

(Systemic) Design for sustainable territorial transition: a literature review of state of the art

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(Systemic) Design for Sustainable Territorial Transition: A Literature Review of State of the Art

Asja Aulisio

Politecnico di Torino

asja.aulisio@polito.it

ORCID 0000-0002-3050-3763

Silvia Barbero

Politecnico di Torino

silvia.barbero@polito.it

ORCID 0000-0002-6589-5672

Amina Pereno

Politecnico di Torino

amina.pereno@polito.it

ORCID 0000-0003-4230-0186

Abstract

Sustainable territorial development is one of the crucial elements of most governmental strategies and action plans at the international level, which have to adapt to the local context in which they are implemented. In its different scales of application, the discipline of Design is increasingly called upon, permeating skills and tools within policy and governmental contexts that contribute to the definition of strategies to address complex problems. This paper presents a systematic literature review to map the specific declinations of the design field, with a closer look at the disciplinary areas close to Systemic Design methodologies, which are most involved in this field of research. The emerging tools and methods aim to support decision-makers or stakeholders in a necessary social, economic, and environmental transition process.

Keywords

Systemic design

Literature review

Sustainability transition

Territorial development

Introduction

As stated in the 'Beyond Net Zero: A Systemic Design Approach' Report by the Design Council (2021), "*We are facing an enormous challenge in dealing with the climate crisis. Despite promises and good intentions across the globe, we continue to see increasing emissions, environmental pollution, and rising inequality.*" (p. 5).

Also, COP26, the 26th United Nations Climate Change Conference, has further stressed the difficulties and lack of cohesion in defining solid strategic objectives. In particular, for the substantial change in climate mitigation actions and sustainability of our socio-economical models, that should be fair and indeed sustainable for all the places in the world. Moreover, we live in a highly interconnected world. Still, relevant decisions on reversing course to tackle climate change often consider the economic needs of the population inhabiting the world's most developed parts. However, the worst problems in underdeveloped or developing contexts are dictated by ever-increasing actions or demands from the countries that define the fate of the global economy. These challenges can be defined as "*wicked*" (Rittel & Webber, 1973), as they are complex, ill-defined problems that traditional problem-solving methods cannot solve. Nowadays, designers are asked to face what Donald Norman and Pieter Stappers call *complex socio-technical systems* (Norman & Stappers, 2016) that should be addressed from a systemic perspective, considering the needs of the planet, as a system, in a more-than-human perspective (Gaziulusoy *et al.*, 2021). Since the global pandemic of Covid-19 and today, with the current conflict between Russia and Ukraine, the fragmented way the phenomena happened in other contexts were previously observed, perhaps far away from where we live, is beginning to change. The global challenges are to be considered transnational in nature and trans-institutional in solution. They cannot be addressed by any government or institution acting alone. They require collaborative action among governments, international organisations, corporations, universities, NGOs, and creative individuals. Moreover, this fragmented view must also begin to be overcome regarding climate change issues. It is, therefore, necessary to enable a vision that emphasises the interconnectedness that has always existed. As James Lovelock 1979, with his Gaia Theory and the Club of Rome researchers, predicted within the *Limits to Growth* in 1972, people began to realise that more sustainable and joint action is needed to avoid an irreversible disaster (Lovelock, 1979).

Design as a Contribution to the Global Sustainability Transition

These preliminary remarks lead us to consider the role that Design, both as a discipline and a practice, can play in dealing with such disruptions by influencing behaviours, managing complex systems, and promoting sustainable production and communication processes. The Design discipline has always been influenced by multiple other fields, from hard science to humanities and social sciences. Afterwards, influence has become the ability to mediate between parties

(Minder & Heidemann, 2018), and this led design to interact with different stakeholders and diversify its fields of action. Meanwhile, as a tangible example of the process mentioned above, during COP26 in Glasgow, it took place *Design For Planet*. The first edition gave the stage to visionaries across the Design field, who are leading in sustainability and climate action, and who aimed to support decision-makers to prioritise the well-being of our planet in their work.



In addition, the Ellen MacArthur Foundation, one of the prominent non-profit organisations dealing with the Circular Economy, took part for the first time in a COP to provide the expertise and information gained over the years. It pointed out that 45 % of emissions are associated with producing goods like food and consumer products (Ellen MacArthur, 2021). This stresses the profound relationship between Circular Economy and Design, thus highlighting the need to redesign production and consumption systems to make them regenerative, capable of exploiting the connections generated within a territorial system and together with the people who live there and govern it. Within this framework, governments must understand that national Circular Economy and climate plans cannot be conceived as separate entities (Barros *et al.* 2021). Innovation, wise management of material flows, new business models and cultural shifts can reduce costs and dependence on raw materials and reduce emissions and environmental impacts. This paper shows the connection between the attention to the local context regarding sustainable development and the role of design by merging levels of complexity Fig. 6 addressed by the discipline. Specifically, the PhD's research highlights how Systemic Design creates mutual relations between people, value chains, and resources of a territory, aiming to enhance local cultures and generate development and collective well-being through a *g/ocal* perspective (Persson & Erlandsson, 2018).

The Evolution of Design as a Discipline. The Fundamentals of the Literature Review

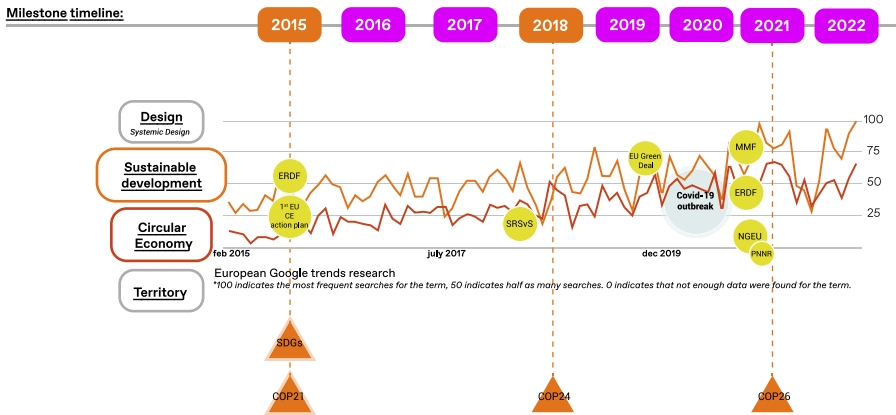
Over the past decade, Design has been committed to offering support as a technical, creative, and participatory practice with various problem-solving tools to be used and shared. These tools are helpful and strategically adopted in tackling challenges involving the stakeholders through a bottom-up and participative approach. One of the aspects already mentioned in a *The Guardian* article in 2013, which referred to the Design Council's work: "By doing research and running workshops with local people, the designers were able to tackle some of the causes of major frustration and confusion for residents and the council" (Design Council, 2021). If we add to the technical and creative elements of design the ability to interpret, visualise and understand complexity, we are dealing with Systemic Design. This is recognised for its ability to address and understand complex and uncertain problems. This aptitude could significantly contribute to strengthening the criticality of the multi-level sustainable development process.

Furthermore, Systemic Design practices have developed co-creation approaches that integrate social systems principles to guide stakeholder design for complex systems (Jones, 2018). This paper presents a systematic literature review that aims to understand in which niches Systemic Design and other Systems-Oriented disciplines have become embedded to support the definition of new strategies at the personal and public levels. The research is part of the first year of the doctorate path and concerns the role of Design (with a focus on Systemic Design) for a sustainable territorial transition. An additional guide is made on what could be the initiatives and action plans related to Circular Economy practices as a driver for local, sustainable development. The latter is an area of interest throughout Europe and internationally. It is essential to underline that nowadays, also thanks to the funds of the 2021-2027 financial framework and the recovery plans from the Covid-19 pandemic (Fig. 2), there are many projects and research which are addressing sustainable territorial development, and many of them relate with Design methods and decision-making processes, especially regarding sustainability and sustainable transition.



Fig. 2
European funds allocated for the financial framework 2021-2027.
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The research context has been set by defining a time frame based on facts, publications and projects that intertwine sustainable development trends and the Circular Economy. As shown in the scheme depicted in Fig. 3, several keywords used within the search queries were considered, revised according to trend analysis, and associated with the outlined national, European and international action plans and strategies.



Two thousand fifteen marks a year to start talking about concrete actions to be taken and goals to be achieved. On September 25, 2015, the 193 states of the UN General Assembly adopted the 2030 Agenda entitled *Transforming our World*, setting ambitious goals that promote cross-sectoral and multidisciplinary cooperation to change the world together.

Fig. 3
Timeframe about Sustainable Development and Circular Economy Trends.
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Methodological Approach to Enable an Innovative Research Process

The methodology adopted at this research stage combines various elements to determine a clear picture of the context in which the research is carried out and then to outline the gaps to intervene through pilot studies in the following years of the doctoral journey. The starting and primary point of the methodology adopted is to answer the following research question: *How can Design, particularly Systemic Design, support sustainable territorial development strategies (at the local and regional level) in a (post) pandemic context?* For this purpose, the research considers facts and papers from 2015 (Fig. 3), the year in which the Sustainable Development Goals were defined within the COP21 objectives. The first Circular Economy Action Plan was published and then arrived at the current (post) pandemic transition context. A methodology implements the research based on four steps, which were analysed according to the double diamond innovation process (Design Council, 2005), integrated with the gradual dynamics of divergence and convergence theorised by Bela H. Banathy in 1996 (Fig. 4).

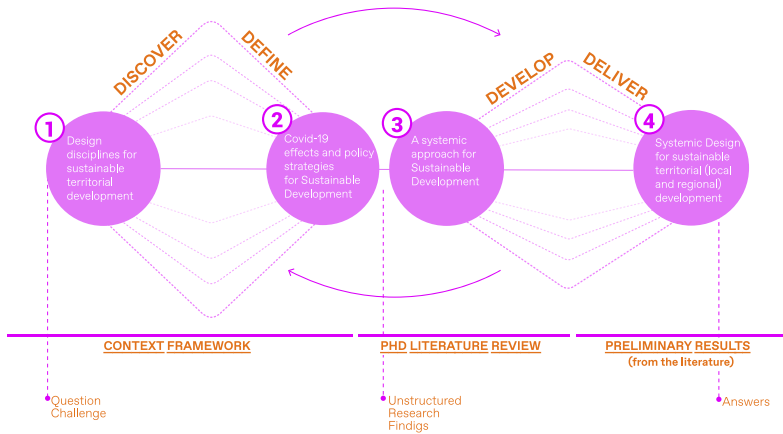


Fig. 4
Visualisation of
Methodological process.
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The methodological choice of combining the two processes mentioned above is because, on the one hand, the double-diamond process prepares an innovative way to approach the topic, including through the literature review process. On the other hand, Banathy's theorisation emphasises the *iterative nature of the design process* (1996). Systemic Design is crucial to assessing the process and projects' effects in the analysed context.

The steps for defining the context within which the research is articulated are explained here. Then we move through the literature review process to convey the preliminary results:

Step 1. is characterised by the review of the academic literature with the addition of reports and research by the world's leading exponents who are concerned with analysing the role of design in decision-making contexts involving not only private spheres but also the public sector (e.g., Design Economy by *Symbola*, OECD Reports);

Step 2. instead investigates the strategic directions of intervention proposed by the different post-pandemic action plans for long-term planning. This provides insight into the complexity behind the action programmes and how the discipline of design can be called upon;

Step 3. brings together the first two steps towards a more specific in-depth study of the research that orbits around Systemic Design for sustainable development and the disciplines close to this field of the design discipline to define some interpretative keys starting from the analysed panorama.

Finally, Step 4. converges all the previous steps of the research to give the preliminary results of the analysed context so that it is possible to outline the intervention scenarios of the doctoral study.

Preliminary Results From the Literature and Analysis

The systematic literature review was carried out through two primary databases (Scopus and Web of Science) to define the impact of Design disciplines on the sustainable territorial transition. *Table 1* highlights the results obtained through a query that was purposely

wide-ranging to include all the topics and fields that have dealt, to a different extent, with design for sustainable development and transition of territorial socio-technical systems. Ultimately, the records obtained from the other databases have been cross-referenced to eliminate duplicates. Among these, the references that did not conform to the search by geographical area or topic were eliminated.

Query	Database	Records	Final publications
TITLE-ABS-KEY ((systemic AND design OR transition AND design OR design AND for AND sustainability) OR (participatory AND design OR co-design) AND ((regional OR local AND sustainable AND development) OR (regional OR local AND sustainable AND transition))) AND (LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015))	Scopus Web of Science	422 217	50

The step-in progress of this preliminary research is the analysis of the collected results and their categorisation according to the main topics dealt with. It is already possible to present an outline of the most relevant keywords highlighted by the databases (Fig. 5) that will allow a general analysis of all the contributions. Greater attention was placed on identifying the areas of design that emerge from the documents within the databases. Those design areas reflect the keywords entered in the search query. However, also other design disciplines have emerged in support of bringing out the opportunity for contamination between methodologies and the design application.

Tab. I
The significant impacts of Design disciplines for sustainable territorial development. © Authors.



Fig. 5
Literature Review keywords. © Authors.

The figure (Fig. 5) shows the keywords identified by the authors in a hierarchical order: some topics of the research are more general (Rural Development, Local Government, Land and Resource Management, Policy Making), and others are related to specific interests (Urban and Regional Planning, Tourism, Cultural Heritage, Local Community). After analysing the keywords, an in-depth reading of the most relevant publications was done based on relevance and the number of citations. For example, we excluded the publications that are out of topic regarding projects developed and the research output. *Table II.* shows a paper selection related to the main issues highlighted and listed in this preliminary literature review phase.

Topic	The main aspect highlighted	Main publications
Policy and Governance	Co-creation; Collaboration and Stakeholders' engagement;	Righettini, 2020; Heitmann, F., Halbe, J., & Pahl-Wostl, C., 2019
Visioning and Planning	Strategic Vision; Resilient Communities	Fredericks et. al 2022; Fouché, E., & Brent, A., 2020
Educational and Cultural aspects	Cultural shift; Transdisciplinary Approach	Arbogast et al. 2020, Trott, C. D., Weinberg, A. E., & McMeeking, L. B. S. (2018).

Tab. II
The main topics and aspects highlighted in the literature for sustainable territorial development.
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The Design Contribution for a Disruptive Sustainable Territorial Transition

The analysis of the keywords from the literature allows us to identify some of the main areas of Design that emerged from the cross-section between design and sustainable development of the territory according to the applications and perspectives of the Circular Economy like *Design for Sustainability, Transition Design, Policy Design, Service Ecosystems Design*. Fig. 6 shows the intersection, done on different scales, between the specific topics emerging from the literature belonging to other Design disciplines and those most closely addressing the proposed research topic. This highlights that design can contribute to radical transformations requiring long-term, systemic, and structural societal changes (Loorbach, 2010). In this scenario, Systemic Design can propose methodological and practical tools to develop strategies for sustainable development policies, collaborating in environments strongly characterised by transdisciplinary environments.

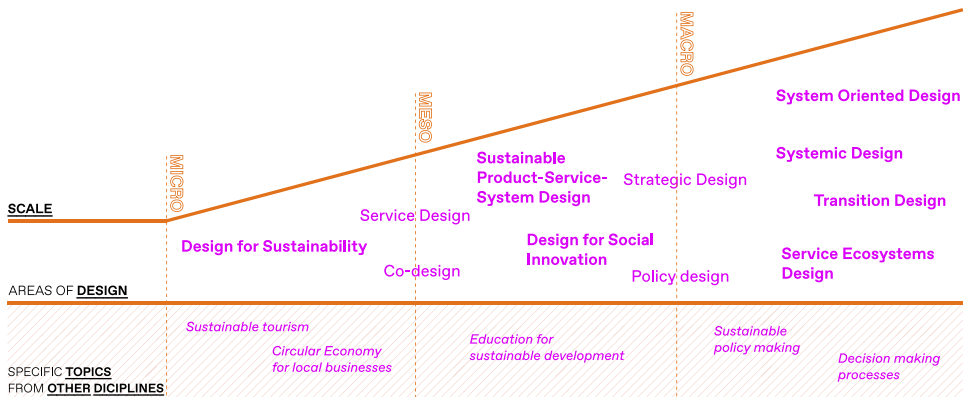


Fig. 6
Literature Review categorised keywords.
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Discussion and Conclusion

This first literature review shows that Design disciplines, specifically the ones closer to Systemic Design, are mentioned in multidisciplinary scientific publications addressing the sustainable transition of territorial systems. Very often, systems thinking is mentioned in contrast to or in support of the creative process of design thinking, highlighting how the different components that make up this design

area are exceptionally flexible and highly cited, especially within the chosen time frame. The terminology is indeed loose, and it is possible to apply it beyond the areas of design. Equally important is that on the international scene, the methodological frameworks of strategy are considered in decision-making processes and co-design spaces with policymakers (Mortati *et al.*, 2016). The paper lays the groundwork to address the research gaps previously mentioned, with its contribution based on the desk research conducted and within projects developed that will be worked in a co-disciplinary and cross-sectoral arena with the Sys – Systemic Design Lab (<https://www.systemicdesignlab.it/>) from Politecnico di Torino. One of the first significant gaps to be addressed in the short-medium term is the definition of practical tools and methods to actively engage stakeholders. This is to enable decision-makers to understand how they can be incisive in the activities they outline if supported by external actors such as designers, who are able to connect people with their know-hows an expertise, resources on a specific context and thoughts that come from the designing process, with a systemic perspective. After defining these tools, it is essential to develop a framework carefully and universally, as the Design Value Framework of the Design Council, to measure the impacts that Systemic Design has on society through the projects and research conducted. Really understanding the dynamics generated when designers are called upon to activate participatory design processes, with an impact on places and people for their sustainability, is crucial, to understanding their real value. The next steps of this work are to address the gaps highlighted by the literature review and to study multiple design methods to support transition processes in transdisciplinary contexts. This is because implementing design-led procedures fosters co-creation and strengthens socio-economic systems; in a long-term perspective, crucial for policymaking, especially concerning the recovery of Covid-19 implications. Transitions have been framed as design challenges with technological, creative, and political dimensions.

Asja Aulisio

She is a PhD Student in Management Production and Design at Politecnico di Torino. She graduated in Systemic Design with a study period in Japan, working with the Kyoto Institute of Technology and Nagoya City University. Her research focuses on promoting the systemic approach as a driver for territorial development in sustainable tourism.

Silvia Barbero

PhD, is an Associate Professor in Design at Politecnico di Torino and vice-coordinator of the Design Collegium. In 2022, she co-founded the Sys - Systemic Design Lab. Since 2018 she has been the president of the International Systemic Design Association. She is the scientific coordinator of numerous European projects concerning sustainable development and the Circular Economy.

Amina Pereno

PhD, is an assistant professor at Politecnico di Torino. She has been a Lagrange Project fellow at ISI Global Science Foundation and a visiting researcher at the Nordic Center for Sustainable Healthcare. In 2022, she co-founded the Sys - Systemic Design Lab. Her research focuses on Systemic Design applied to socio-technical systems and their sustainable transition.

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