Systemic Design for Policy Foresight: towards sustainable future

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Systemic Design for Policy Foresight: towards sustainable future

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In the last 15 years, tackling wicked problems have evolved into a process that requires multiple change-makers able to face with complexity. At the same time, it has generated an increasing interest and proficient relation among foresight and design, due to their shared interest in anticipation and future orientation. Such relationships are visible on similarities they both have on the mindset and methodology used when approaching future scenarios. This paper aims to delve into a better comprehension on how the combination of Systemic Design and foresight can think both creatively and systematically about the future and have a strategic role in a policy-making process. This example of collaborative foresight is illustrated by RETRACE Interreg Europe project (A Systemic Approach for Transition towards a Circular Economy funded by the Interreg Europe), demonstrating how Systemic Design with a foresight vision can play a leverage effect in the transition of the European regions towards Circular Economy in a long-term horizon.

Keywords: Systemic Design, Policy-making, Foresight, Decision Making, Circular Economy

Introduction

Today's complex global and erratic changes are rooted in multiple causes which have become interconnected over time. On a worldwide scale, climate change, high rates of poverty and market instability are just some of the critical drivers that have a great impact on how governments of today operate. The interconnected nature of such global trends, reveals uncertainty as a key issue in our society. This demands us to redesign our public policy conditions in order to be more future-oriented towards sustainable development.

Currently, it is impossible to conceive that wicked problems can be solved individually, in fact, an interconnected world requires a structure of interconnected solutions and change-makers able to understand and visualize complexity. For that reason, it is necessary to adopt anticipatory approaches that enable the combination of technology, design, business and social organization such as strategic foresight, systemic perspectives and participatory methodologies which can activate innovative mechanisms of sharing knowledge and experiences. In particular, the Systemic Design (SD) method tackles the complex phenomena through specific design tools which highlight the hidden potentialities of a scenario, delivering new relations among the local actors and entities, through promoting active collaboration among them (Bistagnino, 2011).

In the last fifteen years, there has been a growing relation among foresight and design, due to their shared interest in anticipation and future orientation. This relation is visible on similarities they both have on the mindset and the methodology used when approaching future scenarios. The practice of looking forward into the future should be at the base of our current policies, as the urgency to shift from unsustainable growth to sustainable development, primarily push the governments to face with complexity. Therefore it is needed

nowadays an innovative approach that fosters society to “think outside the box” (Considine, 2012). Precisely, it is exactly in these scenarios where the role of design, as discipline, becomes vital to approach complex environments, meet unexpected solutions and oversees innovative futures contexts.

It is true that policymaking is today more cross-sectoral rather than the past. In fact, we see examples of a bottom-up and top-down approach, groups with multi-stakeholders belonging from different sectors, a growing interest in a more collaborative approach to cope with global challenges (Krauz, 2016).

According to the above, this paper aims to delve into a better comprehension on how the combination of SD and foresight can think both creatively and systematically about the future and have a strategic role in a policy-making process. Moreover, it explores how systemic designer’s mindset and methodology can support foresight practices and strategic decision-making, developed in a collaborative and multi-stakeholders process. We illustrate this process of collaborative foresight through a specific case study, RETRACE Interreg Europe project, aiming at fostering SD as a policy-design method for regions to move towards a Circular Economy (CE) (Barbero, 2017). In fact, this case study shows how SD, with a foresight vision, can play a leverage effect in this transition, in a long-term horizon of 15 years.

The paper is structured as follows. In the first section, the research is framed inside a complex and interconnected context which requires multiple actors and strategies to cope with the major everydays challenges. Here, the three main areas of investigation are introduced - strategic foresight, policy making and design - whose cooperation reveals to be strategic towards a sustainable development. It follows the analysis provided in the section 2, aiming to deepen into the role of design, which evolved over time, shifting its focus on larger systems. The sections 3 and 4 respectively examine in depth the relation between design with foresight and policy-making. Lastly, through the case study reported, this paper features evidence of the fruitful relation among SD and foresight, by deepening the project’s phases, results and future developments.

Future orientation and strategic decision making

In our current era of unpredictable societal and environmental transformations, governments need to be more future-oriented than ever before. While on the one side, society seeks to be affected by quick changes to tackle everyday issues, on the other side a long-term vision is necessary to anticipate unexpected and disruptive events that often occur, as natural disasters or economic crisis, generated by critical drivers such as climate change, poverty and market instability. These events are just the visual expression of the complex phenomena that characterize today’s world, which leads to an inevitable uncertainty.

These complex and persistent situations are commonly called “wicked problems”. The concept of "wicked problem” can be described as a trivial and enduring situation that cannot be solved immediately due to its inner complexity and its exogenous/endogenous relations. As highlighted by Rittel and Webber (1973), a wicked problem cannot be analyzed and solved with the traditional linear and analytical method of problem-solving, since it has multiple causes and interconnections that make it hard to clearly define it (Briggs , 2007). Thus, the description given by Jones (2014) summarizes all the concepts above mentioned defining a wicked problem as:

> *a persistent, interconnected and generally worsening challenge (...) that cannot be “solved” (...) rather understood in their ecology of relationships. (Jones, 2014)*

The concept of wicked problem is widely known among the community of system thinkers, futurists and, more generally, among all those people who face with complexity. In fact the themes of complexity, uncertainty and wicked problems are both at the center of systemic designers’ investigations, as they aim to tackle global challenges, and are also taken into account by policy-makers who are increasingly using anticipatory strategies and tools to tackle social, economic and environmental issues. Among these, strategic foresight has been used since the 1970s, through the evolving conception of future thinking:

> *from a predictable world of controlled solutions to an unpredictable world of continuous learning and rapid adaptation through redesign and innovation. (Wilkinson et al, 2014)*

On that view, strategic foresight has been initially used by the industry as “corporate foresight”. This method is applied to better address decision-making by looking forward into the future. Since 1990 it has broadened its domains to public policies given the higher complexity of today’s globalized world. In fact, it has evolved from being a linear forecasting approach to be conceived as an on-going series of efforts that illustrates what could be the possible futures and what is necessary to realize these (Rohrbeck et al., 2015).

A generic foresight methodology can be summed up in the six steps outline in the table below:

Table I A generic approach to a comprehensive foresight project

Step	*Description*	*Product*
Framing	Scoping the project: attitude, audience, work environment, rationale, purpose, objectives, and teams	Project plan
Scanning	Collecting information: the system, history and context of the issue and how to scan for information regarding the future of the issue	Information
Forecasting	Describing baseline and alternative futures: drivers and uncertainties, implications, and outcomes	Baseline and alternative futures (scenarios)
Visioning	Choosing a preferred future: envisioning the best outcomes, goal-setting, performance measures	Preferred future (goals)
Planning	Organizing the resources: strategy, options, and plans	Strategic plan (strategies)
Acting	Implementing the plan: communicating the results, developing action agendas, and institutionalizing strategic thinking and intelligence systems	Action plan (initiatives)

Figure 1: A generic foresight methodology. Source: Bishop et al, 2007

It is important to stress the fact that foresight is not used to predict the future, rather to understand what could be the multiple futures that may occur and the value of learning from these. Through identifying and studying the change drivers it is possible to be prepared for the opportunities and threats of tomorrow, in order to develop in advance the best strategy to adopt.

As Vecchiatto (2012) said:

> *it is a planned learning process that requires strategic agility and adaptive capability about the future in order to react more quickly and more effectively to external opportunities and threats as they arise.*

This means to continue re-assess and re-align the project (or the system) boundaries. For this reason, strategic foresight requires a broader, flexible and open mind people able to navigate through the multiple scenarios that emerge from the changing of variables. As remarked by Wilkinson et al. (2014):

> *In times characterized by low predictability and inevitable surprise, the capacity for anticipatory adaptation, resilience and self-transformation is now seen as the key to long term success.*

An adaptive mindset and the ability to navigate through multiple scenarios, is something proper of systemic designers, as mentioned above. But, before going deeper in outlining the systemic designer's shape, it is worth to track designer's evolution over time.

The changing in the role of designer: from product to system

Nowadays, the design has trespassed its own frontiers making its domain broader and less tangible than ever. While traditionally, this discipline has been linked to the creation of objects, starting from the mid-late of the 20th century design has enlarged its application to services and systems (Ceschin & Gaziulusoy, 2016).

Recently, a consistent stream of designers are applying their skills and methods to go beyond a tangible outcome, towards intangible goals like sustainable behaviors and development. One of the reasons for this change is the increasing recognition of designers' impact. In fact, in the last fifty years, designers have been accused of the globalisation effects on mass production and uncontrollable consumption. In reaction to these phenomena the design community acknowledges to be a "dangerous breed", as described by Victor Papanek (1971) in his book "Design for the real world". Movements around design for sustainability have gained momentum providing a different vision on the role of the design. Therefore, the shift towards the dematerialization is considered the tipping point for design as the beginning of an evolving process towards services and systems. At the same time, it shifted the designers' attention from the single user to the communities as users, becoming a more participatory discipline while expressing its social and democratic nature (Buchannan, 1992).

This demonstrates the different shapes that design has, but it is clear its approach to deal with problems. Designers are able to focus on different scales as they can visualise problems, think about new strategies and

eventually “materialize” their ideas. According to Bicocca and Barbero (2017) it must be acknowledged to designers the ability to:

- **make information simple and accessible,** by managing big quantity of data and making them accessible to an end-user through easy-reading maps, schemas and scenarios (i.e. IDEO cards, gigamaps …);
- **think creatively**, and if applied to policy making, it can bring innovative solutions;
- **create connections in complex systems**, to offer a wider look on the problems and to boost transdisciplinarity. Systemic Designer are able to interconnect the elements of a system, in order to generate new business activities, products and relations.

More recently, due to the higher complexity of social, economical and environmental issues that become interconnected overtime, a new approach is needed in order to deliver systemic an interconnected solutions (Brown and Wyatt, 2015). From that panorama emerges the SD, which means understands and tackle problems on a systemic and complex level. SD merges human-centered design inside complex, multi-stakeholder systems. As explained by Jones (2014), this expertise combines designer skills such as research, reasoning methods and visualization practices, generating new reconfigurations for complex services and systems.

Furtherly, Jones (2014) outlined this evolution process in four contemporary domains of design, which have increasing complexity:

- **Artifacts and communications**: that is the traditional way of conceiving the design practice, as a way of producing artifacts
- **Products and services**: this stage includes the services for value creation (i.e. service design, product innovation and user experience)
- **Organizational transformation**: design as a change-oriented practice, using complex and bounded strategies for business transformation
- **Social transformation**: design as a change-oriented practice, for complex social systems, policy-making and community design

From that perspective, the Department of Architecture and Design of Politecnico di Torino developed the SD approach that reconfigures the flows of material and energy from one component of the system to another, modifying outputs of one process into input for another one, in order to obtain zero emissions (Bistagnino, 2011). This approach favors the visualization of hidden potentialities and supports the active collaboration among local actors, enhancing locally-based value chains (Barbero, 2012). The SD methodological approach has been described by Battistoni (2017) and it can be divided in 6 main steps:

- **Holistic Diagnosis (HD)**: it consists on a desk and field research, combined together to investigate the current scenario on the economic, social and environmental aspect, also considering the flow of energy and matter.
- **Definition of problems and leverages for change**: Starting from the framework outlined in the HD, connections and influences are analysed in order to outline possibilities and threats of future scenarios. Problems are regarded as leverages for change from which the project can be defined and initiated.
- **Design the system**: A new production model is designed whose aim is to tend to zero emissions by optimizing energy and material flows and by valorizing the waste as resources.
- **Outcomes Evaluation:** evaluation of the environmental, economic and social benefits belonging from the new production model.
- **Implementation**: implementation of the previously designed system in the specific context and consequent estimation of the new business plan feasibility.
- **Results analysis and feedback**: evaluation of the implemented system and discovering of new opportunities, making it autopoietic.

Through this methodology it is possible to create synergic linkages among the productive and natural realm of the surrounding territory (Barbero & Fassio, 2011), while reinforcing the socio-economic systems connected to that territory, in a long-time perspective.

Design for foresight and policy making

From the designers' features outlined above, it is important to highlight their future-oriented vision, social vein and capacity to deal with wicked problems. That is why is no surprise the increasing collaboration between designers and governments (Bason, 2014) in the activity of policymaking.

> *Policymaking is the process by which governments translate their political vision into programs and actions to deliver 'outcomes' - desired changes in the real world (Blair, Cunningham, 1999).*

So policymaking has to deal with long-term vision and strategy. This cooperation has often taken shape inside the so-called "Policy Labs" (i.e. Public Policy Lab in New York, EU Policy Lab in Bruxelles) usually set in government administrations (Bailey, 2017), or it is facilitated through the use of collaboration toolkits (i.e. IDEO cards). These ones support participatory processes, communication and exchange of information among different disciplines and sectors in order to combine bottom-up and top-down approaches in governance. Also, a large number of programmes and initiatives promoted by the European Commission witness how design expertise is increasingly involved in the definition of new and innovative strategies. Among these, it is worth to mention the "European Design Innovation Initiative ", the "European House of Design Management", "Design for Europe (2014)".

As pointed out by Bailey (2017) the involvement of design in the process of policy making, enables "organizational flexibility, provisionality, and anticipation". So, the key feature that connects designers to policymaking is the human-centeredness, as both are on the quest towards a better future for society. Furthermore, designers can support the process of policymaking by stressing not only on numeric trends but also on qualitative aspects such as culture, uses or local resources.

Chen et al. (2016) argued on the inadequacy of designers to operate on such a large scale, as in the public policies domain (always detected by the social science), since they are historically focused on the small scale of a product or service. As previously explained, the designer's role has evolved towards the awareness of sustainable development, leading to a more conscious design born in cooperation with other disciplines. According to Bason (2014) design is a "hybrid blend" of anthropology, systems thinking and data science, so problems are depicted differently under his lens; furthermore it enables creative collaboration and communication among different disciplines as it makes policies visible and tangible.

From the point of view SD, it overcomes the problem of the small scale through an holistic approach. Thanks to this, it is possible to constantly shift from the small to the large scale and to focus on a particular policy or intervention, while taking into consideration the bigger picture. Additionally, the SD goes beyond the simple and more common "problem solving" typical of Design Thinking, by questioning on new problems that emerge - or could emerge - from a deeper understanding of the context. Starting from the system mapping and highlighting problems and opportunities for intervention, the SD provides a different perspective of a specific context. As a result, it proves to be an effective method to deal with complexity and problems interconnections.

What strategic foresight and SD have in common, is the capacity to constantly question about past, present and future conditions by continuously re-discussing our assumptions. Nevertheless, the involvement of designers in policymaking is still an emerging trend that faces different challenges. First of all, the resistance from some policy professionals and institutions used to work in a more bounded ground that could not leave space to the openness, non-linear and cooperative methods of designers. Secondly, the rejection of external perspectives, usually uncomfortable, given onto topics and policies that always are developed "behind closed doors". Third, the request of quick response that contrasts with the long-term perspective that an innovative action requires (Bailey, 2017).

Cross-cutting approaches: Foresight and Systemic Design

> Foresight projects tend to account for systemic changes in the search for a future ideal state (Jones, 2014)

As discussed above, the practice of looking forward into the future is something shared from futurists, designers, and policy-makers. This section presents similarities, differences and possible future developments among the three different domains.

Starting from a generic foresight approach (Figure 1), it is interesting to see how similar is the methodology adopted by designers when approaching a new project. Both futurists and designers start with scoping the context: the identified problems and the collected information are delivered under the shape of a scenario, which describes the most plausible futures. After choosing the preferred future onto define the new project, a strategic plan is developed in order to be translated into new solutions that should be later implemented through an action plan.

If, on the one hand, sometimes it has been criticized to futurists the lack of action after pointing out new possibilities, on the other hand, designers, are accused to perform a short-term vision that doesn't favor sustainable development. Surely, it is important to acknowledge how the similar methodological approach shared by futurists and designers can be considered an important common ground of cooperation, on the lead of a multi-stakeholder group of policy-making. On that view, it can be considered that the systemic designers could be the right expert to involve in order to overcome the challenge of performing only a short term view.

From the previous, it can be understood the ongoing synergies between SD process and the Foresight framework (Figure 1). Most certainly, both processes share common points that are those which this paper is outlining, such as:

- **Intrinsic future orientation**: as suggested by the etymology of both names: "fore-sight", which means "seeing ahead, knowing in advance" and "pro-ject", which means "to set forward" (Hines and Zindato 2016).
- **To conceive multiple futures / solutions**, because everything changes so it's not about solving a finite problem, rather tackle the multiple problems that emerge from the changing of variables. Complex systems define a class of problems that are often described as non-linear, adaptive, self-organizing and emergent (Hadzikadic, 2015).
- **To deal with complexity,** and with wicked problems that characterise today's global challenges (Rittel and Webber, 1973).
- **Continue re-assessment and re-alignment of the project (or of the system) boundaries**, always questioning about present assumptions (Weigand et. al, 2014).
- **Micro / macro scale**, SD is able to shift from the specific intervention to the wider context on which this intervention is set. (Bistagnino, 2016)
- **Short / long term**, SD is able to deliver solutions on the short, medium and long term by developing a strategy on multiple scales. (Bistagnino, 2016)
- **Open to a collaborative process of multi-stakeholders** since complex problems cannot be solved in isolation but require the cooperation among science, humanities and technology. (Bason, 2014)

Among the tangible deliverables shared by the two disciplines, other connections are seen through the use of:

- **Scenario**: a powerful visualisation of possible or desirable futures with a strong system thinking basis (Ringland, 2010; Godet, 2010)
- **Action plan**: which materialize the strategy previously developed into a series of actions necessary to achieve specific objectives. This document should also specify the timeline, the actors involved and the expenses (costs or funding) (Barbero, 2017).
- **Roadmap**: especially used in polymaking since it specifies the concrete actions and programmes to address a full-scale implementation, shared by policymakers and stakeholders (Bailey,2017).

Since tackling wicked problems is an evolving process that requires multiple change-makers able to face with complexity, this paper explores how the systemic designer mindset and methodology can be supportive in foresight practices and strategic decision making, developed in a multi-stakeholder group. To enable this analysis it was relevant to summarize and point out the connection points among the two disciplines, as stated before. In order to deliver a wider examination on SD and foresight approaches to the discussion, it will be further narrowed the specific case study of RETRACE Interreg Europe project.

Research Exploration: RETRACE Interreg Europe Project

To illustrate how SD methodology, as proven an effective example of foresight in policy making, it will exemplify through the specific case study of RETRACE.

RETRACE is an European project financed by the Interreg Europe ETC Programme, under the 4.2 Specific Objective – Improving Resource Efficient Economy Policies. Through this kind of projects Interreg Europe aims

at improving the implementation of regional development programmes and policies by promoting experience exchange and policy learning among different regional actors (Barbero, 2017).

In this open-ended learning process, the SD approach has been used as a central methodology, shared among the partners, allowing strategic foresight and policy-making in their transition towards a CE. The goal of RETRACE is to develop sustainable Regional Action Plans (RAP) for each of the regions involved, standing the research on contextual data and matching them with the Good Practices (GP) experimented in the other countries.

The project is headed by the Department of Architecture and Design (DAD) at the Politecnico di Torino, involves 8 private and public partners and more than 70 stakeholders from five regions of EU countries: Piedmont Region (IT), Bizkaia (ES), Nouvelle-Aquitaine (FR), Slovenia (SL) and North-East Region (RO). The coordination of the 8 partners comes from the synchronized work between universities, local authorities, government offices, associations and public administration including:

University	*Managing Authorities*	*Public Company*	*Technological Centre*	*Foundation for the local economic development*
Politecnico di Torino (Lead Partner) (IT)	Piedmont Region / Directorate for regional system competitiveness (IT)	Provincial Council of Bizkaia - BEAZ S.A.U. (ES)	APESA - Association for Environment and Safety in Aquitaine (FR)	Azaro Foundation (ES)
Higher School of Advanced Industrial Technology – ESTIA (FR)	Government Office for Development and European Cohesion Policy (SL)			
	North-East Regional Development Agency (RO)			

Table 1: RETRACE Interreg Europe project partners. Source: (Authors)

Each region gathers a Stakeholder Group which includes a wide spectrum of organizations from development agencies, non profit organizations, social enterprises, research centers and innovation clusters, for a total of 70 actors involved. These stakeholders across the RETRACE regions have been key figures for the development of several proposals grounded in the local context, by supporting the transition to a CE or by creating effective tools for this change.

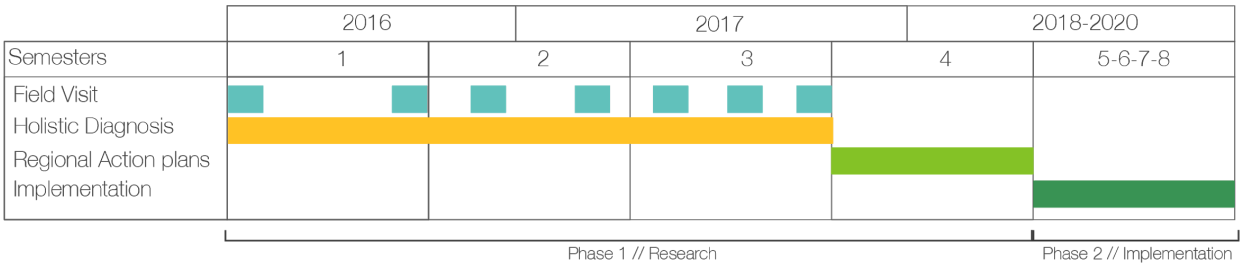

Figure 2: Project development _ RETRACE Interreg Europe project timeline and phases. Source: (Authors)

The timeframe of RETRACE goes from April 2016 and it will end on March 2020. Two macrophases characterize the project: first the research and then the implementation phase. The phase 1 took place from 2016 until 2018 with a series of intense research activities. Among these, the HD was at the foreground of SD methodology which enabled the collection of qualitative and quantitative data, followed by the analysis of

interactions between them (Battistoni and Giraldo Nohra, 2017). As a result, the data collected were presented through infographics, which enabled an easier fruition among a multidisciplinary team. The scope of the HD was to highlight critical factors, as well as hidden possibilities, through a three steps process:

- **Analysis of the regional framework:** concerning the territory and the industrial sectors, collecting quantitative data from official national databases (e.g. Eurostat), as well as qualitative data based on reports and on-site interviews with local stakeholders.
- **Analysis of current policies:** that addressed traditional sectors on environmental sustainability in the domains of water management, urban waste, energy and environment. The aim was to highlight the potential policy gaps that could obstacle the transition towards CE.
- **Analysis of the principal economic and industrial sectors:** Combining the previous steps through the overlapping of the policy instruments and the context information. This assessed potential synergies at systemic level among other sectors or processes at a regional and interregional scale.

While conducting the HD, the first half of the project was dedicated also to the organization of the Field Visits (FV) which lead to the identification of more than 40 GP (Pereno and Pallaro, 2018). During the field visits, the stakeholders discussed strengths and weaknesses of each good practice, in order to transfer this knowledge to the other partner countries.

After matching the results of the HD and the experiences brought from the GP, specifical RAP were developed. The RAP specified the nature of the actions that need to be implemented, their timeframe, the players involved, the costs and funding sources (Barbero & Giraldo Nohra , 2018). To achieve the RAPs each Region contemplated their current Smart Specialisation Strategies (RIS3) and development targets, which included a low-carbon CE, setting a framework for the future sustainable development of Europe.

In April 2018 the second phase of RETRACE begun, which is consisting in the implementation of the RAPs emerged in the first phase.

In the following section we are going to illustrate the preliminary results already obtained, together with those expected in the future, better explaining how RETRACE is relevant for the scope of this paper.

Retrace's results through Foresight lens

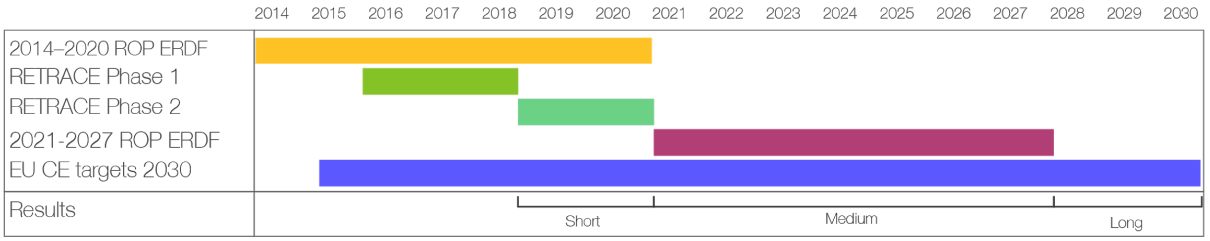

*Figure 3: Project Results development _ RETRACE Interreg Europe project *Regional Operational Programme (ROP) European Regional Development Fund (ERDF) *Sustainable Development Goals (SDG) Source: (Authors)*

In order to understand how RETRACE is framed in the context of "design with foresight for policy-making towards CE" it's worth to do an overall resume, taking the case of the Piedmont region as example.

The HD performed a central role as it scoped the context in a very deep way: in fact, through desk researches and FV, the SD obtained a first scenario related to the current context of the Piedmont Region. Matching these results with policy gaps and taking into consideration the already existing RIS3 of Piedmont region, a RAP has been developed. The RAP can be seen as a strategic action plan in which the policy gaps have been addressed - through the Regional Operation Program (ROP) - with the implementation of 3 to 6 concrete actions (roadmap).

Even if the duration of RETRACE is 2016 / 2020 it should be considered that it operates in the realm of interregional policy making though, it is admissible that the impacts will resonate after the end of the project. Starting from this assumption, RETRACE forward-looking actions have been developed on a short, medium and long term, where the short and medium ones are strategically designed in order to trigger future

implementations and address the change. This practically demonstrates the “actionable and proactive“ mindset of designers that, enriched with a foresight vision, are providing tangible deliverables in the short term, while aiming to activate broader actions in the long term. Though, for each action, a specific indicator to measure its effectiveness has been identified.

The identified actions aim to affect the policies at different levels (Barbero & Giraldo Nohra, 2018):

- **A level that implies a direct activation** of new measures or eventually implies an impact on existing measures, within the defined framework of the 2014–2020 ROP ERDF;
- **A level concerning governance and policies**, in a medium-term perspective;
- **A level concerning culture**, in collaboration with the Politecnico di Torino, to train a future class of professionals who will be able to promote a circular approach to the economy.

From above, we have selected the specific action called “Bioeconomy Platform” belonging from the first level, in order to give to the lectures an insight of a short-term action which have impact on the medium and long term horizon.

Bioeconomy platform

The Bioeconomy platform is framed within the Green Chemistry and Agro-food sectors which, as emerged from the RIS3, are priority areas in which the Piedmont Region is particularly specialised (Barbero & Giraldo Nohra , 2018). This given to the enterprises involved, the technological know-how and a strong concentration of innovation activities and research centers.

The platform has been initiated by a regional call for R&D projects aiming to create “circular connections” between different companies and research organisations, in the field of “Bioeconomy”. On that purpose, the Region intended to finance the development of innovative solutions and collaborative aggregations, facilitating the exchange of knowledge and skills between companies and research centers.

Short Term Results

The first results of this call delivered a total of 11 projects submitted. Furthermore 8 out of 11 projects are connected to CE. Below we report some statistics:

Total 138 partners: 38 Research Organizations, 100 companies

Topics covered by submitted projects and outcomes:

- Biofuels (1 project, 9 companies and 3 RTOs involved)
- Fertilizers (2 projects, 22 companies and 7 RTOs involved)
- Biomaterials/bioplastics (2 projects, 29 companies and 12 RTOs involved)
- Nutraceutics (1 project, 14 companies and 3 RTOs involved)
- New value chains to reuse agricultural and agro-industrial wastes and byproducts (2 projects, 31 companies and 8 RTOs involved).

These results are classified as “short term results” because they are given within the duration of the project. As previously explained, policy actions don’t change in a range of a 4 year project, but they take a more medium and long term adaptation. That said, this first short term results aim to initiate managing authorities in to bigger actions with wider impacts on a medium and long term perspective. Moreover, due to the high interest and participation of companies and research centers on this platform, the following paragraphs make a prevision on what will be the most plausible futures on the mid - long term horizon, based on the current changing drivers. Among these, the overall regional situation is characterised by good resources to transition towards a CE (e.g., research and innovation initiatives, technological development, strong economic sectors with leading industries, key change-makers, networks). On the other hand, it must be underlined that the regional panorama still lacks of a critical mass of industrial and research investments on CE, which calls for further actions (Barbero & Giraldo Nohra, 2018)

Medium-term Results

The mid-term results of the project will be reflected after the completion of RETRACE on the next programing period 2021–2027 ROP ERDF . As explained above, the actions proposed on RAP could only propose tangible-short actions as they were unable to modify the current 2014–2020 ROP ERDF. Furthermore, the CE paradigm on this current programming period is not explicitly addressed as a policy goal. In this context, the

RETRACE actions and strategies will provide an essential input in defining an effective approach to address the CE policy goals on the future programming period for EU funds, in a more systemic and territorial way. On the local point of view, actions like the Bioeconomy platform, will increase awareness and cooperation among industrial, research and innovation players, stimulating other similar initiative that will become real on a mid-term horizon. The eco belonging to this successful action, can resonate also on the national level, creating a wider spectrum of calls which encourage the allocation of more fundings on projects related to CE. On that regard RETRACE supports the improvement of the ROPs especially under the governance point of view, encouraging the focus for new calls to be launched, in order to boost research and investment measures on CE. More generally, the RETRACE outcomes will influence how regions will oversee the development of CE on the next 6 years.

Long Term Results

On a long term perspective, the RETRACE results must be framed on the targets that EU has set for a sustainable development by 2030. For that purpose it must be acknowledged the considerable EU policies towards a CE as - the already ongoing - *Circular Economy Package, EU Bioeconomy Strategy and the EU Plastics Strategy* (EC, 2019). Considering the ambitious CE targets of the EU by 2030, the RETRACE inputs are a relevant milestone as they are addressing regions to achieves major environmental-economical-social advantages through the intervention of regional funds. Based on the elements mentioned above, it is possible to oversee the evolution of RAP actions towards EU 2030 CE targets. In the specific case of the Bioeconomy Platform, one of the possible results will be the increasing use of second-hand materials and enhancement of the by-product value chain among the network of connected enterprises.

Overall results

Thanks to the contribution of RETRACE the actions intended in a short term view will influence the call for proposals throughout all 2018. At the same time, with a long term vision, it will allow to orientate and bring out more clearly the planning concerning the processes of resource efficiency and CE.

Designers, in this project, have a central role since they are the experts who are providing the SD methodology. It is important to stress that the methodology is shared and put in practice by all the partners and stakeholders of RETRACE, creating new mechanisms of sharing knowledge and experiences, on the local and inter-regional scale. On that sense, designers are both at the head and in the middle of design-led innovation. As providers and mediators, their versatile role allow a Quadruple Helix approach where university, industry, government and civil society cooperate in order to co-develop strategic decision-making. This reflect a concept of innovation intended as a contamination of different disciplines and sectors. In order to allow this type of innovation, visualization through infographics, schemas, and gigamaps (Sevaldson, 2011) delivered by systemic designers, perform a key role in the process since complex concepts are made accessible and usable through a simple and common language. This action facilitated the peer reviews meetings, generating deep discussions around the regional data presented and enabling a knowledge transfer to the other partner countries.

Cross-cutting projects like RETRACE offer an inspiring example of forward-looking decision-making. Thanks to RETRACE new policy opportunities have been co-developed in Europe, standing on real data and providing real solutions in handling environmental uncertainty.

Conclusions

This paper contributed to address strategic anticipation in design research, by proposing a collaborative approach shared among SD, strategic foresight and policy-making in order to move towards CE in a long-term horizon.

As extensively discussed, complex and wicked problems are key issues in our society that demands us to redesign our public-policy framework conditions. During the research, it emerged that “strategic agility and adaptive capability” are key elements to react more quickly and effectively to the multiple futures that could arise. Moreover, the interconnections of today’s global challenges demand collaboration among different disciplines in order to tackle the emerging challenges and to deliver systemic and interconnected solutions.

Through this paper, it is highlighted how systemic designer's mindset and methodology can be supportive in foresight practices and strategic decision making, developed in a collaborative and multi-stakeholders process.

On that view, it has been examined how the role of design is changed over time, broadening its lens and shifting its focus on larger systems. Consequently, designers has turned into key players on delivering innovative strategies on the micro/macro scale and on the short/long term. Specifically, Systemic Designers are able to navigate through the multiple scenarios that emerge from this complexity. Literature and the field of practice have shown the intersection points between foresight and systemic design practices. In fact, both design and foresight envision plausible futures and try to strategically design multiple solutions aiming to reach an ideal future outcome.

The RETRACE case study, which supported this research, features evidence of this fruitful relation, proving to be effective in the development of strategic decision making towards a sustainable future.

This paper took the case of the Piedmont Region as an example in order to understand how RETRACE is framed in the context of design with foresight for policy-making, towards CE. The SD methodology adopted in the case study highlights the connections between SD and Foresight. In fact, the holistic diagnosis performed a central role in scoping the context, collecting qualitative and quantitative data and delivering a first scenario. Matching these results with policy gaps and taking into consideration the already existing policy-strategy of Piedmont Region, a strategic action plan has been developed. Finally, the implementation phase of the project, has defined a roadmap of 3 to 6 concrete actions that are going to be developed on the short-medium-long term and aim to affect the policies at different levels: direct activation and implementation (Short), governance and policies (Medium), culture and education (Long). On that view, the RETRACE actions perform an essential input for stimulating the allocation of more EU funds on the next programming period and also fit with the targets that EU has set for sustainable development by 2030.

Inside the RETRACE project, systemic designers performed a double key role as providers and mediators: they share their proper methodology among the partners and make complex concepts and interconnected data accessible and usable to all, through visual maps. This practically demonstrates that systemic designers, enriched with a foresight vision, can play a leverage effect in the transition of the EU regions towards CE, by strategically designing concrete actions which address a long term change.

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