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*Original*
Systemic Design for territorial thinking. Circular urban transitions for post-industrial cities / Nohra, C.G., Barbero, S.. - In: THE DESIGN JOURNAL. - ISSN 1460-6925. - 22:(2019), pp. 915-929. (13th International Conference of the European Academy of Design Dundee, UK 10-12th April, 2019,) [10.1080/14606925.2019.1595408].

*Availability:*
This version is available at: 11583/2738433 since: 2019-07-01T11:12:27Z

*Publisher:*
Taylor & Francis Group

*Published*
DOI:10.1080/14606925.2019.1595408

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05 November 2026



Routledge
Taylor & Francis Group

The Design Journal
An International Journal for All Aspects of Design

ISSN: 1460-6925 (Print) 1756-3062 (Online) Journal homepage: https://www.tandfonline.com/loi/rfdj20

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Carolina Giraldo Nohra & Silvia Barbero

**To cite this article:** Carolina Giraldo Nohra & Silvia Barbero (2019) Systemic Design for territorial thinking. Circular urban transitions for post-industrial cities, The Design Journal, 22:sup1, 915-929, DOI: 10.1080/14606925.2019.1595408

**To link to this article:** https://doi.org/10.1080/14606925.2019.1595408


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# **Systemic Design for territorial thinking.** Circular urban transitions for post-industrial cities

Carolina Giraldo Nohra[a*], Silvia Barbero [a],

[a] Politecnico di Torino

*Corresponding author email: carolina.giraldo@polito.it

**Abstract:** Nowadays cities are pushed to transform drastically and faster their urban-fabric to cope with the demands of the market, this acceleration has resulted in the rise of more post-industrial cities. On that complex scenario, how can a territorial thinking in post-industrial areas foster Circular Economy (CE) frameworks to address the current environmental and economic challenges of society? Through this paper is intended to examine the case study of the post-industrial area of Mirafiori sud in Turin, Italy, to expose how the Systemic Design approach allows a wider examination of post-industrial areas to promote CE strategies that can generate a sustainable consumption of local resources and services fostering urban transitions. Endorsing the Systemic Design approach as an expertise that provides a holistic overview, within a transdisciplinary method brings together governments, industry, and citizenship.

**Keywords:** Systemic Design, Circular Economy, Urban Transitions, Post-industrial, Sustainable Development.

# 1. Introduction

As the worldwide economy is experiencing frenetic changes than ever before. Cities are pushed to transform drastically and faster their urban-fabric to cope with the demands of the market and population. However, this accelerated shift has left many formerly manufacture/extractive cities, once protagonist a Fordist flourishing economy, with deprived and outdated urban fabric (ICLEI, 2018). These former economic epicentres developed a spectrum of infrastructure for industrial purposes such as factories, warehouses, railroads, and harbours, along with social welfare facilities such as housing, schools and recreational areas developing the Fordist city (Cucca & Rancci, 2017). The success of the urban and economic growth of these areas created stable industrial relations, vital for the organization of social integration and fostering local consumption (Kazepov, 2005). However, the typing point for these districts occurred between the ’80s and ’90s with an acceleration of the economy which brought negative impacts. As these infrastructure systems couldn’t cope with the market demands arising gradually the unemployment and population drop which was followed by

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disinvestment and economic recession. Rising the deprivation of the urban landscape, turning the once thriving livelihoods neighbourhoods' outdated infrastructure and brownfields.

Nowadays post-industrial cities are adopting different strategies to transition from a Fordist economic model to a dematerialized/service-based economy with the purpose of meeting the current and future needs (Cucca & Rancci, 2017). In order to overcome the systemic consequences of deindustrialization and re-shape their urban identities, they have come a long way in promoting innovative transformations on restoring thriving livelihoods into the urban fabric (ICLEI, 2018). Furthermore, the legacy of the abrupt socio-economic transformations has brought the recognition of such urban environments as critical areas to tackle sustainable development issues (Bulkeley et al., 2011). At the same time targeting post-industrial legacy areas as 'hubs' for extreme innovation towards more resilient cities (Ernstson et al., 2010a; Bulkeley and Broto, 2012).

On that view, how will the future post-industrial cities ensure enough resources, quality jobs and income opportunities in a more humane, sustainable and efficient manner? According to the Sustainable Development Goal (SDG) 11 "Make cities and human settlements inclusive, safe, resilient and sustainable" (11) and SDG 12 "Ensuring sustainable consumption and growth patterns", cities will have to prepare for a long-term transformation towards a Circular Economy (CE) in order to overcome the systemic effects of deindustrialization. Considering that, "Cities are not actors; they are places where people and economic activities are concentrated; complex social, economic and physical systems" (Otto-Zimmermann, 2011), from a design point of view, it is possible to approach such scenarios with anticipatory approaches, such as design thinking, participatory and systemic perspectives (Buchanan, 1992). Emerge and reflect how the combination of technology, design and social organization are activating new mechanisms to reactivate this deprived areas. Starting with a shift in the way we approach this structures and their local and global issues, it is vital to introduce a profound holistic vision which can make more comprehensible the complexity of urban context (Grimm et al. 2000; Mehmood 2010; Newman 1999). On that complex scenario, how post-industrial cities can achieve an overall sustainable and cohesive urban transitions, that can reduce future economic, environmental and social costs, but at the same time strengthening economic competitiveness? How can a territorial thinking in post-industrial areas foster CE frameworks to address the current environmental and economic challenges of society?

Through this paper is intended to examine the case study of the post-industrial area of Mirafiori sud in Turin, Italy to expose how the Systemic Design approach allows a wider examination of post-industrial areas to promote CE strategies that can generate a sustainable consumption of local resources and services fostering urban transitions.

# 2. Systemic Design approaches for Territorial Thinking

To pave the way towards an effective transition its necessary new anticipatory approaches on urban sustainable development from a holistic and systemic perspective that generate new scenarios of economic profit and cooperation (Barbero, 2017). To achieve this, the Systemic Design (SD) approach delivers specific tools for territorial thinking that allow to envision and design the flow of material and energy from one element of the system to another one, transforming outputs of one process into input for another one in order to obtain zero emissions and generating resilient territories (Bistagnino, 2011).

This methodology generates new relations among the entities of a territory, enabling the visualization of the hidden potentialities which will boost a proactive collaboration among local actors. The creation of such relationship network promotes a general wellness improvement in the community, activating a cash flow between the different system actors: “the cultural and value systems are so spontaneously redefined, with direct environmental benefits” (Bistagnino, 2011). In the particular case of human-environment relations on urban environments from an SD perspective, it allows capturing and interpreting the complete complexity of urban systems (Grimm et al. 2000; Mehmood 2010; Newman 1999). This holistic understanding of relationships and interactions between parts unveils in an effect to devise solutions that integrate the complexities of the potentialities and criticalities of such living systems (Newman and Jennings 2008, 92). The SD approach acknowledges territories to be comprehended in deeper a wider overview, promoting a proactive collaboration and a horizontal dialogue among local actors and simultaneously generating innovative decision-making strategies to future productive activities sustainably.

Cities regarded as living metabolism or a "systems of systems" are on the need to seek for resilience to be able to deal with climate and economic impact. Nowadays the neo-liberal economic model regards cities as parasites (Odum, 1989) based on a resource consumer model. Targeting these fragile urban systems into the erratic economic changes, in particular, post-industrial areas and exemplification of those consequences. To foster effective resilience in those scenarios the current model has to shift into a self-regenerative or auto-poietic (Maturana et al., 1972) from a consumer to a prosumer city (Tofler, 1980) where the enhanced local assets can generate a sustainable urban system over time. To achieve this, the SD approach through a Holistic Diagnosis (HD) tool delivers the required design approaches on strategies, services, and governance that support access to the regenerated spaces while promoting social cohesion and flourishing local economies.

# 3. Systemic Design approach towards a Circular City Framework

Cities will play a substantial role in a global transition to a CE, the current environmental and economic challenges of the society require innovative approaches to complexity, where the systemic one can be an efficient way to interpret and give solutions. Therefore, there is a constant support at the forefront of the cities agenda's for a paradigm change from the traditional linear to CE. The aim of the CE is to restore and regenerate the economy meaning to “keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles” (EMF, 2013). Within this definition, the Ellen MacArthur Foundation (EMF) sets out possible areas for transitioning into a CE using and prioritizing three key principles: preserve and enhance natural capital, optimize resource yields and foster system effectiveness (EMF, 2015). Moreover, these principles are represented on the ReSOLVE framework on concrete six business actions outlined by the EMF: Regenerate, Share, Optimize, Loop, Virtualize and Exchange.

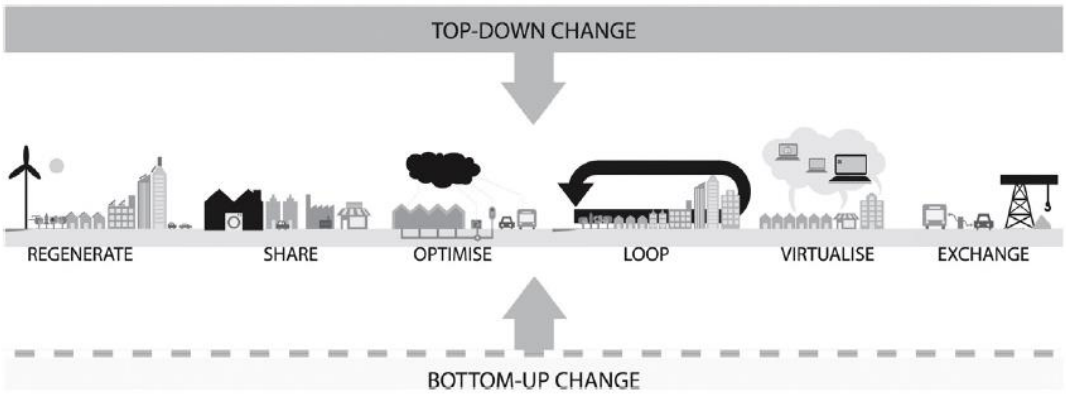



*Figure 1. The circular city framework, adapted from the ReSOLVE framework (EMF, 2015). Taken from (Prendeville et al., 2018)*

These CE actions are traditionally approached from a product perspective, although they can be translated on an urban macro-level perspective (Ghisellini et al., 2015). The conceptual framework of a Circular City (Fig. 1) by Prendeville et al., 2018, delivers an overview from which to comprehend the ways CE could demonstrate in an urban environment. Moreover, captures the strategies of the ReSOLVE framework combined with the bottom-up change (NGO/entrepreneurial activity/social innovation) and top-down change (local government/policymaking/public-private partnerships) (Krauz, 2016; Pomponi and Moncaster, 2016; Ghiselliniet al., 2015; Lieder and Rashid, 2016). This approach features the spectrum of strategies that at urban scale will be vital to reach an effective CE vision which generates a wide range of services fostering local resources and therefore urban transitions (EMF, 2017)

To enable an effective approach of the Circular City framework (CCF), the SD expertise proposes anticipatory tools such as the HD or giga-mapping, introducing a new approach on macro scale areas and territorial development (Barbero, 2017). The HD overview of such complex scenarios provides mechanisms to encourage the generation of new cooperation channels among different local actors. Moreover, it promotes a multidisciplinary approach that invites participants from different sectors to co-create CE strategies within a cross-cutting scenario, bringing in touch managing authorities, civil society, and the industry. The implementation of the SD approach can reactivate all source of local resources in order to anticipate a sustainable development producing strategies towards more self-regenerative territories (Barbero, 2012). That approach allows a better comprehension of SD on enhancing the future CE activities and as an effective expertise to find innovative anticipative paths for urban transformation, economic restoration, and social cohesion. Activating new economic model that arises from the appraisal of the resources offered by post-industrial areas where the community can pull different economic CE activities that coexist to bring social and economic welfare.

# 4. Holistic Diagnosis Tool for post-industrial areas

This research intends to delve into a better comprehension of SD approach as a method to integrate CCF strategies which are economically self-sustaining and can provide multiple benefits for the economic, ecological and social regeneration of deprived urban areas suffering from the consequences of deindustrialization. The paper focuses on the HD tool addressed to CE strategies as

components of urban metabolism networks in post-industrial areas. Such spatial analysis aims to deliver strategies should be cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience.

As the SD methodology spans from the interpretation of the state-of-the-art to the design of a system (Bistagnino, 2011). The HD is defined as a process of analysis that aims to determine the context of a system (Battistoni & Giraldo , 2017), which includes field and desk research to perform analysis and visualization of all the elements that describe the current scenario, considering both in quantity and qualitative characteristics of the surrounding context and the flow of energy and matter. Consequently, this enables the definition of problems and leverages for change on the base of the complex data collected in HD which afterwards deliver eco-guidelines for the definition of the new complex system and most importantly making the results become accessible to a wider public and do not only serve the experts (Barbero, , 2016). Through a holistic overview, post-industrial areas will be able to unveil effective CE strategies fostering urban transitions through the development of new strategies oriented towards new economies shared between public authorities, civil society, and industry (especially SMEs).

The HD is characterized by 2 main steps of analysis which can be customized to scales/scenarios offering the possibility of adding different elements to create an outline for each context. The HD addressing post-industrial areas will be composed of the following steps:

1. Analysis of the urban framework: The first phase starts with an analysis of the urban context.
2. Top-down and Bottom-up analysis: From current policies to grassroots activities (NGO, entrepreneurs,...) regarding axes related to CE and SD.

The centre on the methodological approach from the HD perspective to the Mirafiori district discussion will be further narrowed on the tailored in order to better support the argument.

# 5. Research exploration: Post-Industrial Mirafiori Sud District

The following research is been executed along with the City of Turin and local stakeholders of the Mirafiori Sud precinct. The study approached how the HD tailored to the characteristics of the area could deliver a systemic approaches for urban transitions within CCF strategies able to generate better livelihoods which can impact and be life improving.

Located in Turin capital of the Piedmont region (North- West Italy), the post-industrial district of Mirafiori consist of 40.000 inhabitants across 12km. Mirafiori is one of the most significant examples of Italian city-factory characterized by a relentless process of physical, cultural and social degradation. The district is embedded with the history of FIAT a company which represents the most important model of mass production of the Fordist brand in the history of Italy (Olmo, 1997). It is undeniable that if the company has made Turin the 'automobile city', its fate has also transformed Mirafiori into the workers' district par excellence: the factory built in 1939, subsequently expanded and finally downsized, has marked the rhythms for decades thousands of families every day, determining their movements, organizing their time for work and after work. After World War II, while the city population doubled, arriving about a one million inhabitants, that of Mirafiori was a

triggered exponential growth going from 3,000 artisans and farmers, to over 40,000, mostly workers at the FIAT production plant. Also influenced by the great waves of internal migration that the expansion of the company attracted brought many people from the southern regions of the country. As this massive increase of population the accelerated process of urbanization of the district influence morphology of the buildings, the social character of the population make visible the relationship between capital and labour of mass industrial production (De Filippi & Vassallo, 2016). From that moment the district presents the characteristics of an enclave: a concentration of people with a high incidence of social problems and a strong cultural mix, physically isolated and socially separated from the surrounding areas (Bagnasco, 1986, 1990).

The crisis of production of the 80s brings the slow agony of the FIAT puts an end to the city-factory season. Leading to the 'radicalization of the abandonment process', a progressive depletion of residential buildings and the reduced commercial activities (De Filippi & Vassallo, 2016).Mirafiori, without FIAT, becomes the most evident space of social segregation. Production, community and private property not only defined the value of use of the heritage of the Fordist city, but transformed an abstract space in place (Olmo, 2010). However, since the ‘90s, different urban regeneration projects where promoted to preserve and enhance the urban fabric and Post-industrial Cultural heritage sites, to give a new image to the district. Nevertheless, despite the huge amount of resources and expertise, they have always reached rather modest outcomes.

## 5.1 Holistic Diagnosis 1st step: Analysis of the urban framework

This first step of the HD pretends to deliver a wider radiography of the urban context Mirafiori district. Approaching with an analysis of the territorial framework from different points of view: from the urban fabric to demography, culture, and economy. This data comes from qualitative and quantitative data from the city of Turin databases to the reports made by local stakeholders on the state-of-art (e.g Miraforum report, 2018). As the research is conduct by the designer is it’s vital for the collecting data process to have constant advisory from different specialists in order to certify their right interpretation (Barbero, 2017). Therefore, to enable the management of complex data the HD from the first phase requires an approach from different areas of knowledge. On the case of Mirafiori district, to canalize the bundle of data towards to the scope of the investigation on generating CE strategies, below there is the description of the categories selected and the criteria on which this HD approaches, in particular, this post-industrial area:




*Figure 2. City of Turin Map, on the dark area is located the Mirafiori Sud District. (Author: City of Turin, 2018)*

a) Urban Fabric

This analysis is based on morphological features and natural resources focusing on existing infrastructure, urban voids and public services (with a focus on quantity). This study aims to have a perspective on the system dimensions from a peri-urban perspective (natural ecosystems surrounding the area) to the developed infrastructure around the former FIAT's epicentre, including the factory complex, warehouses, social housing, schools, and public space. To establish a benchmark on the urban framework for Mirafiori district the following categories were selected for the analysis:

- Location: A focus on a peri-urban aspect of the district and morphology of the neighbourhood design around the FIAT. (Total Surface) neighbouring areas through natural barriers like rivers or large scale infrastructures like railways or highways.
- Density of the built environment: This enables to see the vast extension of the land occupied by FIAT compared to the social housing and other services. Also, it reveals the challenges of the current urban voids and disconnection between the services of the district.
- Natural ecosystem: Focus on the urban biodiversity and local ecosystem characteristic given by the peri-urban border along the Sangone River.
- Public space: Analysis of the distribution of the district originally planned as Garden city (FILIPPI.3030) understanding public space areas as amount of green areas, recreational or cultural facilities accessible to the local population and kinds of use /underused. Also including the statistics for urban safety and crime, in relation to the urban voids.
- Quality of the land: As post-industrial area is it is vital to identify the polluted brownfield areas.

- Mobility planning: Private vehicle use area. Mixed-use spatial planning alongside to moving people and goods rather than moving vehicles, bicycle traffic or public transport to cross from one area to another.
- Land use / Infrastructure: Analysis of the quantity and distribution of the current industrial complex of FIAT, identifying the deployed and active areas. Also focusing on social welfare infrastructures (active and abandoned) such as schools, universities, markets, libraries, and social housing quality average. Later one related to the actual extension of the commercial area enables to understand the relation of local population and economic activity.
- Material Flow: Water quality/ Sewage, electricity providers, Food production/ consumption. Analysis of the type of waste to the neighbourhood from the population or local industry or businesses. Presence of Landfills. This aspect highlights the outputs of the district from industrial to household waste.

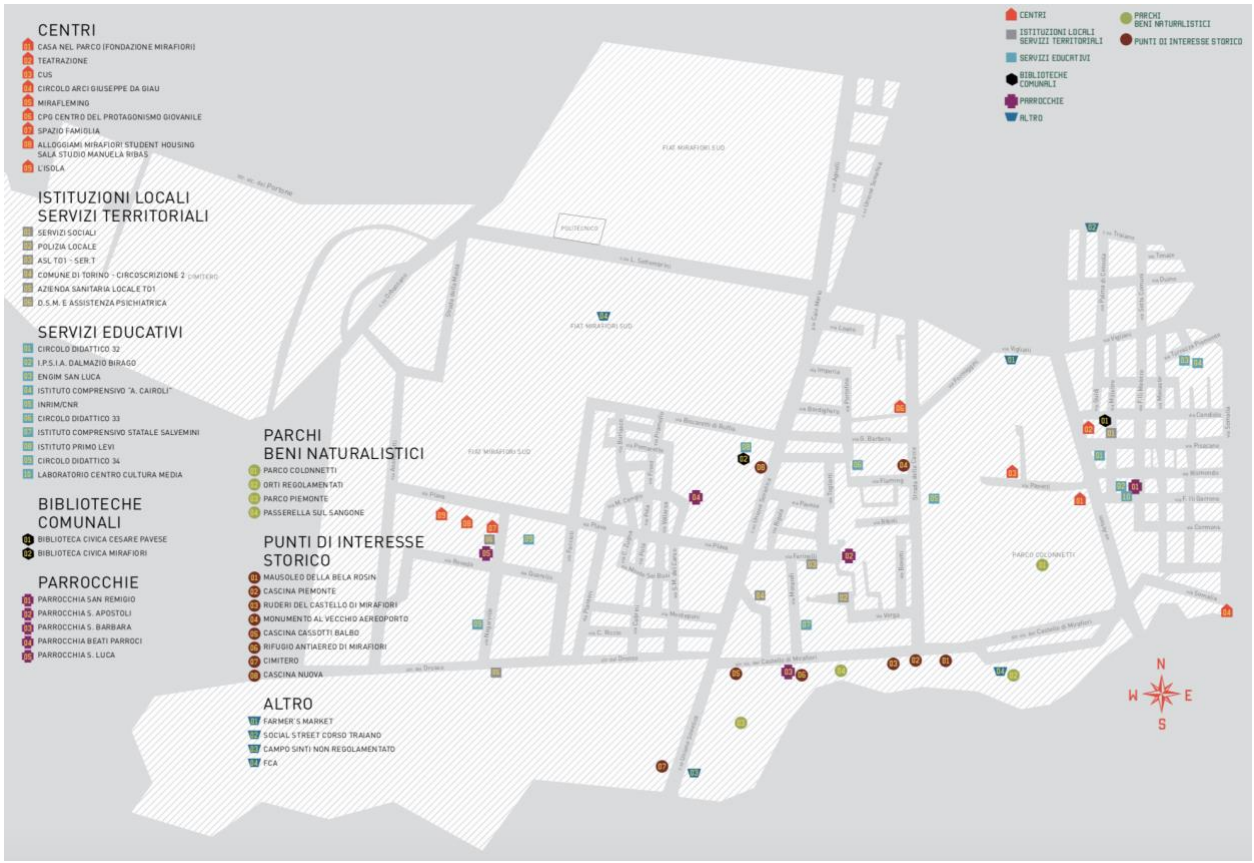



*Figure 2. Mirafiori Sud District services map, first approach on Holistic Diagnosis. (Author: Fondazione Mirafiori, 2018)*

b) Demography

In particular, the Mirafiori District has experienced erratic changes in their population from massive migration in the 1950s from southern Italy to the diaspora crisis of the automobile industry in the 80s. This category aims to have a perspective on the socio-technical system dimension from the collection of general information on the demographic trends over the years of the district and to subsequently describe in a wider perspective the well-known challenges of Mirafiori on social

segregation, poverty and security problems. The previous serves to establish a benchmark on the social challenges and potentialities for Mirafiori district the following categories were selected for the analysis:

- Population features: (numbers of inhabitants, density of population /average age, mortality rate, Migration and emigration facts). This analysis is focused on the post-industrial society of Mirafiori reflected on the segregation, static composition, relational isolation, growth of families formed by a single component. Also the transformation of the social fabric over the years.
- Employment: (rate of employment and unemployment, average income, type of jobs). This indicator is one of the most meaningfully of the area as the jobs where force to diversify on the decline of FIAT.
- Education (schooling rate, vocation of studies) Analysis of the higher education levels and study vocation if it corresponds to the need of the district.
- Material Deprivation: The trends on poverty across the area attracting more vulnerable population (homeless, refugees) refers to the inability for individuals to afford basic consumption goods and activities.

c) Economy

The Mirafiori district transitioned from a flourishing Fordist economic base model with FIAT as the epicentre to an economy in decline since the 90s with low speared entrepreneurial activity. This general study of the economic dynamics present indicators of the district and current assets which resemble the lack of diversification since FIAT left as a main economic actor, from job typology to infrastructure and property value. The indicators should serve as measuring instruments of the skills and services present in the district and a view of the weak and strong sectors. Moreover, is important to highlight the increasing role of the third sector as a potential force of economic reactivation. The analysis aims to focus on shifts then to areas of innovation, from a CCF point of view for Mirafiori district the following categories were selected for the analysis:

- Industry/typologies: From multinationals to entrepreneurial activity to oversee what other sectors have emerged in the district beyond the automotive sector. Including the internal organization which resembles the economically active population (cooperatives, one-man companies…).
- Third Sector: Number and type of social enterprises present in the territory at the moment. Considering the different funding and partnerships (e.g. public- private partnerships)
- Property value: This focus is an indicator on the shift of the property value over time ( 00’s until now) for residential/ commercial/ industrial/ office use. Considering the monthly cost of basic utilities (Electricity, water, Garbage)

c) Cultural

From a cultural point of view, the Mirafiori district shall be approached as Post-industrial Cultural heritage sites. As the history of the area is embed with FIAT on every cultural aspect showing the influence of the company on who has resided in the area and how it has shaped all aspects from the urban fabric to demographical and economy. In this case the strong influence of the automotive sector which created a strong sense of belonging which has decreased over the years. On that view, it is important to identify the activities by local institutions (third sector or local government) that are

promoting the conservation of the cultural heritage and new urban identities. These cultural aspects that are fundamental to understand specific phenomena inside the district. The analysis aims to focus on the local assets that can create a new narrative on Mirfiori district the following categories were selected for the analysis:

- Cultural heritage: Focusing on the diversity of cultural groups from the numerous population of the south of Italy to other countries, including; principal traditions/ languages/ religions.
- Food: Identifying in the district of food traditions, the most popular dishes and recipes, main food resources and their location on a map.
- Architecture heritage: A focus on the industrial dismissed areas of FIAT and other historical sites related to the principal landmarks and their location.
- Cultural Agenda: Trade Fairs, Symposiums, Concerts, Parades - Decrease of generalized participation, from events to Masses

## 5.2 Holistic Diagnosis 2nd step: Top-down and Bottom up analysis

In order to frame HD1 outcomes on the potentialities and challenges of Mirafiori District, it is important to go through the second phase of the HD which includes a Top-down and Bottom-up analysis (Barbero, 2017). Approaching from current policies to grassroots actions (social innovation, entrepreneurial activities, NGOs…) regarding axes related to CE and SD. On this view the analysis is divided into two:

- Top-Down: In particular the Mirafiori district since the begging of its decline in the ’90s the city government has stimulated a series of policies for urban regeneration, entrepreneurship and social cohesion (Torino Metropoli 2025, AxTo - Action for the suburbs of Turin, Metropolitan Strategic Plan 2018-2020, Urban program 2001). This analysis of the current policy instruments that address traditional regeneration approaches aims at describing their main features and priorities but at the same highlight the strengths and weaknesses from an SD and CE perspective. These facts lead to an overview of the state-of-the-art of the policy instruments on Mirafiori district, regarding sustainability and CE orientated. Also, while highlighting the results that these policy instruments have already generated also representing the gaps. On that way envisioning potential improvements that can enable an urban transition towards a CE.

- Bottom-up: After the decline of Mirafiori district it has emerged a strong network of local actors connected by NGOs (Fondazione Mirafiori, Miravolante, ...) that have to promote local development through actions on social innovation, entrepreneurship, health, food security, and cultural heritage. This analysis of all the actions happening on this regard in the district is relevant to overview the main features and at the same time highlight the strengths and weaknesses. As a matter of fact, the most important thing is to identify the relationships generated by this local actions as a key asset. This identification of all grassroots actions on Mirafiori delivers a state-of-the-art on the potentialities and challenges of local stakeholder interactions.

The HD2 overview draws attention to potential assets which can foster a CE. Also allows reviewing the overlapping of HD1 and HD2 unveiling how some elements from the Holistic Diagnosis of the

Mirafiori district are not being considered from the Top-Down and Bottom-up actions, allowing an accurate approach to the gaps towards a CE. Therefore, this analysis it acknowledges the complementarity of bottom-up and top-down actions, taking the view that the SD should play a role in stimulating local assets towards long lasting urban sustainability.

# 6. Conclusions

Post-industrial areas such as Mirafiori have come a long way overcome the systemic effects of deindustrialization to reactivate economic growth. The SD approach as a method to integrate CE strategies as active components of urban metabolism networks in post-industrial areas creating a doorway by generating a space where designers, local authorities, and citizenship can effectively co-develop sustainable urban transitions promotes a multidisciplinary approach that brings stakeholders from different sectors to co-create within an interdisciplinary scenario. The last part of the analysis aims at linking the previous steps by merging the HD1 and HD2, through the lens of the CCF business actions (Regenerate, Share, Optimize, Loop, Virtualize and Exchange) and interpret the data collected. The purpose of it is to activate a new economic model that arises the resources offered by Mirafiori where the community, industry and local authorities can pull new economic activities from a predominant Fordist model in decline to a dematerialized/service-based economy. This will assess potential synergies at a systemic level among other actors or activities at a district and city scale. Moreover, this research broadens the analysis on how the HD through the CCF the can deliver innovation in post-industrial areas at multiple levels:

A. On the technical level, through the new characterization of the Mirafiori District urban metabolism developing or redesign of local, circular supply chains from a technical innovation point of view. From an urban mining perspective (Cossu and Williams, 2015), a "Loop" business action on retrofitting the post-industrial infrastructure or innovative waste management strategies to promote new circular business models. Moreover on the "Regenerate" strategy, exploring nature based solutions on deprived post-industrial areas can be reactivated through technical approaches as urban farming, pollinator corridors…etc., Adopting a self-sufficiency as an ideal principle for decoupling economic growth from the use of resources requires cutting the number of resources utilized per unit of economic output.

B. On the social level, fostering social resilience among all actors in Mirafiori District through co-designing, co-creation and co-implementing CCF strategies. Enhancing social cohesion targeting participative strategies which can enable citizen-based ownership of local resources on Mirafiori. At the same, through education and training on the skills needed promoting the community's behaviour towards CE (Pomponi et al., 2016). In such scenarios should be considered CCF business action like "SHARE" Repair cafes taking advantage of the local know-how reuse or "LOOP" strategies where new community-based urban gardening could boost a neighbourhood bio-digesters.

C. On the economic level, with the creation of a diverse and resilient local economy for the Mirafiori district. Through combining SD approaches with CE business models that enhance local resources and highlights market opportunities. This business-focus aims to reinforce the existing networks and collaborations with all stakeholders in Mirafiori. Fostering diverse public-private partnerships between community, industry, local government, and NGO's. To

enable the diversification of the economic scenario in the district the CCF business actions are addressed to support schemes for entrepreneurial activity that accelerate bottom-up circular innovation (Prendeville et al., 2018). Considering from the CCF the “Virtualize” fostering platforms with local services from mobility to accommodation in the area or “Exchange” promoting locally-sourced products in district markets.

D. On policy-making level, these findings will aim to transform local policies on Mirafiori district, fostering a better governance and disseminate innovative solutions. To enable such outcomes the HD1 and HD2 unveil the key assets on the local contexts to approach effective policy innovation to foster de CCF, acknowledge the complementarity of bottom-up and top-down actions. Promoting horizontal dialogues among all stakeholders, generating innovative decision-making process that lead to the definition and implementation of efficient policy planning (Barbero & Giraldo, 2018). Taking into account the EMF’s ‘Toolkit for Policymakers’ (EMF, 2015), policy interventions for local governments to surpass obstacles in implementing CCF such as; education, awareness, business support schemes, collaboration platforms, public procurement, and regulatory frameworks.

The comprehension of HD tool on the lens of Mirafiori district enables to unveil more efficiently CCF strategies which reactivate their urban fabric and provide multiple benefits for the economic, ecological and social regeneration. Moreover, the steps for Mirafiori HD highlights the active sphere of co-operation for territorial thinking on complex phenomena scenarios between major stakeholders and the design research community, where a multi-stakeholder practice-led research turns into a mutual learning tool to create partnerships towards a CE. Ultimately, this territorial thinking on post-industrial areas shall support urban transitions and develop to expand the current planning and policy environment, leading to the design and implementation of CCF. The SD is poised to be an expertise which benefits all parts leading them to paths where all can reach an effective sustainable development creating (Barbero & Giraldo, 2018). The presented outcome of the HD for Mirafiori delivers a complete overview to understand the CE potentials and its manifestations needed to initiate impactful CCF effectively and in-line with the future city strategy. It is undeniable that cities are enthusiastic about CE but the challenge relies on the lack of understanding of the CE and on grounding the concept of CE in day-to-day practices. On that context, the SD expertise pretends to turn into a role model methodology for cities with industrial legacy, fostering local actors to towards a sustainable development and better governance, disseminating innovative solutions to reinvent and shape more circular post-industrial cities.

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**About the Authors:**

**Carolina Giraldo Nohra,** PhD candidate in Management Production and Design at the Politecnico di Torino (Department of Architecture and Design)(2017-2020). Her research mainly focuses on Systemic Design applied to generate Circular Economy and Urban Transitions. She is a member of the Systemic Design Research group where she is lead researcher of a range of european funded projects among the following ones : RETRACE Interreg Europe Project (2016-2020) (Politecnico di Torino - Lead Partner) on the development of local and regional policies moving towards a circular economy, preventing waste being released into the environment; and ProGIreg H2020 (2018-2022) (Politecnico di Torino - Partner) Nature based solutions for post Industrial Cities (Dortmund, Turin, Zagreb), on the development of Living Labs in urban areas which face the challenge of post-industrial regeneration with Green Infrastructure.

**Silvia Barbero,** PhD is an Associate Professor at Politecnico di Torino (Department of Architecture and Design). She is a lecturer of Product Environmental Requirements at the Design and Visual Communication degree and of Systemic Design at the Systemic Design Master degree at Politecnico di Torino. She is also responsible for the stage & job design curriculum. Her research mainly focuses on Systemic Design applied to agro-food and energy systems. She is the scientific coordinator of the RETRACE Project (Interreg Europe – I Call) on the development of local and regional policies moving towards a Circular Economy, preventing waste being released into the environment. She has been coordinator also of regional projects, and team leader of international projects. She is the author of numerous books on sustainable design. Furthermore, she wrote more than 100 papers in peer-reviewed journals, book chapters and reviewed international conference proceedings.