28 EISIC – 2025

TRANSFORMING CITIES

THROUGH CIRCULAR ECONOMY:

OVERCOMING FRAGMENTATION

IN POLICY AND PRACTICE

Roberto Viviani, University of Roma Tre, Italy,
roberto.viviani@uniroma3.it
Roberta Guglielmetti Mugion University of Roma Tre, Italy,
roberta.guglielmettimugion@uniroma3.it
Maria Francesca Renzi, University of Roma Tre, Italy, mariafrancesca.renzi@uniroma3.it
Veronica Ungaro, University of Roma Tre, Italy
veronica.ungaro@uniroma3.it

Abstract:

Purpose
Research on Circular Cities (CCs) has increased significantly but remains fragmented and lacks common definitions and evaluation tools. In response to these gaps, both conceptual and operational, this paper aims *(i)* to critically assess how circular economy principles are applied in the urban context, with a focus on the role of social sustainability; *(ii*) to analyze the definitions and visions emerging from international city networks, and the common denominator of their participants; (iii) to search for analytical tools capable of capturing the evolving nature of circular strategies over time.

Methodology
The paper combines a literature review with an empirical case study of La Spezia, a signatory of the Circular Cities Declaration. Urban policies are analyzed using an established interpretive framework that categorizes circular economy strategies based on their thematic focus and underlying policy discourse. This framework, originally developed by Calisto Friant and colleagues, is further extended here to include a temporal dimension in order to trace the evolution of circularity approaches of the municipality over time.

Findings
The temporal analysis shows that La Spezia's approach to circular economy is characterized by discontinuity and low formalization, with few explicit strategies and a prevalence of technocentric and fragmented interventions. However, recent planning documents suggest an emerging shift toward more holistic and socially inclusive approaches, as reflected in the gradual increase of policies aligned with transformational discourse types.

Research limitations
The approach adopted presents some structural limitations. The framework was originally conceived to evaluate formal and comprehensive circular economy strategies developed by major urban centers. Its application to a medium-small city, where circular economy policies are fragmented and only partially structured, leads to a methodological limitation.
In addition, the limited availability and detail of certain planning sources made it more difficult to assign consistent scores across all policy areas.

Originality
The paper adopts a temporal perspective to assess the evolution of urban circular economy strategies, in line with recent developments in the literature. This approach enables a more dynamic reading of how circularity discourses, particularly those involving social dimensions, are gradually emerging within urban policies, moving beyond static or purely declarative frameworks. Within this perspective, the study addresses two core questions: how cities define or self-identify as "circular," and to what extent such definitions incorporate social, in addition to environmental, considerations; and whether an interpretive framework originally developed for large cities with formal circular economy strategies can be meaningfully applied or adapted to smaller urban contexts, where circularity is often informal, fragmented, or implicit.

Keywords
Circular Economy, Circular Cities, Circular Strategy, Social Sustainability, Policy Evaluation

Paper type
Research paper

1. Introduction

Contemporary cities represent complex systems where resource consumption, pollution, and social inequality converge. At the same time, they offer fertile ground for transformative change toward sustainability, where replicable and scalable models can be defined, tested, and consolidated.
While intensive urbanization exacerbates environmental, social, and economic problems, urban areas also offer infrastructural, social, and institutional conditions that make them strategic places to implement the transition toward sustainable development models.
In this context, the Sustainable Development Goals (SDGs) and the concept of planetary boundaries serve as essential references. They provide a shared and scientifically grounded assessment framework, helping prevent sustainability from being interpreted arbitrarily or subjectively. Within this framework, the circular economy is emerging as a promising tool to help achieve these objectives (Pasca et al., 2023), proposing a profound transformation of the economic model from linear production and consumption to a circular logic based on regeneration, reuse, and waste reduction.
However, applying the principles of the circular economy to cities presents significant challenges.
First of all, circular economy itself is subject to a variety of definitions and interpretations, making it difficult to assess its effectiveness (Kirchherr, 2023). Moreover, cities are not homogeneous and linear systems, but rather complex and differentiated ecosystems, varying widely both among themselves and within their internal areas. This amplifies the difficulty of identifying truly "circular" models and of accurately labeling cities engaged in this field.
This implies that the principles of the circular economy cannot be applied uncritically or automatically to the urban context. On the contrary, integrating theoretical frameworks, such as those from service management, with advanced analytical tools allows for

maintaining a clear reference to the core principles of circularity and sustainability while developing solutions tailored to the specificities of individual urban contexts (Domenech and Borrion, 2022).
This research aims to achieve two different goals. First, it seeks to analyze the current state of the art in terms of the definition of a “circular city” by examining five of the many international groupings, declarations, and initiatives involving cities. Second, it aims to contribute to the development of an evaluation tool for urban circular policies by integrating an existing model from the literature with new variables and applying it to a case study. Throughout this work, particular attention will be paid to the social aspects of circular policies and initiatives, in line with a growing body of literature showing that these aspects are often neglected in favor of environmental and economic ones (Mies and Gold, 2021; Zavos et al., 2024).
In this context, the study raises two main research questions.
RQ1: Who defines, or self-defines, a city as “circular”? On what basis, and to what extent do such definitions consider social aspects in addition to environmental ones, as suggested by the literature review?
RQ2: Given the absence of formal circular economy strategies in many small and medium-sized cities, is the Calisto Friant framework applicable in such contexts, or can it serve as a starting point for the development of more adaptable evaluation tools?
The paper is structured as follows: after a brief analysis of how social sustainability remains a critical issue within circular economy theory, the discussion moves to explore this topic in the context of cities, with a review of studies explicitly addressing the social dimensions of the urban circular transition. The research then reviews five international initiatives involving urban territories that, in different forms, have conceptualized and implemented circular economy policies.
Finally, to critically analyze the effectiveness and coherence of urban policies inspired by the circular economy, the typological framework developed by Calisto Friant, Vermeulen, and Salomone (2020) has been selected. This model enables the classification and comparison of different visions and strategies of circularity in the urban context, offering an interpretive tool to assess how closely cities’ declarations and actions align with the foundational principles of sustainability. In the remainder of this work, this model will be referred to as the Calisto Friant framework. The framework will be applied, with some methodological adaptations, to the case of the city of La Spezia, a signatory of the "Circular Cities Declaration", to determine its position within the discursive landscape outlined by the authors. The methodological details of the application are illustrated in the following section.
Lastly, the paper presents its conclusions and discusses the research gaps identified, providing a starting point for proposals to further develop studies on the topics addressed here.

2. Literature Review

2.1. Social aspects in circular economy

Studies on the circular economy are steadily increasing. A data extraction carried out on the Scopus database on July 10, 2025, shows that the number of articles with “circular economy” in the title has grown at an exponential rate over the past 10 years, from 21 in 2015 to 1,520 in 2024, an increase of 7,138% (Figure 1).

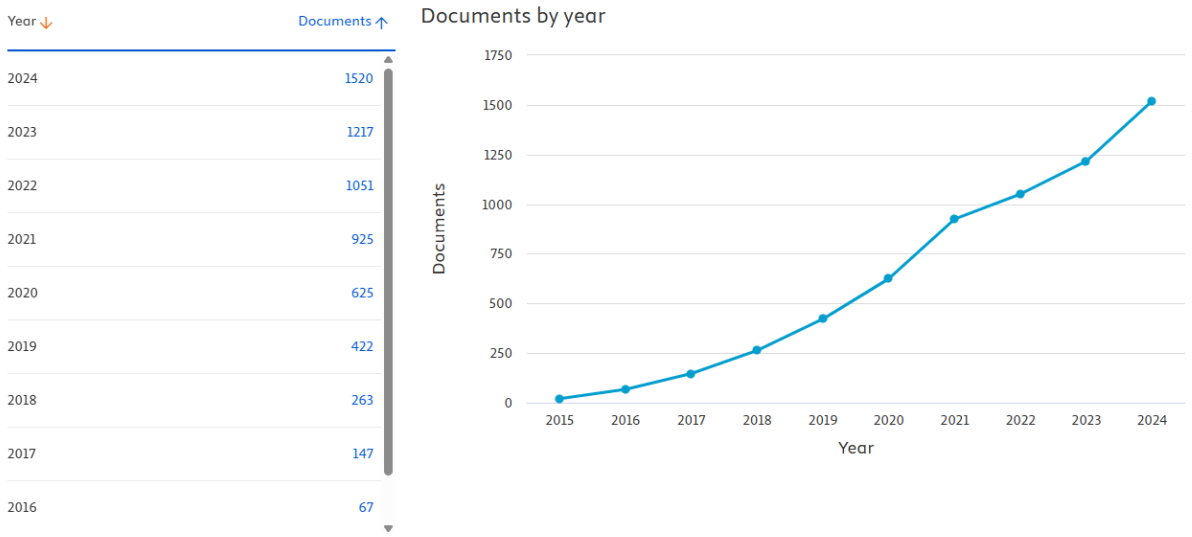

Fig 1- Number of scientific articles published with the words "circular economy" in the title. The search query performed on July 10, 2025, was TITLE ("circular economy") AND PUBYEAR > 2014 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar"))

The highest annual growth rates were recorded in the early years considered, but 2024 saw a rise compared to 2023 (Table 1).

Year	Publications	Growth rate (%)
2015	21	-
2016	67	219.0
2017	147	119.4
2018	263	78.9
2019	422	60.5
2020	625	48.1
2021	925	48.0
2022	1051	13.6
2023	1217	15.8
2024	1520	24.9

Tab 1- Annual increase in publications

Despite this growing interest, the literature on the circular economy has historically shown a marked underrepresentation of the social dimension, privileging environmental and economic aspects (Mies and Gold, 2021, Zavos et al., 2024). This tendency has been highlighted by several systematic reviews, confirming a persistent neglect of social concerns over the years, despite a recent, but belated, increase in attention (Padilla-Rivera et al., 2020).

Furthermore, in the few cases where social issues were mentioned, they were often addressed peripherally and sporadically, with a predominant focus on employment, frequently treated more as an economic indicator than a social one (Mies and Gold, 2021). Many of the social indicators referenced were indistinguishable from economic or environmental ones, such as job creation or the reduction of human exposure to environmental pollution. In particular, the interest in job creation in relation to circular economy often lacked empirical analysis and evaluations regarding the nature, quality, and purpose of the work: “Is job creation therefore a sufficient indicator of social sustainability?” (Mies and Gold, 2021)

Since 2019, a reversal of this trend has been observed, with growing interest in social dimensions. Studies confirm that 90% of the articles addressing social dimensions in the analyzed sample have been published from this date onward (Piao et al., 2023, Valencia et

al., 2023). However, despite this volumetric increase, thematic diversity in the literature has grown very slowly (Piao et al., 2023). Critical engagement with and contestation of the model remain relatively rare, and there is still a lack of detailed empirical research on micro-level practices and human relationships. Many socially oriented studies continue to focus on broader systemic processes and issues, such as discourses and policies on circular economy, rather than on critical analysis or the detailed impact on everyday life (Zavos et al., 2024). Thus, there persists a lack of conceptual clarity regarding the social dimension, which remains difficult to define. At the same time, for the indicators that have been identified, challenges remain in evaluating and measuring them, especially when compared to their environmental and economic counterparts. There is also a lack of assessment of their interrelations, which would help develop a more holistic understanding of circularity policies. There is an ongoing need to move beyond easily measurable social factors that are directly tied to economic or ecological dimensions of sustainability. This suggests that while the absolute number of publications is increasing, the depth and breadth of social analysis, separated from economic or technical aspects, still require stronger integration and a more normative and less instrumental, profit-oriented approach (Mies and Gold, 2021).
In this context, cities represent ideal laboratories to fill these gaps, to identify the key social aspects that need to be integrated into circular policies, and to find the most suitable indicators to assess them. Indeed, they are spaces where circular economy strategies generate social impacts on a wide variety of actors, directly affecting their everyday lives. Moreover, the systemic complexity of urban areas, characterized by interconnections between infrastructure, services, economic networks, and social networks, allows for an analysis of how circular strategies interact with social, economic, and environmental dimensions, revealing benefits, trade-offs, and possible inequalities. Cities also provide a multi-level governance structure that facilitates the experimentation of innovative policies and participatory processes, thanks to the greater proximity of local governments to the population (Winslow and Coenen, 2023)
The following section will therefore examine how the literature on circular cities is, or is not, incorporating the implementation and assessment of social aspects.

2.2. Social aspects in Circular Cities

As with the circular economy, studies on circular cities are also on the rise, as demonstrated by a data extraction carried out on the Scopus database on July 10, 2025, whose results are shown in Figure 2.

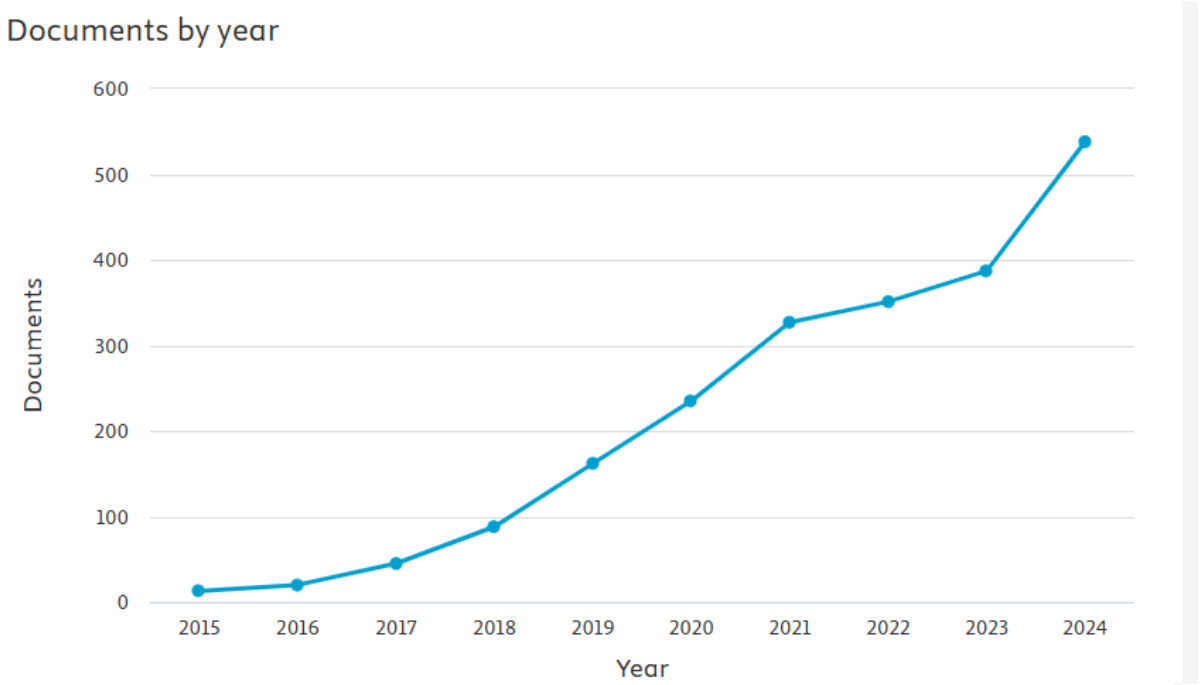

Fig 2 - Number of scientific articles published with the words "circular economy" in the title, abstract or keywords. The search query performed on July 10, 2025, was (TITLE-ABS-KEY (city) OR TITLE-ABS-KEY (cities) AND TITLE-ABS-KEY ("circular economy")) AND PUBYEAR > 2014 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar"))

The scholarly literature on circular cities has grown significantly in recent years, with researchers predominantly focusing on environmental performance and economic efficiency. However, the social dimensions of circular city transitions, such as equity, inclusion, labor justice, participation, and community resilience, have often been underrepresented or marginalized in both academic studies and practical implementations. Recent papers reveal a striking consensus: without deliberate efforts to embed social considerations, circular cities risk reinforcing existing inequalities and excluding the very populations most affected by urban sustainability transitions. Extensive reviews have shown that fewer than 10% of studies integrate social aspects into circular city assessments, with an even smaller fraction deploying inclusive metrics or evaluating outcomes like equity, access, or justice (Vanhuyse et al., 2021; Toboso-Chavero et al., 2025). This exclusion is not merely an academic oversight, it reflects the dominant technocratic orientation of circular economy frameworks that prioritize material flows and efficiency over human well-being and social inclusion. This oversight can trigger a social rebound effect, where efficiency-oriented circular strategies unintentionally reproduce new socio-environmental harms that offset the sustainability gains they aim to deliver (Chen, 2021). For instance, informal waste pickers, who are essential to recycling loops in the Global South, are systemically undervalued and exposed to unsafe, precarious conditions with little legal or institutional support. To address these injustices, a socially restorative model of circular economy has been proposed, one that is based on fair wages, legal recognition, and dignity, highlighting how many corporate recycling initiatives continue to rely on cheap labor without providing adequate social protections or long-term empowerment. While major corporations have launched projects involving waste pickers, these initiatives tend to focus on material recovery targets rather than broader social transformation, thereby reflecting the persistent material bias in circular economy governance (Barford and Ahmad, 2021).

Spatial inequality is another recurring theme, as circular economy employment in some cities is distributed unevenly, with “core” circular economy jobs concentrated in peripheral areas that are poorly connected to public transit (Burke and Grodach, 2025). This spatial mismatch limits access for disadvantaged communities and reproduces patterns of socio-economic segregation. The same concern is echoed in research on Porto, Glasgow, and Amsterdam, where circular city initiatives, though ambitious, often struggle to integrate

social equity into practical implementation (Cavaleiro de Ferreira and Fuso-Nerini, 2019; Calisto Friant et al. 2023). Participatory planning and human-centered indicators emerge as promising pathways to address these gaps. The importance of integrating cultural heritage, social identity, and community well-being into circular city regeneration projects has been emphasized, highlighting the need for more socially responsive approaches (Bosone et al., 2021; Gravagnuolo et al., 2019). Human-Centered Indicators, proposed within these frameworks, offer tools to evaluate inclusivity and local relevance, dimensions that are often absent from conventional circular economy assessments.

Participatory mapping and the creative use of social fiction in planning education further illustrate how community voices can be included in the design and imagination of circular cities (Paoli et al., 2022; Wuyts, 2024). These approaches move beyond consultation toward co-creation, ensuring that circular economy interventions are rooted in the lived experiences and aspirations of urban residents.

Nevertheless, critical voices within the literature caution against the depoliticization of circular city narratives, noting that mainstream circular economy models often perpetuate neoliberal logics of growth, competition, and efficiency under the guise of sustainability, while sidelining more radical visions such as degrowth or sufficiency (Visconti, 2021; Savini, 2019). The concept of the "degrowing circular city" offers an alternative grounded in community resilience, mutual aid, and socio-technical experimentation, in stark contrast to the capital-intensive, high-tech solutions that dominate current policy discourse (Visconti, 2021). This critique is further supported by an analysis of Los Angeles' "One Water" plan, which, despite aiming to promote water sustainability through circular flows, results in decentralized water infrastructure that disproportionately benefits affluent neighborhoods with the resources to invest in home retrofits, ultimately reproducing environmental injustices. The technical approach of water circularity reveals how infrastructure, even when framed as sustainable, can become a medium of exclusion (Meilinger and Monstadt, 2025).

Indicator frameworks, widely used to track circular economy performance, also fall short in capturing social realities (Papageorgiou et al., 2021). Reviews of circular economy indicators show that most frameworks focus narrowly on resource efficiency, material throughput, or carbon emissions, while only a minority incorporate dimensions such as accessibility, employment equity, education, or social participation (Bîrgovan et al., 2022). This limited scope restricts the ability of planners and policymakers to evaluate the broader impacts of circular city strategies, particularly on marginalized populations. Some efforts have been made to address these limitations. For example, a multi-criteria framework developed for the city of Porto includes socio-economic indicators, aiming to broaden the evaluative scope of circular strategies (Cavaleiro de Ferreira and Fuso-Nerini, 2019). Additionally, an evidence mapping study emphasizes the need for more research in non-European contexts, particularly in the Global South, where circular practices frequently arise from necessity rather than formal policy design (Vanhuyse et al., 2021).

In conclusion, the literature strongly supports the view that circular cities must evolve from being merely environmentally restorative to becoming socially restorative and inclusive. To achieve this aim, a paradigm shift is necessary, from viewing circularity as a technical fix to embracing it as a socio-political process that prioritizes human dignity, justice, and participation. Key recommendations from the literature include embedding social impact metrics into circular economy indicator frameworks (Toboso-Chavero et al., 2025; Bîrgovan et al., 2022), expanding support and protections for informal workers (Barford and Ahmad, 2021), promoting participatory and community-led planning (Paoli et al., 2022), and rethinking the growth imperatives underlying circular economy narratives (Visconti, 2021; Savini, 2019). Only by centering people, especially those historically excluded from planning and policymaking, can circular cities achieve their full potential as sustainable, equitable, and resilient urban futures.

2.3. Framework for Circular Cities: definitions, commitments, and differences

To complete the analysis of circular cities, it is useful to attempt a definition of what a circular city is, or at least to understand which cities should be analyzed and why. To date, there are no institutional bodies or recognized associations with the authority to award the label of "circular city," nor are there clearly defined and shared criteria for determining what makes a city circular. So, what exactly are we talking about when we talk about circular cities?
This study aims to examine five of the various declarations and groupings of circular cities, in order to identify commonalities and differences among them.
These five frameworks are: (i) the Circular Cities and Regions Initiative, (ii) the Circular City Declaration, (iii) the Declaración de Ciudades Circulares de América Latina y del Caribe, (iv) the circular cities promoted by the Ellen MacArthur Foundation, and (v) Bloomberg's Circular Cities Hub.
Let us now briefly describe each of them; a summary of the main features is then presented in Table 2.

2.3.1. Circular Cities and Regions initiative

The Circular Cities and Regions Initiative (CCRI) was launched by the European Commission in 2021 as part of the EU Circular Economy Action Plan 2020. It contributes to the policy objectives of the European Green Deal, including the 2050 climate neutrality target, and the EU Bioeconomy Strategy. The CCRI is funded by Horizon 2020 and Horizon Europe, the EU's research and innovation framework programmes.
As stated on the official website, the CCRI aims to support Europe's green transition by boosting circularity at local and regional levels, increasing synergies among projects and initiatives, disseminating relevant knowledge, and giving greater visibility to best practices. It focuses on the implementation of "Circular Systemic Solutions" across Europe's cities and regions.
The initiative is based on the assumption that cities represent the level of governance closest to European citizens, and as sources of innovation and socio-economic transformation, they are ideal environments to lead the shift toward a sustainable, regenerative, and inclusive circular economy. At the same time, in the initiative's "Rationale and Scope," it is acknowledged that many gaps still persist in terms of knowledge, information, skills, and awareness regarding urban circularity.
The initiative focuses specifically on the implementation of "Circular Systemic Solutions", understood as integrated and holistic solutions capable of delivering environmental, economic, and social benefits, while minimizing trade-offs. This concept is reiterated by emphasizing that a systemic circular solution should go beyond waste management alone.
In practical terms, the CCRI provides both financial and technical support through various lines of action: around €200 million over six years for demonstration projects, and €40–50 million for technical assistance and "Project Development Assistance" to support circular economy investments at the local and regional level, depending on specific needs. Additionally, it supports cross-cutting activities such as governance and policy coordination projects, advisory services, capacity building initiatives, and the promotion of best practices. Currently, there are 142 participating entities, including cities, provinces/counties, regions, and territorial clusters (European Commission, 2021).
In the "Projects" section of the official website, 31 practical implementation cases supported by the CCRI are listed to date. These fall into three categories (Innovation Action, Coordination and Support Action, and Project Development Assistance) and cover 23 sectors. However, none of these sectors specifically addresses the multiple and specific social issues that affect cities.
In summary, the CCRI positions itself as a European initiative that, while not granting a formal "circular city" recognition, offers a structured framework of financial tools, technical assistance, and knowledge sharing to support cities and regions in implementing systemic

circular solutions. The social aspects of circularity are treated as part of a holistic approach. There is no specific focus on them, but the explicit statement that the initiative goes beyond waste management already signals a willingness to move beyond past technocentric approaches. Participating cities and regions are not subject to formal reporting obligations or binding monitoring systems. Instead, they are invited to voluntarily take part in workshops, thematic groups, and peer-learning initiatives, and to adopt tools such as the self-assessment tool. In this way, the initiative promotes a model of accountability based on mutual learning and informational transparency, rather than on regulatory coercion.

2.3.2. The Circular City Declaration

The Circular City Declaration is a voluntary commitment, with a European scope, launched in 2020 by Local Governments for Sustainability (ICLEI, originally the International Council for Local Environmental Initiatives), an international network of local governments. It is a declaration signed by cities and regions (88 signatory administrations as of July 1, 2025) that commit to transitioning from a linear to a circular model in their urban policies. The declaration was drafted by a diverse set of stakeholders: EU bodies and institutions (European Committee of the Regions, European Economic and Social Committee, European Investment Bank), UN agencies (UN Environment Programme, UNEP), municipal agencies (Regional Development Agency for Podravje – Maribor; ReLondon), non-profit collectives (Metabolism of Cities), and also private entities such as the Ellen MacArthur Foundation, whose specific project on Circular Cities will be addressed later.
The three core principles of the declaration are:

- Decouple economic growth from resource use;
- Local and regional governments have a critical role to play;
- A common vision of a circular economy is a useful journey guidance.

Joining is entirely voluntary, and any European city can sign the Declaration to join the movement. The signatories position themselves as ambassadors of the circular transition in their respective territories.
The declaration explicitly states the commitment of signatory cities to promote social justice and the pursuit of improved human well-being. Likewise, it clearly affirms the goal of decoupling economic growth from resource use. It refers to the various actors that make up urban life (citizens, businesses, and the research community), while recognizing the crucial role of local governments in achieving the systemic and transformative change required. Finally, the declaration sets out a ten-point list of concrete and systemic commitments that signatory cities pledge to implement in order to accelerate the transition to a circular economy. This list outlines an operational roadmap, beginning with the need to establish clear goals and strategies for circular economy, and to raise awareness both within local administrations and among citizens and businesses. The decalogue also includes the use of economic incentives and fiscal measures to encourage circular behavior, and the promotion of a favorable local regulatory framework for secondary material markets, repair, reuse, and sharing programs. It also emphasizes the need to cooperate with national governments and European institutions to ensure an appropriate policy framework (Circular cities declaration, 2021). In summary, the overall tone treats urban circularity not merely as a technical or economic matter, but as a holistic urban transformation project, where environmental sustainability, economic prosperity, and social inclusion go hand in hand.
The official website of the Circular City Declaration, managed by ICLEI Europe, serves as the reference platform for the initiative. It provides access to the updated list of signatory cities, outreach materials, operational guidelines, and a section dedicated to published reports. To date, two reports have been released, one in 2022 and one in 2024. Signatory cities are encouraged to share their progress with a dual objective: on the one hand, to promote transparency and accountability regarding their commitments; on the other, to foster a process of mutual learning by offering concrete examples and inspiration to other European cities that may wish to embark on similar paths.

2.3.3. Declaración de Ciudades Circulares de América Latina y del Caribe

The Declaración de Ciudades Circulares de América Latina y del Caribe is a regional political declaration, presented in Rome in October 2021 during the 10th Italy–Latin America Conference, with the support of the Economic Commission for Latin America and the Caribbean (ECLAC) and the Italo–Latin American Institute (IILA).
Similar to the Circular City Declaration, this is a voluntary initiative aimed at cities in Latin America and the Caribbean, initially involving eight founding signatory mayors (including Santiago de Chile, Lima, Bogotá, and Buenos Aires). Participation is open to other interested cities, with no binding obligations, but with the objective of creating a regional network of cities committed to circularity.
The declaration is structured as follows: first, nine points outline the motivations behind the need for a transition to a circular economy model in Latin American and Caribbean cities; then, five points specify the concrete actions to be undertaken, including the creation of cross-sector working groups, the drafting of guidance documents, the engagement of local stakeholders for a shared vision, awareness-raising activities targeting citizens, and the dissemination of progress through publications and events. Finally, two clauses state the objectives and scope of implementation.
The four key objectives of the agreement include the definition of clear and measurable guidelines and targets, the promotion of awareness around circular practices, support for a favorable regulatory framework for circular business models, and the acceleration of the integration of circularity principles in urban planning, infrastructure, and asset management.
The second clause specifies that this is a voluntary commitment document, open to new members, aimed at supporting the transition from a linear to a circular economy. It also highlights the role of the declaration in fostering consensus and increasing active engagement among city administrations and other stakeholders, stressing the importance of collaboration to achieve global goals and cooperation between cities.
From a strictly social perspective, the declaration emphasizes citizen participation in co-creating solutions and identifying priority objectives, acknowledging that the circular transition can only succeed with community involvement. It places strong emphasis on inclusion, equity, and urban well-being: the text explicitly states that the transition must combine environmental sustainability with social inclusion, improving quality of life, public health, and resilience in cities. It speaks of equitable and sustainable urban development, of addressing inequalities, and of ensuring that the new urban model benefits all segments of the population (Comisión Económica para América Latina y el Caribe, 2021).
Unlike the European Circular City Declaration, there is no dedicated website or platform, making it difficult to track updates on the initiative. However, some developments have emerged through online research, such as an event organized by the Economic Commission for Latin America and the Caribbean (ECLAC) in 2022 for signatory cities, and the signing of the declaration by the Brazilian city of Curitiba in March 2023.
A noteworthy aspect of this project is the leading role played by Italy's National Electricity Company (ENEL), one of the world's main operators in the electricity and gas sectors. Specifically, ENEL Chile promoted and organized the first technical team meeting following the launch of the declaration, in September 2022, giving the initiative an immediate public–private collaboration dynamic.

2.3.4. Ellen MacArthur Foundation – Cities and Circular Economy

The Ellen MacArthur Foundation, as stated in its mission, is "a non-profit organisation that creates evidence-based original research on the benefits of a circular economy, and how it can contribute to solving global challenges like climate change and biodiversity loss."
The Foundation's approach is to "engage with the current system to drive change quickly, building strong relationships with decision-makers from business, government and academia, designers, innovators, NGOs and others."
The Foundation, named after its founder, a former British solo long-distance sailor, was

established in 2010.
One of the topics it focuses on in relation to the circular economy, alongside food, fashion, education, and others, is that of cities.
On this topic, the Foundation's framework includes 34 case studies showcasing circular economy-related initiatives implemented by cities around the world; articles and publications offering recommendations and guidelines; a self-assessment tool specifically addressing food systems in urban contexts; and a deep dive that explores how applying the principles of the circular economy can provide solutions in the areas of buildings, mobility, and food within cities (Elle MacArthur Foundation, 2018)
Although it does not include a formal declaration or group cities based on geography, the Foundation serves as a global reference point for the circular economy and is one of the two most cited frameworks in the literature on the subject (Woldeyes et al., 2025).
The case studies presented by the Ellen MacArthur Foundation mainly focus on cities that have developed concrete action plans for implementing the circular economy in their specific contexts. However, not exclusively, some case studies highlight individual initiatives, many of which are centered on food waste reduction, waste management, and solutions to counteract extreme climate events through the enhancement of urban green spaces. Social aspects are not explicitly addressed in either the framework or the case studies. Only the most recent case study, dated February 25, 2025, discusses the city of Cleveland and the involvement of local stakeholders to support circular economy initiatives. However, it does not specifically mention improvements in social conditions, the inclusion of marginalized communities, or the reduction of inequalities within cities.
In terms of partnerships, the Foundation collaborates with strategic partners that include major multinational corporations such as Amazon, Coca-Cola, Nestlé, Visa, Intesa Sanpaolo Bank, among others. In 2024, it was funded 57% by corporate donations (Elle MacArthur Foundation, 2025).

2.3.5. Circular cities hub by Bloomberg and Holcim

The Circular Cities Barometer is an initiative launched by Holcim (a multinational company in sustainable building materials) and Bloomberg Media in April 2022, with the goal of measuring and comparing the progress of cities in transitioning from a linear to a circular economy. Similar to the EMF, this initiative was selected for analysis because, thanks to Bloomberg's significant media and commercial influence, the index has a strong capacity to shape public debate, guide urban policies, and establish widely recognized global benchmarks. The tool is an annual barometer that evaluates the performance of a selected group of major global cities leading the way in urban circularity. The second edition of the Barometer, published in September 2023, includes 30 cities, having added five new ones (Vienna, Brussels, Buenos Aires, Washington D.C., and Madrid) to the original 25.
The 30 cities were selected from among the nearly 100 cities whose mayors are part of the C40 network, a global coalition working to address the climate crisis, partially funded by Bloomberg Philanthropies. They are assessed through a proprietary algorithm that assigns urban circularity scores.
Specifically, the barometer evaluates each city across four key dimensions:

- Circular Buildings: circular construction;
- Circular Systems: urban systems such as resource, waste, energy, and mobility management;
- Circular Living: circular lifestyles and consumption patterns among citizens;
- Circular Leadership: policies and leadership supporting circularity;

Each dimension is assessed through specific criteria: for buildings, the presence of sustainable constructions with certifications is evaluated; for systems and lifestyles, the extensive use of renewable energy, the availability of green mobility options for residents, the presence of recycling hubs that keep materials in circulation, closed-loop economy, and broad access to green and natural spaces in cities, also measured by tree canopy coverage,

are all considered. The Circular Leadership dimension considers enabling factors such as urban policies and investments that foster a supportive regulatory environment; recently, the indicator for circular public procurement was introduced.
The results are synthesized into an overall score and ranking: in the most recent edition, published in 2023, London ranked first, followed by Seattle, Copenhagen, Paris, and Zurich. The Barometer serves as a comparative tool and as a database of best practices: the latest edition collected over 300 exemplary circular initiatives, related to construction, energy, waste, policies, and more, from the analyzed cities, with the intention to update and expand this collection annually.
As for social aspects, the Barometer does not include indicators explicitly focused on inclusion or social cohesion. Its primary focus lies on urban infrastructure, environmental sustainability and governance. However, some of the metrics, particularly those under the Circular Living category, indirectly reflect residents' well-being and quality of life, such as the availability of sustainable transport for all and access to urban green spaces.

Framework name	Introduction year	Application type	Number of cities that signed/were analyzed	Promoting organization	Geographical area	Framework name	Funding type	Evaluation/reporting method	Prevailing approach	Social references
Circular Cities and Regions initiative	2021	Volontary	142	European Commission	Europe	Circular Cities and Regions initiative	Public (UE, Horizon 2020)	Success stories, published case studies, and participation in communities of practice; no binding obligations	Environmental, with emphasis on social aspects and inclusion, and a strong focus on multi-stakeholder governance and collaboration.	Yes, as part of a holistic approach
Circular City Declaration	2020	Volontary (by signing the declaration)	88	ICLEI Europe + EU partner	Europe	Circular City Declaration	Public (UE, Horizon 2020)	Self-assessment, voluntary commitment. Reporting every 2 years	Environmental, with a focus on governance	Yes (inclusion, well-being, participation)
Declaración de Ciudades Circulares ALC	2021	Volontary (by signing the declaration)	13	CEPAL + ENEL	Latin America and Caribbean	Declaración de Ciudades Circulares ALC	Mixed (istitutional and private)	Political commitments and declared periodic review. Not updated.	Environmental, with emphasis on social aspects and inclusion	Yes (inclusion, equity, participation)
Ellen MacArthur Foundation - Cities	2017	Collaborative/project-based (by invitation and partnership)	34	Ellen MacArthur Foundation	Global	Ellen MacArthur Foundation - Cities	Private, corporation	Adaptable tools and frameworks (no scoring)	Environmental, with limited reference to social aspects	Yes (quality of life, cohesion, employment)
Circular cities hub	2022	External analysis (selection by the initiative's promoters)	30	Bloomberg Media + Holcim	Global	Circular cities hub	Private (Holcim+Bloomberg)	Periodic comparative index, proprietary algorithm	Environmental, social aspects only indirectly addressed (Circular Living)	Not explicitly, but implicitly through 'Circular Living'

Tab 2 - Main features of the frameworks analyzed

2.4. The framework

The critical review of the literature reveals that definitions of the circular economy, and consequently of circular cities, are extremely heterogeneous and fragmented. Despite the proliferation of theoretical models, proposed indicators, and concrete initiatives, no clear or shared definition emerges, reflecting the inherently variable nature of Circular Cities, which are by definition characterized by multiple diversities.

This lack of theoretical convergence inevitably translates into divergent practical approaches, making it difficult both to assess the actual effectiveness of implemented actions and to compare experiences, thus hindering the sharing of best practices.

Moreover, the analysis highlights how social aspects related to the application of the circular economy are systematically undervalued: they are often absent from theoretical definitions and from the evaluation frameworks adopted, and remain marginal even within the individual initiatives implemented by cities.

This lack of attention to the social dimension risks reproducing, even within urban circular economy models, the very same inequalities generated by the linear production and consumption model (Barford and Ahmad, 2021) that this approach seeks to overcome.

The Calisto Friant framework, analyzed in this section, serves as a useful tool for standardizing the analysis of urban circular economy policies. Its ability to systematically classify policies according to thematic areas and types of strategic approach allows for the comparison of circular policies across cities, highlighting their dominant orientations and existing gaps. The framework consists of three main components.

First, it identifies 48 concrete circular economy policies, grouped into 12 thematic areas ranging from waste management, construction, and mobility to governance, education, and social inclusion. These are further organized into three macro-areas: Waste, energy, and material resource flows; Built environment and spatial planning; Socio-political structure.

Second, each policy is classified according to four different types of strategic discourse that reflect distinct ideological visions of the urban circular economy:

(i) Reformist Circular Society (optimistic and holistic); (ii) Technocentric Circular Economy (optimistic and segmented); (iii) Transformational Circular Society (skeptical and holistic); (iv) Fortress Circular Economy (skeptical and segmented).

Finally, the framework includes a scoring system to assess the intensity of cities' commitments, using a scale from 0 to 5 to measure the level of implementation of each policy in a specific urban context. This methodology allows for the calculation of both the overall engagement of a city in each thematic area and the relative strength of the different discursive approaches adopted, resulting in a synthetic and comparable profile of urban circular strategies.

The final output, as exemplified by the case of the city of Amsterdam, is presented through two types of charts. The first type shows where the city is acting (policy areas), while the second illustrates how it is conceptualizing the circular economy, i.e. the underlying philosophies of its strategies.

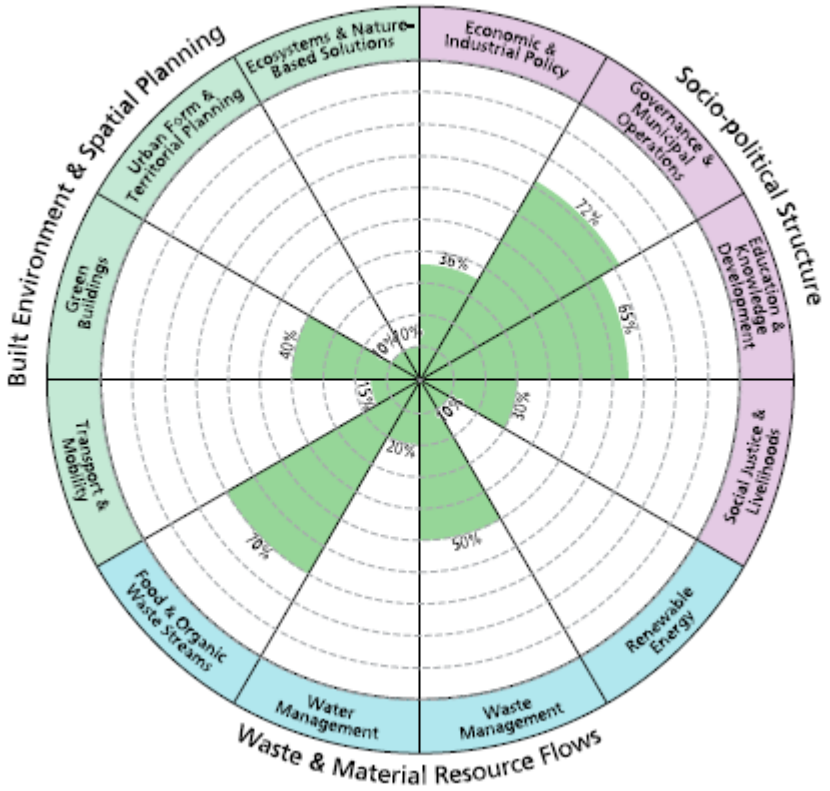

Fig 3 - Assessment of the 48 policies according to the Calisto Friant framework

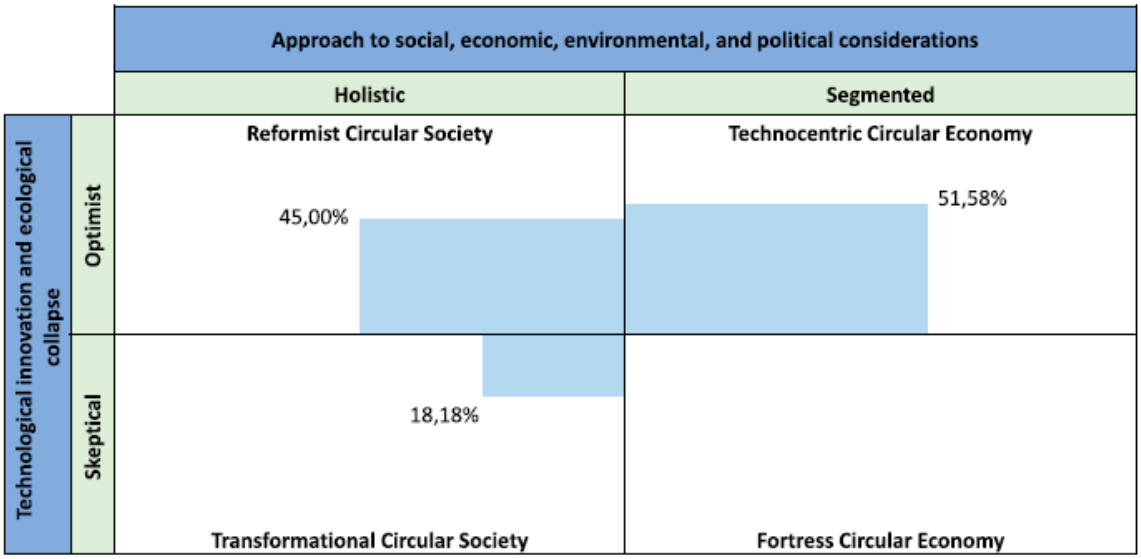

Fig 4- Assessment of the city discourse type according to the Calisto Friant framework

The present framework therefore proves to be a valuable tool for analyzing the approach of cities to the issue of circularity, as well as a necessary means for comparing the different approaches implemented by different cities.

However, given the evolving nature of the circular economy, it becomes necessary to integrate the temporal dimension into this framework. circular economy is a dynamic concept, whose content and meaning have changed over time, progressively incorporating more explicit references to sustainability and social aspects. We have already shown how, in recent years, the literature on circular cities has increasingly included social dimensions. Therefore, to meet the needs of a more comprehensive analysis aligned with the theoretical and practical evolution of the phenomenon, it is proposed to extend the existing framework with a temporal analysis. This integration would make it possible to assess how cities' approaches change over time, whether there is an increasing focus on social aspects, and whether convergence trajectories are emerging toward more inclusive and just models of

urban circular economy. In this perspective, the framework would not only be a static tool for classification, but would become a true dynamic metric of transition, capable of reflecting the cultural and political transformations of cities in their circular transition.
In addition, the temporal dimension allows for the correlation of urban circularity policies with specific events, such as a change in city administration, or particular economic and social contingencies that may influence the nature of the policies and initiatives implemented by a city.

2.5. Case Study: La Spezia, Italy

To apply the proposed evolution of the framework by adding the temporal dimension, we now examine its direct application to a specific case: the city of La Spezia, in Italy.
The city of La Spezia was selected because it is one of the 88 signatories of the Circular Cities Declaration, and one of only four Italian cities to do so, along with Florence, Genoa, and Prato. La Spezia is a provincial capital located in the Liguria region. It is a coastal city with just over 92,000 inhabitants.
It hosts a major commercial and military port, as well as significant industrial facilities, resulting in environmental and health-related challenges linked to these activities.
From 1962 until 2021, the city was home to one of Italy's largest coal-fired power plants. Partly due to this, since the early 2000s, epidemiological studies have reported health risks for the local population caused by industrial air pollution. For example, research conducted by the National Cancer Research Institute of Genoa (Fontana et al., 2000) found increased respiratory symptoms and certain blood disorders in the industrial district of Vallegrande, where the power plant was located.
In recent years, the municipality has launched a series of sustainability-oriented actions, including urban interventions aimed at reducing environmental impacts and promoting more responsible behaviors among citizens.
Although Amsterdam, Copenhagen, and Glasgow have also signed the same Circular Cities Declaration as La Spezia, it is clear that we are dealing with completely different contexts. The cities analyzed in Calisto Friant framework represent medium-to-large urban centers, and most importantly, cities with high per capita wealth, productivity, and tourist inflow. To illustrate, Amsterdam has around 905,000 inhabitants (CBS Statistics Netherlands, 2025 and more than 22 million tourist visits annually (Amsterdam municipality, 2025).
Copenhagen, with approximately 665,000 inhabitants (Statistics Denmark, 2025) and over 10 million annual tourist overnight stays (Wonderful Copenhagen Annual Report, 2019).
Glasgow has 635,000 inhabitants (National Records of Scotland, 2022) and is considered the second economic and cultural hub of Scotland, with approximately 2 million annual visitors (International Passenger Survey 2023).
In contrast, La Spezia has just over 92,000 inhabitants (Istat, 2025), an economy strongly tied to shipbuilding, port logistics, and cruise tourism, with significantly lower tourist volumes compared to the other cities mentioned (La Spezia municipality, 2025).
Using the same evaluation framework for such a different context allows us to assess its potential and limitations, as well as possible improvements, reflecting the variability that characterizes so-called circular cities and, more specifically, the signatories of the Circular Cities Declaration.
However, the selection of La Spezia implies a modification in the applied methodology: although it is a signatory of the declaration, the city does not have a dedicated circularity manifesto, nor the "main circular economy action plans or strategies and other directly associated documents published by the local city governments or their partners in the initiative" that were analyzed for the other three cities.

2.5.1. La Spezia as signatory of the Circular Cities Declaration

In the 2024 report of the Circular Cities Declaration, as well as in the 2022 edition, the section dedicated to La Spezia immediately states that La Spezia does not have a dedicated

circular economy action plan. In the most recent version, it also notes that “Starting in 2017, the city has developed a specific La Spezia Green programme, aimed at achieving a more sustainable city.”
However, the link associated with “La Spezia Green programme” redirects to a page on the city’s official website titled “Projects, funding, and calls for proposals on ecological transition topics”, where the only two attached documents refer to the request and confirmation for the installation of electric car charging stations.
As for the main aspects related to circularity mentioned in the reports of the Circular Cities Declaration concerning La Spezia, they are as follows:
Report 2022:

- awareness raising about waste management: the associated link redirects to a page on the official website of the Municipality of La Spezia that does not exist;
- shared mobility: as in the previous point, the associated link redirects to a non-existent page on the Municipality of La Spezia’s website;
- energy and water efficiency: the associated link redirects to a page on the Municipality of La Spezia’s website containing the building regulation, a 92-page document approved by the municipal administration in 2015 and later integrated and revised in 2017.

Report 2024:

- waste management: The associated link leads to the "Waste Management" page on the Municipality’s official website, which contains 10 press releases related to works and initiatives on the topic, but no programmatic or comparable document;
- sustainable urban mobility plan: The link, similarly to the previous point, leads to the “Sustainable Mobility” page on the Municipality of La Spezia’s website, which contains various institutional communications but no strategic plans or broad-scale programs;
- water saving measures: As in the 2022 report, the link redirects to the building regulation on the Municipality’s website.

These findings confirm the absence of a coherent and structured strategic framework dedicated to circular economy in La Spezia. The references included in the Circular Cities Declaration reports mostly lead to fragmented or inaccessible content, further highlighting the limited formalization of circular initiatives at the municipal level.

3. Methodology

First, a research was conducted in the scientific literature to identify any studies related to the city of La Spezia and its circular economy policies. The research was carried out on the Scopus database, with no time restrictions, using the keywords "La Spezia" and "circular" in abstracts, titles, and keywords, expressed through the following query:

(TITLE-ABS-KEY ("la spezia") AND TITLE-ABS-KEY (circular))

The search returned 4 records, none of which were even remotely relevant to the topic.
A second search was then carried out, expressed through the following query:

(TITLE-ABS-KEY ("la spezia") AND TITLE-ABS-KEY (city) AND TITLE-ABS-KEY (strategy))

This returned a single result, an analysis focused on another Italian port city (Torre Annunziata), which mentioned La Spezia as a benchmark and was dated 2013.
It was therefore decided to carry out a search entirely online, using the Google search engine.
Five policy documents were identified, although they are not explicitly focused on circular

economy policies. Specifically, these include:
(i) the “Sustainable Energy Action Plan” (SEAP), signed by La Spezia’s administration in 2011, (ii) the “Mayors Adapt”, launched by the European Commission and joined by the city in 2014, (iii) the masterplan “La Spezia 20.20 – The City Becomes Smart,” dated 2015, (iv) the protocol “La Spezia of the future: a model of sustainable and circular development” from 2019, and (v) the “Territorial Strategy for Sustainable Development,” published in 2024.
The first two documents are initiatives of the international agreement "Covenant of Mayors – Europe" not specifically focused on circularity theory. They represent general guidelines primarily centered on the concept of sustainability, though used in two different contexts with distinct objectives.
Regarding the SEAP, its main goal is climate change mitigation through actions aimed at improving energy efficiency, promoting sustainable mobility, and increasing the use of renewable energy within cities. The information regarding this document was gathered from the page dedicated to La Spezia on the official website of the Covenant of Mayors, which includes the Action Plan for Sustainable Energy, that is not available for consultation, and the 2016 monitoring report (European commission, 2011).
From the monitoring report, we extracted the indications of the action plan that La Spezia committed to.
Mayors Adapt, on the other hand, focuses specifically on adaptation to climate change and its consequences. Participating cities are required to submit local adaptation strategies across various areas. On the same La Spezia webpage on the Covenant of Mayors website, it is possible to consult the commitment document signed by the mayor, which qualifies as a high-level programmatic document. The remaining information was gathered from the official website of the Municipality of La Spezia, where a dedicated page collects informational material and individual practical initiatives implemented in the area as a result of the plan’s application. There is also a link to the official website of the project, which involves Italian and French cities, where additional informational material can be found (La Spezia municipality, 2015).
The third and fourth documents, however, are indeed broad programmatic initiatives, created specifically by the municipal administration of La Spezia. As suggested by their titles, they are focused on the implementation of smart and sustainable circular strategies.
For the masterplan “La Spezia 20.20 – The City Becomes Smart”, three publicly available documents were found, including an institutional presentation drafted by the city councillor responsible for the project, a sectoral report from an institutional project partner and sectoral knowledge platform webpage (La Spezia municipality, 2015). These describe the strategy launched in 2015 by the municipality of La Spezia to transform the city into a smart and sustainable urban system, with a focus on energy efficiency, digital infrastructure, and stakeholder participation. The program includes actions such as retrofitting public buildings for energy savings, implementing smart grids, creating energy communities, promoting local biomass chains, and enhancing urban mobility through electric vehicle charging and bike-sharing services. However, no official masterplan document adopted by the municipality was found, which limits the possibility of verifying the strategic framework or the level of formal commitment.
For the protocol “La Spezia of the future: a model of sustainable and circular development”, only a press release announcing it could be retrieved.
Although this could be equated to the programmatic documents used in Calisto Friant framework in their analysis of Amsterdam, Glasgow, and Copenhagen, the absence of the original text makes it impossible to include it in the analysis.
Finally, for the “Territorial Strategy for Sustainable Development”,four sources were identified for this purpose, one of which is the Regional Territorial Plan of the Liguria Region. This is the strategic plan to which the Municipality of La Spezia requested and was granted accession, by submitting a specific project for its own territory.
The regional document is highly detailed and comprehensive, explicitly defined as a “strategic plan that (i) bases its reflection, objectives, and actions on medium to long term scenarios, starting from a grounded analysis of current realities and trends; (ii) identifies

diversified actions according to the different objectives and target stakeholders; (iii) proposes the sharing of objectives among the involved actors, while leaving each of them the necessary interpretative flexibility." (La Spezia municipality, 2024).
For this reason, it was included in the analysis, as it provides a programmatic perspective and, for the first time, contains explicit, though general, references to the principles of circularity.
For the Municipality of La Spezia, the following sources were identified:
(i) the formal approval document for joining the regional plan and obtaining related funding, within the framework of the territorial strategy for sustainable development;
(ii) the Municipality's web page listing, though not detailing, some proposals not included in the formal approval document;
(iii) the report from one of the focus groups planned within the strategy, involving various local stakeholders.
All of these are available on a dedicated page of the official website of the Municipality of La Spezia. In the policy evaluation process, greater weight was given to the documents specifically related to the city of La Spezia, particularly for those policies explicitly addressed by municipal actions. The regional strategic plan was also taken into account for policies oriented toward broader-scale strategies, especially considering that the program is set to conclude in 2027.
To these four identified documents, it was decided to add the building regulation drafted by the municipality, as it is explicitly referenced in the Circular Cities Declaration.
This is the municipal regulation that governs construction activities in the City of La Spezia. Its main purpose is to define the procedures for obtaining building permits, like the bureaucracy underlying construction authorizations, and to establish technical and functional requirements for urban quality.
The regulation includes detailed provisions on hygiene, safety, energy saving, removal of architectural barriers, and landscape and environmental protection, integrating national and regional legal frameworks.
It is difficult to equate it to a programmatic document, given its primarily administrative and regulatory nature, although some articles refer to principles of energy efficiency, rainwater recovery, and the installation of photovoltaic systems.
The five documents were analyzed to assign scores to the 48 policies included in the Calisto Friant framework. In the final assessment of a policy relating to a specific period of time, the highest score obtained by one of the policy documents issued during that period was used. The main features of the documents are presented in Tab.3.

Document	Year	Sources	Brief Description
SEAP	2011	Covenant of Mayors official website (monitoring report)	Climate change mitigation plan: energy efficiency, renewable energy, sustainable mobility. No access to the original action plan.
Mayors Adapt	2014	Covenant of Mayors official website (commitment document); Municipality of La Spezia website and Adapt initiative official website (project info)	Adaptation strategy to climate change. High-level commitment document signed by the mayor.
La Spezia 20.20 – The City Becomes Smart	2015	Municipality of La Spezia, Fondazione Torino Wireless (project partner), SmartCityWeb (sectoral knowledge platform)	Smart city strategy proposed by the municipality. General goals available, Includes concrete measures across energy, transport and governance. No full document retrieved.
Building regulation	2017	Municipality of La Spezia website (92 pages document)	Administrative regulation for building permits and urban quality. Includes references to energy efficiency and environmental criteria.
Territorial Strategy for Sustainable Development	2024	Municipality of La Spezia website (single webpage)	Recent municipal strategy on sustainable development. Very limited content available online.

Tab 3 - Main features of the five policy documents considered for the case study of La Spezia

To summarize, the scoring process is composed as follows

1. collection of the programmatic documents from the City of La Spezia;
2. distribution of the documents into three time periods: 2010–2014; 2015–2019; 2020–2024;
3. evaluation of the 5 collected documents and subsequent scoring of the framework policies;
4. calculation of the scores for the 12 policy areas and 4 discourse types;
5. definition of the discourse types for the city of La Spezia across the three time periods.

It must be noted that the approach adopted presents certain structural limitations. The Calisto Friant framework was originally designed to assess urban circular economy strategies on a large and formalized scale, such as those implemented by major European cities with explicit and well-structured strategic plans. Applying the same framework to a medium-small urban context like La Spezia, in the absence of a programmatic framework specifically built around the circular transition, inevitably involves a certain degree of methodological distortion. Moreover, regarding two of the five documents, specifically “La Spezia 20.20 – The City Becomes Smart” and the “Territorial Strategy for Sustainable Development,” only limited information is available, which made it more difficult to assign scores for the relevant policies. Despite these critical issues, it was decided to proceed with the analysis, fully aware of its experimental nature. The goal, in fact, was not to provide a definitive judgment on the city's circular performance, but rather (i) to understand the criteria for including a city in international initiatives dedicated to circular cities and (ii) to assess the potential of the framework proposed by Calisto Friant in this context, in order to understand whether the international initiatives that bring together circular cities reflect a particular type of policy. Although the documents analyzed are not programmatic strategies in terms of circular economy, their multiplicity allows us to place them in different time periods and thus to analyze potential evolutions or trajectories related to sustainability policies already adopted by the municipality. In the future, it may be worth considering the inclusion of individual initiatives in the evaluation model, in addition to programmatic documents. This would contribute to studying the evolutionary trajectories of circular strategies and, moreover, to monitoring whether the commitments made through strategic documents are actually implemented through initiatives and practices
In this sense, the case of La Spezia serves as a useful example for evaluating both the current state of the art and the limitations regarding the classification and assessment of so-called circular cities.

4. Results

The first graph (fig. 5) shows the level of interest expressed by the municipality in the twelve policy areas identified by the Calisto-Friant framework, divided across the three analyzed periods. A clear predominance is observed, during the first two periods, of policies related to governance and municipal operations, confirming an initially strong institutional and administrative orientation. In the third period, this attention slightly decreases. Interest in economic and industrial policies remains almost entirely absent throughout all periods, consistent with the lack of explicit references to the circular economy in the examined documents. Attention to ecosystems and nature-based solutions records a significant presence in all three periods, reaching 100% in the most recent one. Additionally, there is a progressive increase in attention towards urban form and territorial planning, driven particularly by the Strategic Plan for Sustainable Development, which explicitly includes territorial planning among its priority axes.
Moreover, a decline in attention towards policies related to social justice and livelihoods is observed. This trend is concerning, as it can be attributed to the fact that the only policy document available for the third period, the Strategic Plan, despite being oriented toward sustainability, does not explicitly address these areas. This reflects a persistent gap in

attention that continues to treat social aspects as non-essential for the implementation of sustainable solutions.
Another observed slowdown across the periods pertains to the Green Buildings area. This is due to the development of the building regulation between 2015 and 2019, which significantly impacted related policies.
Finally, special attention should be given to the data concerning the waste management policy area, which appears extremely low across all three analyzed periods, being entirely absent in the first and third. This result, however, seems misleading, as it does not reflect the actual importance that the issue holds within municipal strategies. La Spezia has in fact implemented a comprehensive series of initiatives in waste management over the years, achieving noteworthy results at the national level (La Spezia municipality, 2024).
The municipality is among those with the highest material recycling rates, thanks to the introduction of an advanced separate collection system, which includes a pay-as-you-throw pricing mechanism based on the "polluter pays" principle. Moreover, La Spezia has successfully moved beyond the traditional door-to-door model, often considered the ultimate goal in urban waste management, experimenting instead with area-based collection through smart recycling points and digitalized waste containers, significantly enhancing service efficiency. These measures are accompanied by a concern for social justice, reflected in adjustments of waste taxation for lower-income households, determined based on the Equivalent Economic Situation Indicator (ISEE), a parameter measuring the overall economic level of a household.The intersection between waste management and the social dimension is therefore clear but is not captured by the adopted framework, as these actions are not formalized within official policy documents. This discrepancy raises questions about the framework's ability to detect established operational policies that are not formalized in strategic plans, suggesting a need for methodological integration to better capture concrete administrative actions.

Fig 5 - Assessment of the 48 policies in the three different periods, for La Spezia

Fig. 6 illustrates the intensity with which the urban policies of La Spezia were adopted, over the three analyzed periods (2010–2014, 2015–2019, 2020–2025), each of the four discourse types defined in the Calisto Friant framework. In the first five-year period examined, the city of La Spezia shows a relatively marked alignment with the technocentric and reformist approaches, indicating a predominantly optimistic orientation in addressing the challenges related to circular transition. This suggests a positive perception of the ability of technology and institutional reforms to drive change. Additionally, there is limited evidence of elements linked to the skeptical Transformational Circular Society Approach, indicating a partial but not predominant openness towards more critical and systemic interpretations of ongoing transformations. In the second five-year period, the city of La Spezia's vision evolves, exhibiting greater adherence to the skeptical approach outlined by the Transformational Circular Society Approach, which progressively gains prominence in interpreting circular dynamics. Simultaneously, the optimistic component strengthens, with increased alignment to both technocentric and reformist approaches, confirming an articulated and plural interpretation of urban transformation trajectories.
This multidirectional expansion in alignment is justified by the profoundly different nature of the two policy documents produced in this period. On one side, the Master Plan "La Spezia 2020 – The City Becomes Smart" represents a broad, highly visionary perspective oriented towards innovation, although the absence of the complete document limits a more detailed analysis. On the other side, the building regulation is a technical and detailed act, focused on specific regulatory aspects, with a more operational and sectoral scope.
In particular, the increased alignment with the skeptical approach can be explained by the fact that the Building Regulation contains numerous provisions aimed at mitigating the effects of climate change and managing environmental impacts, reflecting an adaptation and prevention logic fully consistent with the critical perspective of the Transformational Circular Society Approach. Finally, the most recent period analyzed reveals an overall decrease in adherence to the various approaches, partly due to the availability of only one policy document, the Strategic Plan for Sustainable Territorial Development, which by its very nature provides a unified and broad vision, limiting the emergence of divergent trajectories. Within this context, there is a marked strengthening of the reformist approach, characterized by a holistic and optimistic perspective towards sustainable transformation, while the segmented and technocentric approaches decrease, consistently with the integrated and systemic nature of the plan. However, a residual presence of the skeptical approach remains, justified by explicit references to climate resilience interventions and mitigation of environmental impacts, highlighting a persistent attention to the systemic consequences of ongoing changes.

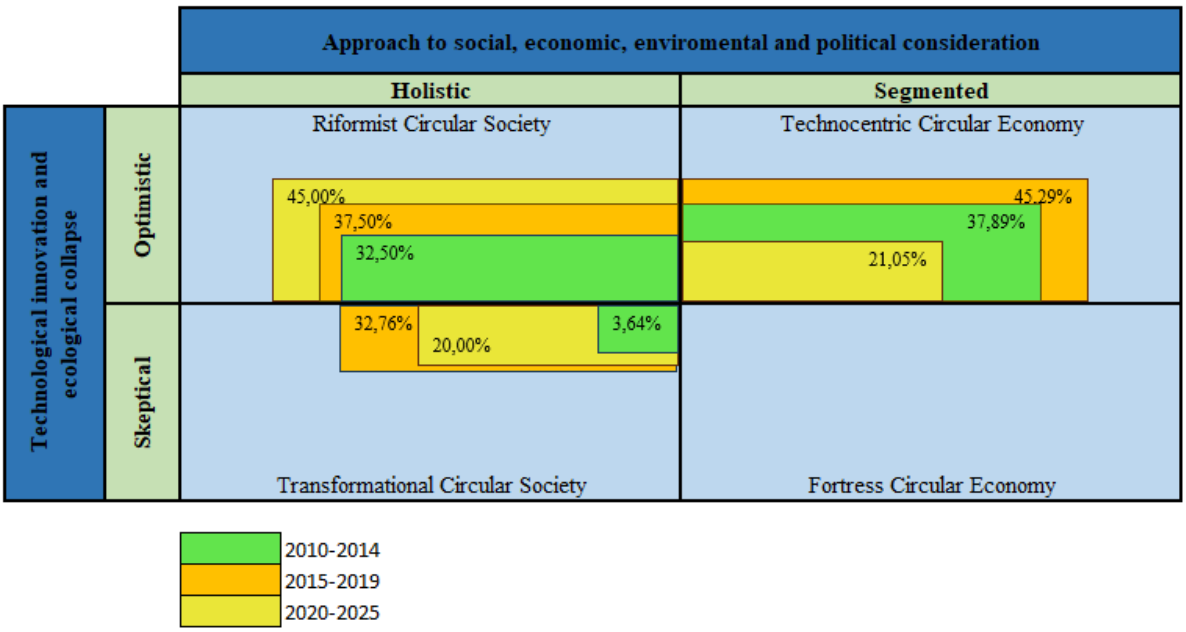

Fig 6- Assessment of the city discourse type for La Spezia

5. Conclusions

This research investigated the theoretical, practical, and evaluative fragmentation of so-called circular cities, differentiated and complex ecosystems engaged in integrating the principles of the circular economy, which are still evolving.
The analysis leads to four main conclusions:

1. Interest in the social dimensions of circular policies is growing, highlighting the need for integration in both academic research and implementation practices. The necessity to shift from a linear system of production and consumption to a circular one in order to halt planetary environmental collapse is now widely acknowledged. However, limiting analyses of circularity to this single aspect appears increasingly short-sighted and, at times, counterproductive. The transition to a circular system affects all three pillars of sustainability - economic, environmental, and social - and neglecting one may generate new imbalances and undermine the potential contribution of the circular economy to the SDGs;
2. Cities are fundamental ecosystems not only for implementing but also for driving and leading the shift toward circular thinking. The favorable conditions they offer, in terms of geographic scale, involvement of multiple stakeholders, and direct interaction between citizens and policymakers, are both an advantage and a responsibility. In this role, cities cannot overlook the issue of human waste production and the fact that they are the primary sites where it is generated. The circular policies they implement must therefore be aligned with the objective of bringing such production down to zero;
3. The case study of La Spezia demonstrates that local administrations joining such initiatives should not do so without developing strategies and action plans built around the principles of circularity. Without a clear guiding framework, the actions undertaken risk being ineffective or generating trade-offs between the different dimensions of sustainability;
4. The Calisto Friant framework is a valuable and useful tool for analyzing the political approach of cities to the topic of circularity, but on its own, it captures intentions rather than outcomes. To measure actual circularity, complementary tools are needed—tools capable of assessing implementation and the evolution of impacts over time.

6. Research limitation

Some limitations related to the application of the Calisto Friant framework have already been discussed in the methodology section, particularly concerning the adequacy of the tool in relation to the local context and the availability of documents.
Moreover, while this work includes a selective literature review aimed at reconstructing the debate on circular cities with specific attention to social aspects, a true systematic literature review on these issues is still lacking.
Dimensions such as inclusion, equity, participation, environmental justice, and social impacts are often addressed in a fragmented or secondary way within broader studies.
A systematic review would make it possible to identify theoretical trends, gaps, and emerging approaches, and to clarify the actual role of social dimensions in the urban circular transition.

7. Suggestions and Research Proposals

7.1. Research suggestions

Complex systems such as cities, into which a still loosely defined framework is being introduced, require equally complex evaluation tools. Now, after nearly two decades of research on circular cities, scholars have the opportunity to assess the evolution of practical

implementations. In this context, evaluation should be conducted in a more articulated way, combining qualitative and quantitative analyses and actively involving local stakeholders. Beyond political intentions, assessment should focus on the actual transformation of cities over time, in terms of practices and outcomes. The Friant framework represents an important first level of evaluation, which should be complemented by tools capable of assessing concrete actions, thus providing a dynamic picture of urban circularity.
At the same time, the scientific community, the education system, and public institutions should critically examine which models and initiatives they choose to promote, also reflecting on their ultimate purposes. Scientific literature and non-profit organizations have, for instance, highlighted cases of greenwashing and environmental or social legal disputes involving major corporations that are partners of the Ellen MacArthur Foundation. For this reason, before adopting such frameworks and rankings, universities, public administrations, and evaluation bodies should demand full transparency regarding governance structures, decision-making criteria, and potential conflicts of interest. This is essential to prevent "circularity" from becoming a label with high reputational value but low transformative impact. It is also necessary to address the geographical imbalance in the literature, which remains heavily focused on cases from the Global North: this disparity underscores how research on circular economy is predominantly shaped by institutions in industrialized countries, with contributions from the Global South remaining largely marginal or underrepresented. As a consequence, many strategies implemented in developing countries tend to mirror the models of the Global North, rather than emerging from locally grounded needs or alternative forms of socio-environmental innovation. This dynamic risks positioning cities in the Global South as passive adopters of externally designed frameworks, rather than as active agents in the sustainable urban transition (Haswell et al., 2024).
As an antidote to theoretical and practical fragmentation, it is useful to adopt a solid theoretical framework that can offer a lens through which to observe circular cities, guiding their efforts and clarifying their objectives. One such lens could be that of Service Collaboration (ServCollab), which "extends the focus to needs and equity beyond individual contribution, recognizing that people possess different resources and that these resources are not always proportional to the outcomes they deserve," and calls for an emphasis on "differentiated needs and equity in service experiences" (Fisk et al., 2020).
This approach integrates the socio-economic dimension organically into analyses of circular cities and allows for comparable evaluations that are sensitive to inequalities.

7.2. Suggestions for policymaker

To ensure coherence and credibility in circularity policies, it is essential to reassert public leadership in the definition of standards and parameters. Supranational bodies, primarily the United Nations and the European Union, should facilitate exchange networks between cities based on holistic and shared criteria, in order to limit the risk of private entities shaping the agenda according to reputational or commercial interests.
Declarations, protocols, and rating schemes directly influence research, the dissemination of best practices, and the allocation of resources. A transparent, participatory, and socially just governance is therefore crucial to avoid partial implementations, prevent trade-offs between environmental goals and social rights, and ensure that the circular economy contributes meaningfully to the achievement of the SDGs.

8. References

Amsterdam municipality, (2025). Toerisme MRA 2024-2025. Available at: https://amsterdam.raadsinformatie.nl/document/15617352/1/Bijlage+2_+O%26S+-+Toerisme+in+de+MRA+2024-2025_def?connection_type=16&connection_id=1050026 (accessed 20 June 2025)

Barford, A., Ahmad, S.R., (2021). A Call for a Socially Restorative Circular Economy: Waste Pickers in the Recycled Plastics Supply Chain. Circular Economy and Sustainability

1, 761–782. https://doi.org/10.1007/s43615-021-00056-7

Bîrgovan, A.L., Lakatos, E.S., Szilagyi, A., Cioca, L.I., Pacurariu, R.L., Ciobanu, G., Rada, E.C., (2022). How Should We Measure? A Review of Circular Cities Indicators. International Journal of Environmental Research and Public Health. https://doi.org/10.3390/ijerph19095177

Bosone, M., Ciampa, F., (2021). Human-centred indicators (HCI) to regenerate vulnerable cultural heritage and landscape towards a circular city: From the Bronx (NY) to Ercolano (IT). Sustainability (Switzerland) 13. https://doi.org/10.3390/su13105505

Burke, L., Grodach, C., (2025). Centrifugal circular cities: mapping circular economy employment and accessibility in Melbourne, Australia. Urban Geography. https://doi.org/10.1080/02723638.2025.2513764

Calisto Friant, M., Reid, K., Boesler, P., Vermeulen, W.J.V., Salomone, R., (2023). Sustainable circular cities? Analysing urban circular economy policies in Amsterdam, Glasgow, and Copenhagen. Local Environment 28, 1331–1369. https://doi.org/10.1080/13549839.2023.2206643

CBS Statistics Netherlands, (2023). Population; key figures. Retrieved from https://www.cbs.nl/en-gb/figures/detail/37259eng?q=amsterdam%20population (accessed 2 June 2025)

Chen, C.W., (2021). Clarifying rebound effects of the circular economy in the context of sustainable cities. Sustainable Cities and Society 66. https://doi.org/10.1016/j.scs.2020.102622

Circular Cities Declaration, (2021). About the declaration. ICLEI Europe. Available at: https://circularcitiesdeclaration.eu/the-declaration (accessed 6 June 2025)

Comisión Económica para América Latina y el Caribe (CEPAL), (2021). Declaración de Ciudades Circulares de América Latina y del Caribe. Available at: https://plataformaurbana.cepal.org/sites/default/files/2022-10/Espanol_Declaracion%20Ciudades%20Circulares%20.pdf (accessed 12 June 2025)

Domenech, T., Borrion, A. (2022). Embedding Circular Economy Principles into Urban Regeneration and Waste Management: Framework and Metrics. Sustainability, 14(3), 1293. https://doi.org/10.3390/su14031293

Elle MacArthur Foundation, (2018). Circular cities: thriving, liveable, resilient. Available at: https://www.ellenmacarthurfoundation.org/topics/cities/overview (accessed 21 June 2025)

Elle MacArthur Foundation, (2025). Annual Report and Accounts. Available at: https://content.ellenmacarthurfoundation.org/m/4677508983608f34/original/Ellen-MacArthur-Foundation-Annual-Report-and-Accounts-September-2023-August-2024.pdf (accessed 21 June 2025)

European Commission, (2011). Convenant of Mayors. City of La Spezia. Available at: https://eu-mayors.ec.europa.eu/en/signatory/14485 (accessed 6 June 2025)

European Commission, (2021). Circular Cities and Regions Initiative. Available at: https://circular-cities-and-regions.ec.europa.eu (accessed 2 June 2025)

Cavaleiro de Ferreira, A., Fuso-Nerini, F., (2019). A framework for implementing and tracking circular economy in cities: The case of Porto. Sustainability (Switzerland) 11. https://doi.org/10.3390/SU11061813

Fisk, R.P., Alkire (née Nasr), L., Anderson, L., Bowen, D.E., Gruber, T., Ostrom, A.L., Patrício, L., (2020). Elevating the human experience (HX) through service research collaborations: introducing ServCollab. Journal of Service Management 31. https://doi.org/10.1108/JOSM-10-2019-0325

Fontana, V., Baldi, R., Franchini, M., Gridelli, P., Ceppi, M., Magnoni, U., Puntoni, R., (2000). Epidemiologic study of the residents of the southeastern area of the Municipality of La Spezia. Epidemiologia e prevenzione, 24(4), 172–179.

Gravagnuolo, A., Angrisano, M., Girard, L.F., (2019). Circular economy strategies in eight historic port cities: Criteria and indicators towards a circular city assessment framework. Sustainability (Switzerland) 11. https://doi.org/10.3390/su11133512

Haswell, F., Edelenbosch, O. Y., Piscicelli, L., van Vuuren, D. P., (2024). The geography

of circularity missions: A cross-country comparison of circular economy policy approaches in the Global North and Global South. Environmental Innovation and Societal Transitions, 52,100883 https://doi.org/10.1016/j.eist.2024.100883

International Passenger Survey (2023), Great Britain Tourism Survey. Available at: https://www.visitbritain.org/research-insights/about-international-passenger-survey (accessed 22 June 2025)

Istat, (2025). Resident population as of January 1. Available at https://demo.istat.it/popres/index.php?anno=2023&lingua=ita (accessed 25 June 2025)

Kirchherr, J., Yang, N.H.N., Schulze-Spüntrup, F., Heerink, M.J., Hartley, K., (2023). Conceptualizing the Circular Economy (Revisited): An Analysis of 221 Definitions. Resources, Conservation and Recycling 194, 107001–107001. https://doi.org/10.1016/J.RESCONREC.2023.107001

La Spezia municipality, (2014). Mayors adapt. Available at: https://www.comune.laspezia.it/amministrazione/aree-amministrative/dipartimento-1-servizi-finanziari-e-informatici/politiche-comunitarie/progetti/adapt/progetto-adapt.pdf/@@download/file/Progetto-ADAPT.pdf (accessed 8 June 2025)

La Spezia municipality, (2024). Gestione Rifiuti. Available at: https://www.comune.laspezia.it/argomenti/gestione-rifiuti (accessed 8 June 2025)

La Spezia municipality, (2015). La Spezia 20.20 – La città diventa Smart. Available at: https://www.comune.laspezia.it/amministrazione/aree-amministrative/dipartimento-1-servizi-finanziari-e-informatici/politiche-comunitarie/eventi/la-spezia-20-20-la-citta-diventa-smart.pdf/@@download/file/La%20Spezia%2020.20%20%E2%80%93%20la%20citta%CC%80%20diventa%20Smart.pdf (accessed 8 June 2025)

La Spezia municipality, (2015). La Spezia 20.20 – La città diventa Smart. Available at: https://wwfit.awsassets.panda.org/downloads/alessandro_pollio__presentazione_la_spezia_20_20_it_gen_16_.pdf (Accessed 8 June 2025)

La Spezia municipality, (2024). Relazione di Piano. Available at: https://sit.spezianet.it/wp-content/uploads/2022/03/Relazione_di_Piano.pdf (accessed 8 June 2025)

La Spezia municipality, (2025). Tourism in 2024. Available at: https://www.comune.laspezia.it/novita/comunicati/turismo-da-record-alla-spezia-oltre-1milione-e-200mila-notti-trascorse-in-citta-in-tutto-il-2024-con-aumento-del-16-rispetto-al-2023#:~:text=rispetto%20al%202023-,Turismo%20da%20record%20alla%20Spezia:%20oltre%201milione%20e%20200mila%20notti,del%2016%25%20rispetto%20al%202023 (accessed 27 June 2025)

Meilinger, V., Monstadt, J., (2025). One water in Los Angeles? Contesting the circular city through infrastructural practices. Urban Geography. https://doi.org/10.1080/02723638.2025.2456376

Mies, A., Gold, S. (2021). Mapping the social dimension of the circular economy. Journal of Cleaner Production (Vol. 321). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2021.128960

National Records of Scotland, 2022. Mid-year population estimates. Available at: https://www.nrscotland.gov.uk/latest-news/mid-year-population-estimates-for-scotland-in-2022/ (accessed 12 June 2025)

Padilla-Rivera, A., Russo-Garrido, S., Merveille, N., (2020). Addressing the social aspects of a circular economy: A systematic literature review. In *Sustainability (Switzerland)* (Vol. 12, Issue 19). MDPI. https://doi.org/10.3390/SU12197912

Paoli, F., Pirlone, F., Spadaro, I., (2022). Indicators for the Circular City: A Review and a Proposal. Sustainability (Switzerland) 14. https://doi.org/10.3390/su141911848

Papageorgiou, A., Henrysson, M., Nuur, C., Sinha, R., Sundberg, C., Vanhuyse, F., (2021). Mapping and assessing indicator-based frameworks for monitoring circular economy development at the city-level. Sustainable Cities and Society 75. https://doi.org/10.1016/j.scs.2021.103378

Pasca, M.G., Padovani, G., Arcese, G., Mugion, R.G., (2023). How does the circular economy contribute to the pursuit of Agenda 2030? A systematic literature review. E3S Web

of Conferences 436, 05004–05004. https://doi.org/10.1051/e3sconf/202343605004

Souza Piao, R., de Vincenzi, T. B., da Silva, A. L. F., de Oliveira, M. C. C., Vazquez-Brust, D., Monteiro Carvalho, M., (2023). How is the circular economy embracing social inclusion? In Journal of Cleaner Production (Vol. 411). Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2023.137340

Savini, F., (2019). The economy that runs on waste: accumulation in the circular city. Journal of Environmental Policy and Planning 21, 675–691. https://doi.org/10.1080/1523908X.2019.1670048

Statistics Denmark, (2025). Population figures. Available at: https://www.dst.dk/en/Statistik/emner/befolkning-og-valg/befolkning-og-befolkningsfremskrivning/folketal (accessed 15 June 2025)

Toboso-Chavero, S., Zisopoulos, F.K., Jong, M. de, Schraven, D., (2025). Critical review of methodological tools and trends for assessing the performance of inclusive circular cities. Cleaner Environmental Systems. https://doi.org/10.1016/j.cesys.2025.100275

Vanhuyse, F., Fejzić, E., Ddiba, D., Henrysson, M., (2021). The lack of social impact considerations in transitioning towards urban circular economies: a scoping review. Sustainable Cities and Society 75. https://doi.org/10.1016/j.scs.2021.103394

Vanhuyse, F., Haddaway, N.R., Henrysson, M., (2021). Circular cities: an evidence map of research between 2010 and 2020. Discover Sustainability. https://doi.org/10.1007/s43621-021-00059-2

Visconti, C., (2021). Degrowing circular cities: Emerging socio-technical experiments for Transition. TECHNE 22, 201–207. https://doi.org/10.36253/techne-10599

Winslow, J., Coenen, L., (2023). Sustainability transitions to circular cities: Experimentation between urban vitalism and mechanism. Cities, 142, 104531. https://doi.org/10.1016/j.cities.2023.104531

Woldeyes, T.D., Muffatto, M., Ferrati, F., (2025), Emerging Business Model Archetypes in the Circular Economy: A Systematic Literature Review. Sustainable Development, 33: 4428-4456. https://doi.org/10.1002/sd.3348

Wuyts, W., (2024). Imagining inclusive circular cities: the role of social fiction in planning education. Planning Practice and Research. https://doi.org/10.1080/02697459.2024.2324235

Zavos, S., Lehtokunnas, T., Pyyhtinen, O., (2024). The (missing) social aspect of the circular economy: a review of social scientific articles. Sustainable Earth Reviews, 7(1). https://doi.org/10.1186/s42055-024-00083-w