



Systemic Design for Circular Cities. Designing Circular City models for post-industrial precincts

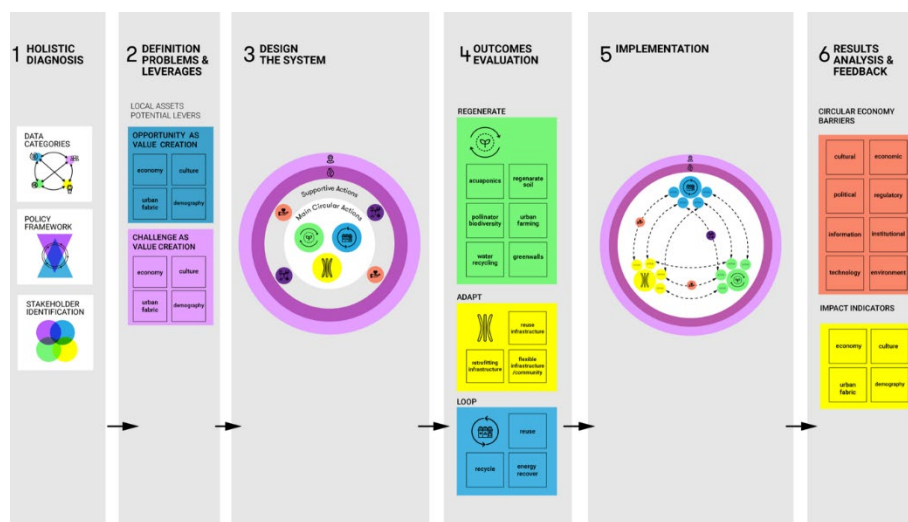
Research Through Design Case Study

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Year of completion:	2021
Discipline/field:	Systemic Design
Type of Doctorate (e.g. PhD, DDes, ArtD)	PhD
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Abstract

The research explored how a Systemic Design approach can support a Policy Design process on Circular Economy towards a Circular City model in post-industrial precincts. The thesis argues about how Circular Economy (CE) policymaking has wicked scenarios that are often reinforced by a linear model of governance. Allowing “wicked problems” to be locked into “silos” narrowing the understanding of the complex nature of such systemic problems. Therefore, to achieve a transition of CE in cities it is needed a radical shift towards a more adaptive and collaborative policy framework. On that perspective city governments approach CE policy instruments that enhance local value which is cohesive with long-term environmental goals of a Circular City.





In particular this doctoral research is focused on three research questions: What Circular City model can be envisioned post-industrial precincts and what are the challenges and opportunities for their transition? In what ways a systemic designer can co-design policies for a post-industrial precinct that encourage their transition towards Circular City? and What value can Systemic Design approaches bring to the field of Public Policy on CE in cities beyond the scope of post-industrial areas?

The first Chapter delivers an overview of the background of this research applied to cities with post-industrial precincts their CE challenges and the role of the designer in crafting effective policy-making process. On the one hand the interest in post-industrial precincts was documented. Through their evolution from deprived areas towards 'hubs' for radical innovation and thriving resilient precincts underlining their wicked problems in the governance and linear economy to be able to reactivate these precincts resides. This panorama was followed by a CE introduction and how such an approach is critical to unlocking the wickedness in post-industrial precincts. For that aim it presents the need to propose effective policy strategies to transition towards a CE creating new socio-technical systems. Therefore, the discussion is narrowed towards the need of the conceptual framework of a Circular City which delivers an overview from which to comprehend the ways CE could policies demonstrate in an urban environment. Such a model requires an innovative model of governance and decision-making combining top-down and bottom-up processes. In order to activate new mechanisms of decision making such as design thinking participatory and systemic approach towards co-design policies for a Circular City model. On that view the Systemic Design has introduced as crucial expertise which provides practical tools to approach complex scenarios in this case addressing a CE policy design process in post-industrial precincts.

The second Chapter presented a state of the art reviewing the literature on System Transitions Design for Sustainability Systemic Design Co-design practices CE Policy Design and identified a knowledge gap. Such examination contributed to setting the scope of this research around CE policy design and outlining the problem to be investigated the need to investigate in which ways a Systemic Design approach to CE policy cycles can establish a more inclusive and cohesive policy design process for a circular model relationship with the context to develop local value. As an outcome a Systemic Design lens on Policy Design for CE decision-making was drawn as a conceptual approach to inform the following phases of this examination.

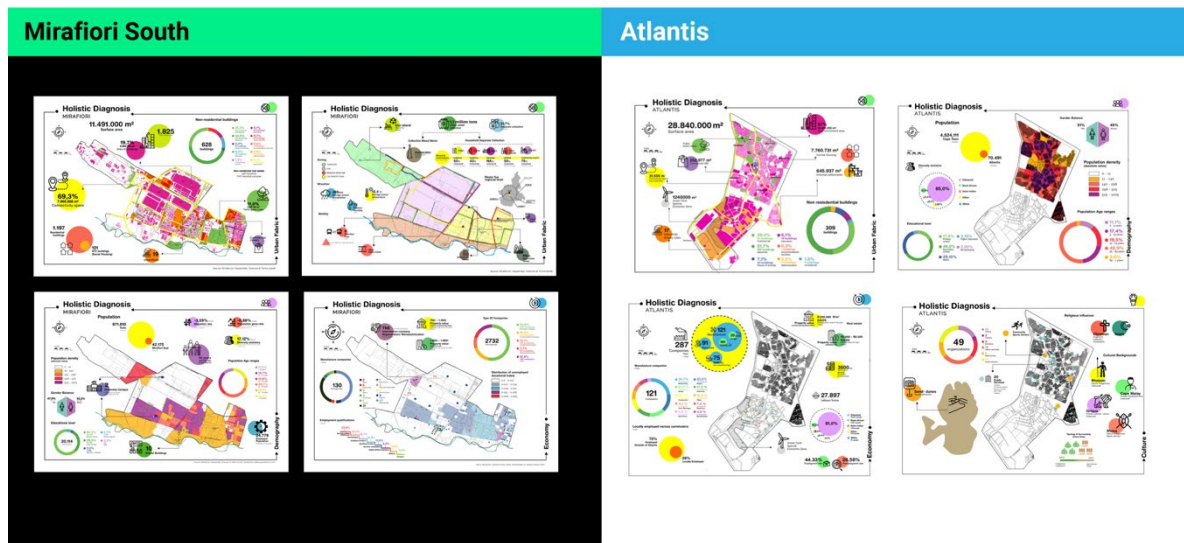
The third Chapter introduces the research methodology of this investigation it describes the exploratory purpose pragmatist paradigm and the mixed-method type of this research. Moreover, it explains the intended research strategy through the choice of case studies. This section describes in detail the research design including data collection methods from Literature Review to the Systemic Design methodology

determined to address the research aim and objectives drawn in section. Also is delivered a further discussion on the selection of data collection and analysis methods applied in this research process.

The fourth Chapter presented the scoping study which was framed by a specific literature review targeting the evolution of the Circular City model carried to reach a theoretical proposition on Systemic Design approaches for a Circular City Framework as set out in the rest of this Chapter. For that aim the literature review from the urban sustainability background to the current models around the Circular City.

Ultimately the researcher carried a method of design synthesis of the outcomes into a theoretical proposition to inspire a Circular City Framework on the lens of Systemic Design for post-industrial precincts. This research outcome complements the Systemic Design methodology as it adds the scope of Circular City model elements narrowing towards a CE perspective for post-industrial precincts. Moreover, the framework delivered a co-design approach to tailor CE strategies that can coexist to deliver social and economic welfare and activate new mechanisms for value creation in post-industrial areas.

1 HOLISTIC DIAGNOSIS



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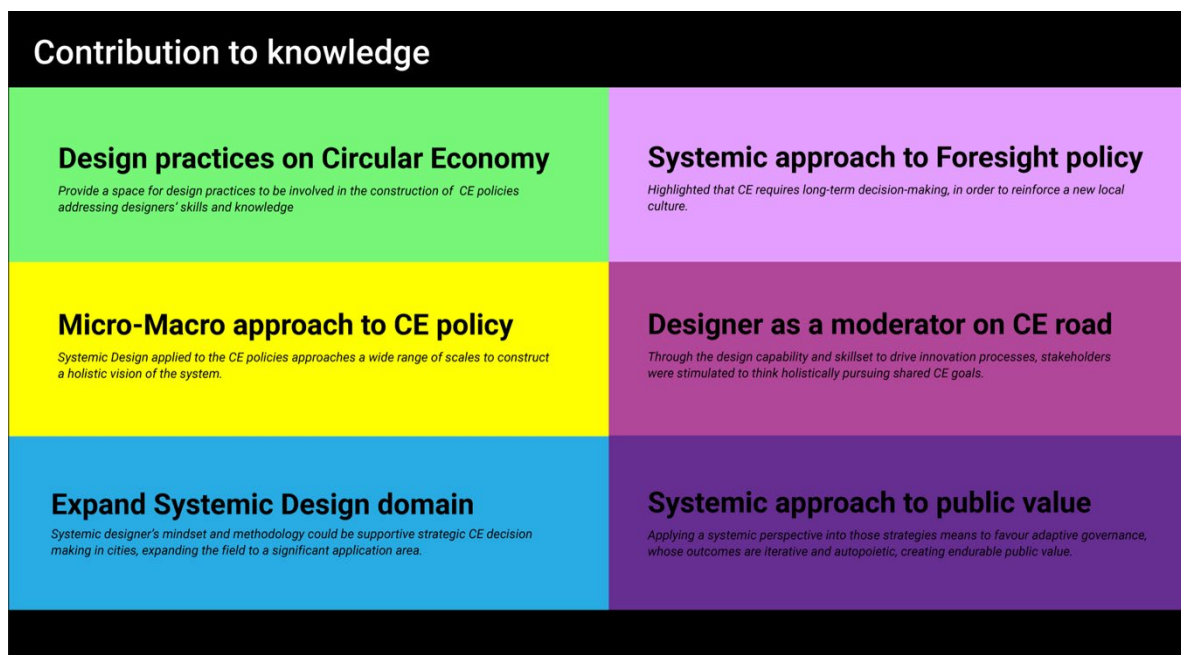


The further examination of the proposed Systemic Design Framework for Circular Cities was through the cases study of Mirafiori South Precinct in Turin (Italy) (Chapter five) and Atlantis precinct in Cape Town (South Africa) (Chapter six) which allowed bridging from the theoretical proposition of Systemic Design Framework for Circular Cities to tangible practices co-designing situated circular strategies for decision-making. Both considering post-industrial legacy as a pillar for to generate a Circular City model yet the nature of both scenarios (Europe/Africa) is radically different which



brought to the outcomes a broader and different understanding on how to activate decision-making process to transition into a Circular City model. In both examinations a Holistic Diagnosis was conducted that deliver a holistic system panorama of both precinct assets to identify the current local assets from opportunities to challenges as leverages for value creation and co-design the current system based on the conceptualisation of a Systemic approach on Circular City framework in this context. The result of the framework delivered a tailored Circular City model for each precinct. That identified the potential planned or executed strategies around the main Circular Actions (Regenerate, Adapt, Loop). Also established system dynamics through concrete implementations for each strategy potential or already executed and assess the proposed Circular Actions through the lens of the CE barriers and impact indicators. The results of this study aim to facilitate a better un for the area understanding of the potential CE strategies for a resilient Circular City model on a Global North and South perspective.

On Chapter seven a research synthesis was conducted to assess the case study application aimed to oversee the strengths and challenges of the proposed framework implementation through examining four levels of innovation: technical social economic and cultural. Including the issue of 'value creation' on CE policy-making process by proposing that Circular City model system through anticipatory scenarios could bring more future-oriented and sustainable-oriented policy actions to enhance local value creation. Also the assessment of the examination findings on Systemic Design capability to navigate this wicked scenarios aiming to maximise the value of government tackling and be supportive in CE policy foresight practices and strategic decision making in cities.





The last Chapter presents how the research aim and objectives were reached and a conclusive overview of the doctoral research. Moreover, it displays the primary contributions of this research to the systemic design discipline. Ultimately it addresses the limitations regarding the research and proposes recommendations for further research.

Summary of research through design activity

This research was inspired by cities increasing interest in Circular Economy policies as an essential model of design, production and consumption, contributing to sustainable development and wellbeing. At a city-level scenario, what does the transition toward a CE entail, and what can it do? To achieve a Circular City model is imperative to overcome the “wicked problems” at a governance level, represented on the current environmental, social and economic challenges. Such wickedness has manifested itself in cities through radical changes in politics, markets, human population densities and urban fabric; those transformations haven been so accelerated that not all cities could cope with the demands of the market and population. This drastic shift has left many formerly manufacture/extractive or Fordist cities with the deprived and outdated urban fabric; this has resulted in the rise of post-industrial precincts whose traditional linear government approach have taken perpetuated such complexity over time. Thereby to understand the CE wickedness, it is required a deep comprehension of the system complexity and the ecology of its relationship.

On that view research tackled the problem of governance inefficacy to approach cities wicked problems enabling their capacity to tailor circular economy strategies, producing city policies that are not inclusive or cohesive and do not produce local value over time. On that view, the research explored how a Systemic Design approach can support a Policy Design process on Circular Economy towards a Circular City model in post-industrial precincts. This thesis argues that CE policymaking wicked scenarios are often reinforced by a linear model of governance, which encloses problems into “silos” and limits the understanding of the complex nature of such systemic problems. Therefore, to achieve a transition of CE in cities, it is needed a radical shift towards a more adaptive and collaborative policy framework. On that perspective, city governments approach CE policy instruments that enhance local value which is cohesive with long-term environmental goals of a Circular City. With this in mind, this research emphasised the role of systemic design as a decision-making practice for CE policymaking. For this research project, the Systemic Design for a Circular City was investigated through its application to post-industrial precincts, chosen as a unit of analysis for this decision-making case study research. Furthermore, it is essential to



highlight that this research does not focus on policies themselves, but to explore the Systemic Design methodology for a governance “paradigm shift” towards a collaboratives approaches for value creation on Circular Cities from a ‘Time-Based Design’ perspective.

Underpinning research, context and summary of methodology

The research explored how a Systemic Design approach can support a Policy Design process on Circular Economy (CE) towards a Circular City model in post-industrial precincts. This thesis argues that CE policymaking wicked scenarios are often reinforced by a linear model of governance, which encloses problems into “silos” and limits the understanding of the complex nature of such systemic problems. Therefore, to achieve a transition of CE in cities, it is needed a radical shift towards a more adaptive and collaborative policy framework. On that perspective, city governments approach CE policy instruments that enhance local value which is cohesive with long-term environmental goals of a Circular City.

In order to overcome the current governance challenges towards a Circular City model in post-industrial precincts, this thesis proposes a Systemic Design (SD) as a co-design methodology to address CE policy cycle, delivering a holistic territorial diagnosis for local value creation strategies that respond to the system challenges, which means in the scope of this investigation to create resilient Circular City models for post-industrial precincts.

With this in mind, a systemic transition into the Circular City model requires a transdisciplinary approach that involves a quadruple helix and designers as mediators to co-create CE strategies within a bottom-up and top-down that fits each scenario. The SD approach delivers a holistic overview of complex post-industrial scenarios which can activate a Circular City model that arises from the appraisal of the resources offered by post-industrial precincts.

As an outcome, this thesis proposes a Systemic Design Framework for Circular Cities, which can implement in a policy cycle a more inclusive and cohesive policy design for a Circular City model. The framework aimed to create through the lens of the SD approach diagnoses and asses to co-design CE strategies in precincts that can coexist to address activating new mechanisms for value creation towards a Circular City model. In order to be applied to the case studies selected for this research: Mirafiori South and Atlantis precinct.

Both precincts regard their post-industrial legacy as a pillar for to generate a Circular City model yet, the nature of both scenarios (Europe/Africa) is radically



different which brought to the outcomes a broader and different understanding on how to activate decision-making process to transition into a Circular City model.

The case study application aimed to oversee the strengths and challenges of the proposed framework implementation through examining four levels of innovation: technical, social, economic and cultural, which will be approached in the following section. Moreover, this thesis addressed the issue of 'value creation' CE policymaking process by proposing that Circular City model system through anticipatory scenarios, could bring more future-oriented and sustainable-oriented policy actions to enhance local value creation. Also, examination findings have shown that SD provides knowledge to navigate this wicked scenarios aiming to maximise the value of government tackling and be supportive in CE policy foresight practices and strategic decision making in cities.

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This Case Study is an outcome of the D.Doc Project, funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

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