it.

External collaborations between different entities—whether public, private, or nongovernmental—are crucial for the successful implementation of a CE. However, the effectiveness of these collaborations depends heavily on the clarity of their objectives and the robustness of their governance structures. Establishing formal agreements can provide a clear framework for collaboration and outline shared goals and responsibilities. From this perspective, intermunicipal collaborations and partnership agreements facilitate the coordination of actions and the alignment of objectives. One interviewee noted, “*We are fortunate to benefit from the strong cooperation between different municipalities, and we even organize intermunicipal working groups. We share best practices and sometimes even undertake joint actions*” (Interviewee 4). However, these partnerships often lack mechanisms to monitor their impact or adapt to changing needs, thereby limiting their scalability and replicability.

During the interviews, agreements between regions and professional organizations in specific sectors were also highlighted as a pivotal strategy for advancing CE initiatives. For instance, regional agreements aimed at integrating the CE into the construction sector were described as valuable for bringing all stakeholders together. However, these agreements were not without challenges; they often faced resistance from stakeholders unwilling to adjust established practices or share resources. These agreements were often challenging to establish, but they were seen as fostering collaboration, promoting a shared understanding of CE, and enabling stakeholders to collectively anticipate and address

potential challenges.

The interviews likewise underscored the importance of geographic proximity in facilitating collaboration, particularly in areas with a high concentration of stakeholders. However, some interviewees from rural territories, characterized by numerous municipalities, noted the increased complexity of launching initiatives across such broad areas. These disparities reveal a critical limitation of CE strategies—their overreliance on localized synergies, which may not be feasible in dispersed territories. They emphasized that projects such as industrial symbiosis require localized actions and close engagement to succeed, as broad, less targeted approaches often fail to gain traction. This highlights the need for adaptive strategies tailored to territorial specificities, particularly in rural or fragmented regions.

Internally, local authorities must not only possess the technical skills necessary to lead circular projects but also improve collaboration between different departments to overcome organizational inertia and silo effects. The recurring issue of siloed operations within municipalities reflects a broad structural inefficiency, in which departments prioritize their own objectives over collective outcomes. In our case studies, the CE issue was linked to either the waste management department or the economic development department. However, in most of the interviews conducted, the lack of communication between departments was lamented: *“For me, the major challenge in municipalities is achieving collaboration across all departments. It is something extremely interesting but also very difficult, so it does not always happen as it should”* (Interviewee 6). These silos not only reduce operational efficiency but also exacerbate resource duplication and conflicting priorities.

The lack of communication between departments often leads to duplicated efforts, conflicting priorities, and the absence of a coherent strategy, significantly hampering the success of CE initiatives. Departments frequently operate in isolation, missing opportunities to leverage one another's expertise and resources. This situation, in turn, results in fragmented policies and a disjointed approach to sustainability. According to insights shared by the interviewees (2, 6, 11, and 29), these organizational silos can also create delays and misunderstandings, further complicating the implementation of comprehensive CE projects. Moreover, the internal competition among departments for recognition of success reflects deep governance issues that hinder collective action and dilute the broad vision of sustainability. Related to this, Interviewee 27 noted that tensions can arise when different departments or organizations seek individual recognition, particularly when the successes of CE initiatives begin to receive public attention. This internal competition can undermine the collective goals of the municipality and reduce the overall effectiveness of collaborative efforts.

As a response to the aforementioned issues, capacity building appears to be an essential approach to address inertia and organizational rigidity. This involves equipping leaders with the skills required to manage diverse teams, build consensus, and develop a vision that incorporates various perspectives and needs. One respondent explained that their organization had undertaken significant internal restructuring, with each department tasked with evolving its systems to align well with CE goals (Interviewee 33). However, without accompanying changes in organizational culture and incentives, such restructuring risks being superficial and failing to address the root causes of inefficiency. Reorganization requires adequate awareness and training to be effective, as several teams still struggle with a clear understanding of CE principles. This highlights the need for sustained efforts to train and support staff in adapting to these new frameworks.

Moreover, in the context of collaboration and partnerships, transparency and accountability are fundamental for fostering trust. Transparency in this context is often hindered by a lack of standardized reporting frameworks and weak mechanisms for stakeholder engagement. The interviews revealed the importance of openly sharing progress, challenges, and milestones to build and sustain confidence among stakeholders. The respondents emphasized that leveraging the full range of available tools within local authorities, such as public procurement

and regulatory frameworks, is essential. However, they also noted that achieving success requires the establishment of effective connections between public and private actors. The absence of such connections often leads to misaligned priorities and the reduced effectiveness of public–private collaborations.

Finally, large metropolitan areas may encounter major challenges in advancing these initiatives because of the complexity and slow pace of their processes. The respondents highlighted that exchanges in rural intermunicipalities are often simpler and more direct, while those in metropolitan processes tend to be lengthier and more difficult. This difference underscores the need for differentiated strategies that account for territorial dynamics rather than applying a one-size-fits-all approach. Additionally, the interviews revealed a significant communication-related issue that affects the success of many projects. Several participants noted that financial constraints often lead to reductions in communication budgets, despite the critical role of communication in the implementation and success of initiatives. This situation undermines the ability to build consensus and engage stakeholders effectively. Such budgetary cuts reflect a short-sighted approach that undermines stakeholder engagement and reduces the visibility and legitimacy of CE initiatives.

4.3. Overcoming legitimacy and cultural hurdles in a company's engagement

Businesses play a crucial role in the transition to a CE, but our interview analysis shows that mobilizing companies remains a significant challenge. The predominant reliance on immediate economic incentives reflects a narrow understanding of business drivers, which limits the strategic engagement needed for long-term participation. Businesses need clear, tangible, and immediate incentives to engage in circular practices. Often, immediate economic interest is the primary driver of their involvement. Companies must see a direct benefit to be motivated to participate actively in circular initiatives. As one interviewee stated, *“With businesses, continuous engagement is necessary. They often do not have time to meet regularly, and it is difficult to mobilize all of them. For it to work, they need to quickly see the benefit of getting involved, and their main interest is economic”* (Interviewee 2). This transactional approach constrains the extent of their engagement and weakens efforts to establish enduring partnerships founded on shared sustainability objectives.

In the context of implementing industrial and territorial ecology approaches in which local authorities act as important intermediaries, the persistent lack of structured and sustained engagement mechanisms highlights an institutional gap. The results indicate that without continuous and structured engagement, businesses often find themselves isolated, and the synergies identified during workshops do not materialize or are not ambitious. Therefore, companies struggle to commit to or may be disappointed by the outcomes of these initiatives. This emphasizes the need for local authorities to adopt proactive facilitation roles, ensuring that business partnerships are nurtured beyond the early stages of engagement.

Moreover, local authorities often face a significant challenge related to the perceived lack of legitimacy of project managers when engaging with businesses. This issue stems from the deep structural divide between economic development and waste management cultures, which creates a disconnect between local authorities and businesses. Companies, particularly those focused on profitability and growth, often find it difficult to engage with interlocutors who lack practical business experience or understanding. The respondents noted that many waste management services fail to communicate in terms that resonate with businesses, instead relying on environmental jargon that companies struggle to relate to their operational realities. This misalignment perpetuates mutual distrust and reinforces the perception that CE initiatives are disconnected from core business priorities.

To overcome these obstacles, local authorities must broaden their

focus beyond waste management and establish shared governance that includes businesses from the initial stages of circular initiative development. The absence of shared governance frameworks has often resulted in CE projects being overly technical or operationally narrow and failing to align with broad economic concerns. The respondents highlighted the importance of integrating economic concerns into these initiatives to create strong and durable synergies with local businesses. Such integration requires local authorities to shift from a regulatory or facilitative role to one of co-creation, in which businesses are treated as equal partners in shaping the agenda.

Additionally, efforts to transform economic offerings to align with the realities and expectations of businesses are critical. These involve incentivizing demand for local, repairable products and services and fostering a territorial ecosystem in which businesses can thrive independently of subsidies or external support. A respondent noted that increasing the demand for such offerings is essential for ensuring the long-term success of CE initiatives. However, this demand must be supported by policies and market mechanisms that reduce dependency on public funding, enabling businesses to adopt circular practices as an integral component of their competitive strategies.

4.4. Financial instability and uncertainty from excessive dependence on public funding and incentives

Circular economy initiatives rely largely on public subsidies for their implementation and maintenance. While these subsidies are instrumental in initiating projects, overreliance on them creates vulnerabilities, particularly when funding priorities shift or resources are withdrawn. Excessive dependence on these funding sources poses significant risks to financial stability and operational resilience. It can create financial instability, as projects become vulnerable to fluctuations in public funding. For instance, the agreements between the National Agency for Ecological Transition and municipalities have allowed them to receive substantial subsidies and hire project managers to implement the programs to which they commit: *“This three-year contract allowed us to receive substantial subsidies and hire project managers to implement the program. We also managed to secure operational and investment grants, totaling nearly one million euros, which is quite considerable”* (Interviewee 5). Although these funds can be significant, reliance on external financing does not secure stable long-term resources. This financial boost often fails to translate into long-term stability, as it is not accompanied by robust frameworks to ensure self-sufficiency once external funding ceases. Another issue is that shifts in government priorities can abruptly alter funding availability or contract terms, thereby disrupting ongoing initiatives. This unpredictability undermines project continuity and diminishes stakeholder confidence in CE initiatives. For instance, new administrations may reduce support for sustainability-focused public service contracts, which can leave municipalities unable to maintain or expand their programs. Similarly, companies that rely heavily on public contracts are at risk of significant revenue declines if these contracts are not renewed or if incentive programs are eliminated. Such dependency inhibits the resilience of both public and private actors, rendering their participation in CE initiatives precarious and contingent upon external financial flows.

In this context, some economic actors, particularly those in the social and solidarity economy, face compounded challenges. Their reliance on subsidies often constrains their ability to operate independently, as they struggle to meet administrative requirements or manage cash flow effectively. Accessing European funds, for example, frequently requires steering complex procedures, which can discourage participation from small organizations with limited resources. This administrative burden perpetuates inequities, as large, resourceful entities are well positioned to capitalize on available funding opportunities.

To ensure the sustainability of CE initiatives, some local authorities are exploring partnerships and business models that can attract private investment and reduce dependency on government incentives. This shift

reflects a growing recognition of the need for diversified and sustainable financial mechanisms to support CE initiatives. For example, local authorities can stimulate entrepreneurial initiatives that generate added value, such as repairable product markets or resource-sharing platforms, which reduce reliance on public funding while strengthening local economies.

Some local authorities use public procurement as a tool to drive demand for circular products and services, prompting businesses to adapt. This involves setting criteria that prioritize sustainability, resource efficiency, and life cycle impact in procurement processes. As one circular manager explained, *“If public procurement does not give the necessary impetus, businesses will not engage on their own. That is why the economy is one of the priority areas in the Scheme for the Promotion of Responsible Purchasing, with a dedicated project manager for the CE to support this objective”* (Interviewee 28). Therefore, such measures require consistent and targeted implementation to avoid superficial compliance or token efforts. While subsidies remain essential for catalyzing action, they must be coupled with long-term strategies that prioritize resilience and self-reliance. Failure to address these dependencies risks perpetuating a cycle of instability, undermining the broad goals of the CE.

4.5. Evaluation of circularity in local policies as a relatively nascent practice

Significant challenges are involved in setting up effective metrics and indicators to gauge a city's advancement toward its CE objectives. A critical issue is the fragmentation and inconsistency of current approaches, which often fail to provide actionable insights or to support strategic decision making. While some areas have made strides in monitoring waste reduction, resource efficiency, and economic benefits from circular initiatives, these efforts remain limited in scope and impact. Moreover, leveraging data and feedback for the continual refinement of strategies and policies is essential to maintain momentum and secure political support (Interviewees 4, 9, 10, and 18). Without a structured evaluation culture, however, many local authorities lack the tools to demonstrate progress, making it difficult to sustain stakeholder engagement and justify investments.

In France, the absence of a robust evaluation culture and dedicated resources significantly undermines the capacity to analyze CE initiatives effectively. This shortfall creates a vicious cycle in which limited insights prevent the identification of best practices, perpetuating inefficiencies and missed opportunities for improvement. The respondents emphasized the need for comprehensive and standardized evaluation frameworks to overcome these limitations and enhance the continuous improvement of initiatives. Beyond the lack of an evaluation culture, the availability and collection of data are also major issues. Although local authorities have several indicators, these indicators do not always allow for the measurement of key impacts, such as the reduction of greenhouse gas emissions or a decrease in the quantity of waste produced in the territory (Interviewees 3, 5, 13, and 41). This complicates the creation of an accurate baseline and projection of what an optimal CE could look like at the local level. Another respondent noted, *“Sure, we have indicators, but they do not directly measure the reduction in carbon impact or the amount of waste avoided”* (Interviewee 5). These gaps point to a disconnect between the metrics employed and the overarching objectives of the CE, thereby diminishing the capacity to accurately assess transformative impacts.

In particular, SMEs face significant challenges in managing data related to their waste, often because of the absence of detailed sorting practices. This situation results in a poor understanding of waste streams, which limits opportunities for targeted interventions and resource optimization. Many companies dispose of all waste in a single bin, resulting in a lack of precise information on waste streams. This situation creates a pressing need for great awareness and support to help businesses improve data collection and management. Consequently, local policymakers frequently make decisions based on incomplete

information, which undermines the effectiveness of their interventions and their ability to adhere to CE principles.

Despite these challenges, limited resources often compel local authorities to conduct their own evaluations using basic calculation tools, such as rudimentary Excel spreadsheets, as noted by one respondent. Some authorities have begun to explore innovative methods, shifting their focus toward economic and financial analyses as a means of evaluating and diagnosing their territories. This approach positions the CE as a lever for territorial development, contrasting with traditional methods that prioritize material flow analysis, particularly related to waste. One respondent highlighted a shift in strategy, describing how their team conducted a financial diagnosis to analyze the flows of imports, exports, and local transactions. This method enabled them to identify circular loops and assess the associated economic opportunities, such as job creation and revenue generation, which garnered strong support from elected officials responsible for economic development.

However, this pivot toward financial diagnosis also raises questions about its scalability and applicability across diverse contexts. While successful in some regions, the adoption of this approach may be limited by varying levels of expertise, resources, and institutional capacity. Developing training programs and sharing best practices are essential to maximize the potential of this strategy and enable more regions to leverage it effectively. Overall, addressing the evaluation gap requires a multifaceted approach that combines cultural change, capacity building, and the integration of advanced analytical tools. Local authorities must prioritize the development of robust and comprehensive metrics that align with the broad objectives of the CE. Failure to do so risks perpetuating inefficiencies, reducing transparency, and undermining the credibility of CE initiatives among stakeholders.

5. Discussion

This section integrates the findings of this study and focuses on its contributions to both theory and practice. It delves into the key dimensions influencing the implementation of CE initiatives and offers insights to address the challenges faced by local authorities. The discussion further examines research contributions, theoretical implications, practical applications, and recommendations for advancing the CE at the local level.

5.1. Research contributions and theoretical implications

This study provides an in-depth understanding of the factors that shape the adoption of CE practices at the local level. It highlights the critical dimensions driving the implementation of CE initiatives, with particular emphasis on the roles of political support, leadership, strategic vision, regulatory frameworks, and collaborative networks. These insights contribute to advancing theoretical perspectives on the mechanisms that enable the transition toward a CE.

5.1.1. Advancing theoretical frameworks on local CE implementation

This work deepens theoretical insights into the role of local authorities in CE adoption by framing the relationship between governance, economic factors, and cultural factors. Prior studies, such as those by Bourdin and Torre (2020), have highlighted the need for strategic planning to integrate circular practices into sustainable development goals. Our findings build on this by showcasing the importance of political leadership in aligning resources and priorities to achieve CE objectives. Leaders with clear and consistent strategic visions can effectively mobilize stakeholders and allocate resources, demonstrating how governance structures shape the success of CE initiatives.

Incorporating a multidimensional approach, this study addresses gaps in existing frameworks by integrating legislative, economic, social, and cultural factors into the analysis. Unlike previous studies, such as those by Russell et al. (2020a, 2020b) and Campbell-Johnston et al. (2019), which focus on sector-specific barriers, such as construction, our

research provides a broad, systemic perspective. It identifies organizational inertia, siloed management, and a lack of interdepartmental communication as critical barriers. It expands on frameworks proposed by Kirchherr et al. (2017, 2023) by offering empirical evidence of these challenges within French cities and regions.

5.1.2. Repositioning the CE as an economic development strategy

This study advances the discourse on the CE by positioning it as a driver of local economic development rather than merely an environmental initiative. This perspective aligns with those of Niang et al. (2023) and Bourdin and Torre (2022), who emphasized that a CE can support decarbonized reindustrialization and enhance territorial resilience. Our findings reveal that CE initiatives, particularly in the context of French cities and regions, have significant potential to create local employment opportunities, stimulate innovation, and attract investment.

These insights are consistent with the broad literature, which highlights the CE's economic potential. For instance, Munaro and Tavares (2023) discussed the role of the CE in the construction sector, noting its ability to generate economic value through the reuse of materials and the development of secondary markets. Similarly, Schröder et al. (2019) argued that the CE can reduce dependency on imported raw materials, thus enhancing economic stability. However, our study goes further by identifying the mechanisms through which the CE can be integrated into local economic strategies. Examples include leveraging public procurement to stimulate demand for circular goods and fostering local entrepreneurship in the repair and recycling industries.

Despite these opportunities, the literature also highlights barriers that limit the CE's economic potential. Kirchherr et al. (2018a, 2018b) noted that cultural and institutional inertia often prevents businesses and policymakers from fully embracing the CE. Our findings corroborate this by emphasizing the need for a strategic vision and political commitment to reposition the CE as a core component of economic development policies.

5.1.3. Addressing the dynamics of local governance and collaboration

Our study enhances the understanding of governance dynamics by emphasizing the crucial role of collaboration in advancing CE initiatives. Local authorities encounter substantial challenges associated with fragmented governance structures and siloed departmental operations, as evidenced by prior research examining organizational barriers (Korhonen et al., 2018; Geissdoerfer et al., 2017). The findings of this study confirm that these silos frequently result in poorly coordinated efforts, duplication of activities, and missed opportunities for synergy.

In this regard, the literature highlights the importance of integrated governance as a prerequisite for systemic transformation. For instance, Predeville et al. (2018a, 2018b) and Turcu and Gillie (2020a, 2020b) argued that effective governance depends on alignment across departments and the involvement of diverse stakeholders. Our study adds to this body of knowledge by presenting empirical evidence from French cities and regions. It demonstrates that local authorities address governance barriers by establishing intermunicipal partnerships and engaging stakeholders effectively. The findings also resonate with those of Campbell-Johnston et al. (2019), who highlighted the challenges of fostering collaboration across diverse stakeholders in cities such as Amsterdam, Utrecht, and the Hague. Similar to them, we found that building trust and establishing clear roles and responsibilities are essential for successful collaborations. However, our study goes further by identifying specific strategies for addressing these challenges, such as capacity-building initiatives and the creation of dedicated coordination teams within local governments.

5.1.4. Place-based implications of CE adoption

Our findings demonstrate that regions often possess great regulatory expertise and financial stability, enabling them to implement large-scale CE initiatives effectively. For instance, 77.27 % of coded segments

relating to regional initiatives in our study identified organizational rigidity and inertia as significant barriers, reflecting the challenges associated with navigating complex bureaucratic processes and ensuring interdepartmental coordination. These observations resonate with the findings of [Arsova et al. \(2022\)](#), who emphasized that such structural constraints often impede the agility required for CE transitions at the regional level.

Conversely, municipalities benefit from their proximity to local stakeholders, which facilitates direct engagement, fosters trust, and enhances coordination in circular initiatives. This proximity allows for strong relationships with businesses, local organizations, and residents, making it easy to mobilize resources and implement small-scale but impactful projects. As highlighted by [van Keulen and Kirchherr \(2021\)](#), stakeholder proximity plays a critical role in building trust and fostering collaboration, which are essential for successful CE implementation. However, municipalities and intermunicipal entities also face significant challenges, with 89.47 % of coded segments pointing to political disengagement as a major barrier. Limited political commitment, coupled with resource constraints, often undermines their capacity to support CE initiatives independently.

Regions, on the other hand, are often less reliant on external funding tied to project calls, thanks to their stable financial structures. This financial stability allows for the long-term planning and execution of CE strategies. In comparison, municipalities excel in their ability to establish direct relationships with local stakeholders despite their resource limitations. They leverage these connections to coordinate and implement circular projects effectively. However, their limited organizational capacity and dependence on external funding can pose significant challenges, particularly when scaling pilot projects or addressing complex governance structures. This observation aligns with that of [Russell et al. \(2020a, 2020b\)](#), who noted that fragmented governance and inadequate resources frequently hinder the scaling of local CE projects.

Our study contributes to the ongoing discourse by emphasizing the importance of tailored CE strategies that account for the distinct roles, capacities, and constraints of cities and regions. While regions excel in navigating regulations and securing stable funding, they must address organizational inertia and improve decision-making processes. Similarly, municipalities must overcome resource constraints and foster political engagement to capitalize on their strengths in stakeholder proximity and coordination. These findings emphasize the need for multilevel governance frameworks that integrate the complementary strengths of cities and regions to advance the implementation of CE initiatives effectively.

5.2. Practical implications

This study provides actionable insights for local authorities seeking to implement CE initiatives effectively. The findings emphasize the critical importance of political leadership, robust governance structures, stakeholder engagement, financial innovation, and rigorous evaluation practices. By addressing these dimensions, municipalities and regions can overcome persistent barriers and capitalize on enablers for CE adoption.

5.2.1. Strengthening political leadership and the agency of governance structures

Political leadership is essential for embedding CE principles into local policies and ensuring their sustained prioritization. Elected officials, as initiators and accelerators of change, as well as place-based leaders ([Grillitsch and Sotarauta, 2020](#)), hold a pivotal role in driving CE adoption. However, their effectiveness relies on targeted training that broadens their understanding of the CE, moving beyond its conventional association with waste management. To address this, local governments should institutionalize specialized training programs for elected representatives, focusing on the economic, environmental, and social dimensions of the CE. These programs should incorporate case

studies from leading cities where political leadership has been instrumental in fostering CE transitions. Participation in national and international CE networks, such as the Circular City Network, can facilitate knowledge exchange and enable local authorities to learn from successful practices elsewhere. Collaborations with peers, municipalities, and regions can accelerate the transition to a CE while mitigating common pitfalls.

To overcome organizational inertia and fragmented governance, local authorities should create cross-departmental CE task forces. These task forces would facilitate coordination between the waste management, economic development, and environmental planning departments, ensuring the development of cohesive action plans. The creation of dedicated CE offices within municipal governments, staffed with specialists who liaise with various departments and external stakeholders, can further streamline the implementation of CE policies.

5.2.2. Enhancing stakeholder engagement

The proximity of municipalities to local actors provides opportunities to foster collaboration and co-create CE initiatives. As suggested by [Bourdin and Torre \(2024\)](#), local authorities should establish formal platforms for dialogue, such as stakeholder forums, industry-specific roundtables, or public-private collaboration networks, to leverage this advantage. These platforms can serve as venues for identifying shared goals, aligning stakeholder priorities, and ensuring transparency in decision making.

Community engagement is equally crucial. Local governments should design targeted public awareness campaigns to educate residents and businesses about the benefits of a CE. These campaigns should emphasize the economic opportunities and cost savings associated with circular practices, such as reduced waste disposal fees and material costs. Organizing workshops, hackathons, and neighborhood cleanup initiatives can further galvanize community participation, creating a culture of shared responsibility for circularity.

5.3. Diversifying financial mechanisms and leveraging public procurement for circularity

A key challenge identified in this study is the overreliance on public subsidies to finance CE initiatives. While subsidies play a critical role in initiating projects, excessive dependence on them can lead to financial instability and hinder long-term sustainability. To mitigate this, local authorities should diversify their funding sources by adopting innovative financial models.

Public-private partnerships (PPPs) offer a practical solution, enabling shared investment in circular infrastructure, such as recycling facilities, repair centers, and industrial symbiosis networks. Local governments can also issue green bonds to attract investment from environmentally conscious stakeholders. These bonds could be linked to specific CE projects, such as the development of circular business parks or renewable energy systems, providing transparency and accountability to investors.

Public procurement represents a powerful tool for driving demand for circular products and services. Local authorities should embed circularity criteria into procurement policies, prioritizing suppliers that utilize recycled materials, design repairable products, or offer take-back schemes. For instance, municipalities could mandate that all construction projects use a minimum percentage of recycled materials, aligning with the best practices in the construction sector, as highlighted by [Munaro and Tavares \(2023\)](#).

Beyond materials, procurement policies can support service-based business models, such as product-as-a-service contracts for office equipment or furniture, in which suppliers retain ownership and responsibility for maintenance and end-of-life management. By leveraging their purchasing power, local governments can stimulate market demand for circular innovations and incentivize businesses to align with CE principles.

5.3.1. Establishing robust evaluation and monitoring systems

Evaluation and monitoring are essential for assessing the effectiveness of CE initiatives and refining strategies over time. Local authorities should develop comprehensive metrics that measure environmental, economic, and social impacts (Scarpellini et al., 2019). These metrics should extend beyond traditional indicators, such as recycling rates, to include measures of resource efficiency, carbon footprint reduction, and job creation in the CE.

Investing in digital tools and platforms for data collection and analysis can significantly enhance evaluation efforts. For instance, local governments may utilize geographic information systems to map material flows within their jurisdictions, thereby identifying opportunities for industrial symbiosis or improved waste management. Regular reporting on CE performance, presented in accessible formats for stakeholders, can foster trust and ensure accountability.

Local authorities should also establish feedback loops that integrate lessons learned into policy revisions. For example, pilot projects should incorporate structured evaluations to identify best practices and areas for improvement. The findings from these evaluations can guide the scaling of successful initiatives, ensuring that resources are allocated both efficiently and effectively.

6. Conclusion

This study investigates the challenges and drivers influencing the implementation of CE practices at the local level, informed by insights from 47 interviews conducted with practitioners across France. The findings highlight the significance of political leadership, capacity-building initiatives, and innovative financial strategies as essential determinants of CE success. Local authorities are positioned as critical facilitators of these transitions; however, their endeavors are frequently hampered by organizational inertia, fragmented governance structures, and an overreliance on public subsidies.

A key contribution of this research is its reframing of the CE within a local context. Traditionally construed as a waste management framework for local authorities, the CE has been reconceptualized as a lever for broad economic development. By integrating the CE into local economic policies, municipalities can harness its potential to drive innovation, generate employment, and enhance territorial resilience. This perspective aligns with existing scholarship that emphasizes the transformative potential of the CE while also extending the discourse on it by demonstrating how integrated, cross-sectoral approaches can secure sustained political commitment and stakeholder engagement. This reconceptualization challenges prevailing paradigms and presents practical pathways for local governments to leverage the opportunities afforded by the CE.

The findings underscore the critical role of political leadership and vision in advancing CE initiatives, as previously established by agency theory in the literature (Bourdin, 2024). Elected officials who act as CE champions are pivotal in delineating the long-term vision and mobilizing the requisite resources. Nevertheless, addressing existing gaps in knowledge and expertise remains essential. Strengthening capacity-building efforts among stakeholders, particularly within local governmental structures, is vital for dismantling silos and fostering cross-departmental collaboration. Additionally, collaborative networks, underpinned by robust partnerships with external actors, are equally important in overcoming organizational fragmentation and establishing resilient governance frameworks.

Financial resilience emerges as another critical factor. While reliance on public subsidies has been instrumental in launching CE initiatives, it presents considerable risks to long-term viability. Diversifying funding sources and leveraging public procurement policies to stimulate demand for circular products and services can mitigate this dependence. Innovative financial strategies aligned with territorial development objectives provide opportunities to enhance resilience and effectively scale CE initiatives.

The study also identifies a significant gap in the evaluation and monitoring of CE policies at the municipal and regional levels. The lack of robust metrics restricts the capacity to assess the long-term impacts of circular initiatives and obstructs continuous learning and improvement. Addressing this gap necessitates the development of tailored evaluation frameworks that are consistent with local contexts and priorities. By integrating systematic monitoring and utilizing tools such as financial diagnostics and geospatial data, local authorities can refine their strategies and demonstrate the tangible benefits of CE initiatives to both policymakers and citizens.

This research contributes to the expanding body of CE literature by enhancing the understanding of the territorial dimensions of CE implementation. It complements existing macroeconomic and firm-level analyses by highlighting the systemic challenges encountered by municipalities and regions. Subsequent studies should build upon these findings by conducting longitudinal analyses to evaluate the sustainability and impact of CE initiatives over time. Comparative studies across regions and countries could further straighten out contextual variations. Furthermore, exploring the role of cross-border and regional collaboration can yield insights into how international partnerships affect the development of circular practices, either by fostering innovation or by introducing barriers as a result of misaligned policies and priorities. Another avenue of research involves seeking an in-depth understanding of spatial inequalities in the implementation of CE initiatives. Disparities in regional capacities, resources, and governance structures significantly influence the adoption and success of CE initiatives. Peripheral and rural areas, in particular, present unique challenges, including geographic isolation and limited stakeholder networks. However, these regions also possess untapped potential for leveraging the CE to promote localized resource use and sustainability. Finally, the role of intermediaries in regional governance warrants close examination, as entities such as regional development agencies or nongovernmental organizations can serve as catalysts for CE adoption or, conversely, as sources of inefficiency and fragmentation.

Our study has several limitations. The reliance on qualitative interviews limits the generalizability of the results. Additionally, the focus on the French context may affect the relevance of our observations to other countries. Future research could conduct comparative studies between different cities, regions, or countries to understand how cultural and political contexts influence the implementation of the CE by local authorities. It would also be interesting to complement qualitative analyses with quantitative studies based on surveys of mayors to identify the specific barriers they face and the factors that motivate them to implement CE strategies in their territories.

In conclusion, the CE must be recognized as an integrated strategy that encompasses economic development, environmental stewardship, and social equity. Strong leadership, collaborative governance, and innovative financial mechanisms are essential for overcoming the barriers identified in this study. Addressing gaps in evaluation and implementing integrated strategies allows local authorities to unlock the full potential of the CE to promote sustainable and inclusive development at the local scale.

- o All authors have participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version.
- o This manuscript has not been submitted to, nor is under review at, another journal or other publishing venue.
- o The authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the manuscript

CRediT authorship contribution statement

Sébastien Bourdin: Writing – review & editing, Writing – original

draft, Validation, Supervision, Methodology, Investigation, Formal analysis, Conceptualization. **Nicolas Jacquet:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

None.

Acknowledgments

This research is part of the European Chair of Excellence on Circular Economy and Territories, a Jean Monnet Chair funded by the European Union's Erasmus+ program. The initiative aims to accelerate the transition to a circular economy across European regions and cities.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ecolecon.2025.108542>.

Data availability

The data that has been used is confidential.

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