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Rethinking social and sustainable innovations through prospective co-design and project-grounded research

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Abstract

How can project-grounded research in social design make it possible to question the creation of social relations and the emergence of forms of solidarity? Our article aims to articulate in social and sustainable innovation the contribution of prospective co-design, foresight and societal fiction to offer new imaginaries of territories. We also explain how the evolution of Project-Grounded Research (PGR) in social design can widen through design fiction by solidarity economy. We develop our subject in five parts to explain how social design could invest in sustainable development and the social and solidarity economy (SSE). First, we present PGR in social design to precisely delineate its theoretical roots. Second, we explain how we can cross design fiction and social design through a reflexive analysis of PGR in social design, focusing on two different topics that are both related to comparative and comparable purposes for mobilizing prospectively for sustainability issues. Third, we present a synthesis of the reflective analysis on relating participatory and prospective design. This leads us to reframe the SSE, communities and commons prospectively in the fourth part. Finally, we open the reflection on the necessity of third places and actions and propose our approach as a prospective solidarity design.

Keywords: Social design, Project-grounded research (PGR), Prospective co-design, Sustainability, Social and solidarity economy (SSE)

Introduction

Project-grounded research (PGR) in social design is presented as a form of research at the crossroads of action research, participatory research and research and development, driven by the desire to transform society and promote social change (Catoir-Brisson & Watkin, 2021; Findeli, 2003). This research approach questions through social design the economic forms and social relations of social innovation embedded in the social and solidarity economy (SSE). Shaken by the imperatives of sustainability, social innovations seek through social design a more harmonious and ecological relationship with the environment. The participatory dynamic of social design becomes a vector of social innovation and sustainable development. How can PGR in social design and prospective co-design make social and sustainable innovations possible? How can prospective and future-focused fiction help redefine innovation in social design for sustainability?

Several themes can be considered to deal with this issue, such as sustainability and project timeframes on the one hand and user appropriation modes on the other. We propose to question how PGR in social design makes it possible to question the creation of social relations and the emergence of forms of solidarity by relying on collaboration and participation. Thus, it questions “the habitability of the world” from a theoretical perspective aiming to study “generalized human ecology” (Findeli, 2015). Social design is also close to social innovation through design, which concerns “everything that designers can do to activate and support processes of social change” (Manzini, 2015). It makes it possible to study, propose and put into action not only intentions and desires but also diverging points of view to create a debate to better understand the needs concerning our environment.

Social design and innovations raise topical issues of sustainability and development to imagine different ways of living and inhabiting the world. Indeed, innovation in itself is a paradox because it does not exist over time (Schumpeter & Fain, 1951) despite the desire to pursue a social aim. What kind of role should be given to research and the researcher in the project-driven process to move the lines and paradigms of society and trace new ones over the long term?

Our article aims to articulate in social and sustainable innovation the contribution of prospective co-design, foresight and societal fiction, to offer new imaginaries of the territories. We propose to develop our subject in five parts. First, we present PGR in social design to precisely define our theoretical roots. Second, we explain how we can cross design fiction and social design through the reflexive analysis of two PGR actions in social design, focusing on two different topics and both related to comparative and comparable purposes on mobilizing prospectively for sustainability issues. Third, we present a synthesis of the reflective analysis on relating participatory and prospective design. This leads us to reframe the SSE, communities and commons prospectively in the fourth part. Finally, we open the reflection on the necessity of third places and actions and propose our approach as a prospective solidarity design.

Project-grounded research in social design

PGR (Findeli, 2003, 2005, 2015) is an extension of action research that follows some principles of grounded theory (Strauss & Corbin, 1994). It is also an updated form of participatory research through the improvement of the research participants' experience (Findeli, 2005). The participants are involved in finding the solutions that best suit their needs and aspirations. The scientific knowledge principle of producing through action is the basis of PGR. As research through design is "active, situated and engaged in the field of a design project" (Findeli, 2015), the designer-researcher must "draw methodological rigour" from the many theories resulting from the human and social sciences. A double problem leads the designer-researcher to ask a research question as a question of design. Beyond a singular experience and a problem of use, design focuses on "fundamental questions relating to the human experience in the world" (Findeli, 2015).

The contribution of PGR in action research implies an iterative, process-based approach, which involves action about a research question. The creative methods coming from design renew both project practice and traditional project management methods but also action research, since design contributes to developing new methods of producing, collecting and processing ethnographic data. These deliverables produced through the various project iterations are also research evidence. PGR is also an approach to innovation open to exploration, prototyping of ideas and iterative learning. This form of abductive research makes it possible for the actors themselves to bring out societal issues as they carry these issues throughout the participatory design process. To innovate is to start from the tensions that appear between the actors and make them express themselves during the co-design process to identify them and imagine solutions to resolve them. This specific PGR approach leads us to take an interest in social innovation through design in public policies.

This line of research integrates social design more than other design practices because it has participatory techniques. Other design strategies such as speculative design, critical design and strategic design engage participants with others in various participatory forms. Nevertheless, social design is essential in this paradigm offered by PGR, because it adds to the act of projecting design in a context of interaction of plural communication between actors, partners, stakeholders in the project. Therefore, it renews research in human and social sciences by providing researchers with tools for their investigations (Catoir-Brisson

& Watkin, 2021). This relationship between the researcher and the social design approach foreshadows innovative and experimental forms of ways of working, producing and interacting with others. In this way, carrying out PGR stimulates for research or the project an interest in forms of cooperation and collaboration.

PGR involving social design ultimately questions the project's sustainability. This sustainability, through its social dimension, grows through participatory techniques, and the emerging forms of social and economic organizations (the SSE for instance) are the basis for sustainable societal and environmental development.

It is also interesting to observe the links between the purposes and values of PGR in social design and action research in the SSE, for example, the topics of social transformation's sustainability at different scales of a territory, the posture of the researcher engaged in forms of co-construction of knowledge with this territory's local actors and building the complex ecosystem of skills, expertise and knowledge that need to be articulated in a project situation. Co-construction is based on the co-production of data and contents able to engage participants to revisit their role and posture in contact with others. It is organized "with the intention of neutralizing social hierarchies and power regimes between actors; co-production and the collective intelligence can reverse established roles. Playful dynamics, the use of emotion, and collective communication devices participate in these modifications" (Catoir-Brisson & Watkin, 2021).

In addition, we can specify how social design and the SSE mobilize forward-looking approaches, such as prospective co-design (Lavoie et al., 2018), to imagine alternative solutions to existing ones in terms of social innovation. Indeed, the common trajectories of design and the SSE have already been considered based on the capacity of design to materialize utopias (Béchet et al., 2015). Design fiction seems able "to promote the expression of a pluralism of visions which is imperative in the design of public policies" (Kerspern et al., 2017).

We rely on two reflexive analyses of participatory and forward-looking design mobilized in the field of public policies at the level of a metropolis and the field of heatwave risk at the department level. These two projects were designed for comparative and comparable purposes as prospective devices to imagine solutions with the inhabitants of a territory. They are analyzed to explain how social design in project research is participatory and forward-looking.

Crossing fiction and social design: Reflexive analysis in social design

How can PGR in social design and prospective co-design make social and sustainable innovations possible? How can prospective and future-focused fiction help to redefine innovation in social design for sustainability? To answer, we propose a reflexive analysis of two PGR actions: the analysis is focused on the collaboration's mechanisms triggered by fiction within social design.

POPSU: The frieze of metropolitan futures

In this collaborative research observation of projects and the metropolization of Montpellier (POPSU Métropoles), we developed a prospective tool for the territory to better analyze and co-design avenues of reflection, ideas or recommendations. Plateforme d'Observation des Projets et Stratégies Urbaines (POPSU) is a major national research effort financed by the Plan Urbanisme Construction Architecture, involving more than 100 researchers nationally. This programme bridges and coordinates universities and local governments of each metropolis to facilitate collaboration to study metropolitan urban projects and processes. Each metropolis, such as Montpellier, constitutes its own network and partnership. This

forward-looking tool aimed at thinking about and stimulating collective reflection on territories has been the subject of several iterations while adapting to contexts and situations. First initiated during the POPSU PGR research during a large workshop with multiple stakeholders in the metropolis (Watkin & Redondo, 2019), this prospective tool was later applied and improved during other workshops, including the conference of the OPDE (Tools for Deciding Together) and PSDR (For and On Regional Development) network in October 2019 (Redondo & Watkin, 2020) and one for a more project-driven initiative with a Mexican private design firm designing the future of the public space strip along the seashore of Tulum (a major somehow hidden tourist site on the Yucatan Peninsula) (Watkin et al., 2019). This first POPSU workshop initiated a triple helix relationship between actors of the metropolis by integrating non-for-profit organizations and private companies involved in social entrepreneurship amongst the public agents from the municipalities and the academics of the Montpellier local universities. The SSE was at this stage suggested by this interrelation between actors.

The other two workshops mentioned also considered this third sector part of collaborative experience to seek another viewpoint on future scenarios. In this context, it was intended in the case of the workshop of the OPDE conference to invite local actors of Grand Clermont and the PNR Livradois-Forez to use this design assistance tool to make visible and broaden the spectrum of possibilities in the Clermont-Ferrand region through a participatory approach on visual representations. Here, the prospective tool is part of design practice in the sense that it materializes in a tangible medium prepared and then creatively manipulated by the participants. In that sense, it is assimilated to social design because it responds to its own social and territorial dynamics. It borrows and draws inspiration from speculative design and more specifically from the scheme popularized by what the designers Dunne and Raby (2013) call the “cone of speculative futures”. The diagram illustrates the amplitude between feasible, possible and probable futures (Fig. 1). This dialectic perspective for thinking and imagining territories by and with the actors articulates the participatory approach of social design with the more strategic aim of foresight (Abrassart et al., 2017). Finally, the sustainability dimension of this frieze is not reduced to its participatory, engaging and communication dynamic by proposing for its realization to consider the three pillars of sustainable development to structure collective reflection and proposals. The frieze consists of a triptych corresponding to the proposed futures.



Figure 1: Frieze of territorial futures: Co-designing prospective scenarios in Clermont.

Images and visual representations of each chosen territory are prepared and selected in advance to constitute a database used during the workshop to make the visual frieze for a collective and discussed narrative. The participants undertake to debate and choose images catalogued and preselected by the organizers adapted to the problem and the territory. This contextual visual database constitutes the main material to build this collective debate and narrative. The participatory dynamic is organized in the form of 'turning tables'. Discussion is also activated by organizing the composition of the participants at each table. Distributing diversity and anticipating representation is therefore, necessary to boost discussion, friction, empathy and power relations. The result is a visual frieze for discussing the future of the territory and making people understand the importance of the probable future and lead to a cross-examination based on the pillars of sustainable development. This experience and prototype in making this visual tool for prospective views on territory is intended to be produced in third spaces to favour the presence of third actors. In this case, the SSE presents a diversity of actors. We think it can enhance the objective of and capacity given to such a visual tool of the frieze of territorial futures.

OPRIC: A helmet for a prospective journey facing a heatwave risk

OPRIC is part of the national programme ANR Inplic (Initiatives des Populations Locales et Intégration dans la Conduite de crise) carried out by the DICEN laboratory of CNAM Paris, UTT-ICD (the University of Technology of Troyes - Charles Delaunay Institute) and the Projekt laboratory of the University of Nîmes and financed by the National Research Agency (ANR). In 2020, it gave rise to a heatwave risk observatory, OPRIC. In the context of climate change, the aims of the project are as follows: 1) to sustain the development of a risk culture by gathering and making visible inhabitants' initiatives to cope with heatwaves; 2) to build collective and individual memories to be able to use it in a crisis context; 3) to co-design some solutions with participants by opening the collective imaginaries.

This research is based on social design PGR, especially to sustain the inhabitants' initiatives. However, from the very beginning of the project, we decided to mobilize fiction to prototype future situations related to natural risks and help participants plan and act by experimenting with solutions. The need to develop forward-looking approaches in the field of risks has led us to take an interest in the contribution of fiction to design to urgently respond to an imperative of broadening imaginaries and design paradigms in the face of the environmental crisis. We can underline the importance of working with fiction when we deal with situations that do not exist yet: fiction is useful to project the participants into some crisis situations to stimulate their creativity in a collective and collaborative mode.

The first step consisted of carrying out field trips with residents of Nîmes and nearby (May–June 2020). At the same time, interviews were carried out with professionals (firefighters, local authorities and the prefecture), and a synthesis of initiatives related to risk was carried out. Given the Spring 2020 period (pandemic context and lockdowns), digital networks were used in a logic of participatory sciences based on contributory platforms (Chupin, 2016; Severo & Filipponi, 2021) for collecting information and exchanging information with residents and interested persons. The second step was the organization of three workshops (in September 2020, April 2021 and August 2021) with different participants depending on each one's objectives.

To explain how fiction has been used in social design, we focus on a specific activity we proposed in the first workshop with the inhabitants, "Heatwave and collective imaginaries" (Zacklad et al, 2020). The workshop was organized in a third place, to be more precise in a local FabLab. We decided to create and test a specific device, close to prospective co-design, to imagine solutions to the risk of heatwaves located in the

Occitan region, in particular the Gard department, by projecting oneself into a possible future over 20 years away, “like an imaginary detour to then think differently about the present” (Abrassart et al., 2017). The purpose of the device designed for the workshop was to respond to scenarios of crises through design fiction. To do this, a forward-looking travel helmet was used in a dedicated workshop to help participants in this collaborative activity shortly project themselves into an unknown situation (Fig. 2). The participants, accompanied by a facilitator, could play four roles: traveller (who wears the helmet), shaman (who guides the trip), scribe (who takes note of the exchanges on a dedicated board) and journalist (who asks questions).



Figure 2: The forward-looking travel helmet experience to co-design the future.

The result of this workshop was a series of co-creation sessions on diverse themes, such as cooling fabrics by a group of makers and engineers at the service of the common good or even support systems for the homes of elderly or isolated people in a heatwave situation, etc. This entertaining and forward-looking device is particularly suited to the question of risk, which requires planning to anticipate and imagine alternatives to the existing one. In a context of tangled domino-effect crises, anticipation, co-construction and agility are useful for questioning paradigms of thought and accepting life with uncertainties (Lagadec, 2015). Design seems to be a relevant avenue to explore, in dialogue with the other disciplines called upon by each risk, in a transversal manner to adopt a different perspective and experiment with exploratory methods engaged in participatory research. An invitation to social innovation through design makes it less possible to apply tools or a list of recommendations than to develop a management capacity to quickly redefine an organizational vision, identify the best initiatives, anticipate and practise creativity (Lagadec, 2015).

Relating participatory with prospective design

These two forward-looking devices are examples that demonstrate the relevance of mobilizing forward-looking co-design as a process of co-creation of forward-looking solutions with the inhabitants to embody situations in stories in which we can project ourselves thanks to the force of the story and storytelling. These two examples demonstrate the desire to include the prospective approach in a social design approach so that the solutions imagined contribute to the support of the local initiatives of the inhabitants by coordinating them with other actors of the territory.

It is in this perspective that participatory and forward-looking design can encompass dimensions of sustainable development and the SSE. In particular, it makes it possible to project oneself into imaginaries of the resilience of territories in a forward-looking dynamic and to support sustainable transformations at three levels (ethical, social and environmental). Thus, the prospective design complements the participatory, socializing and socialized approach of social design because it mobilizes imaginaries and summons both dystopia and utopia to project oneself towards an ideal of habitability, which encompasses the dimensions of sustainable development and the SSE in addition to social innovation.

To deepen the reflexive analysis of our two projects, we can explain the link between prospective and participatory design. The commitment of stakeholders, beneficiaries, users and all participants in creative dynamics is stimulated when the objective or question of the project goes beyond the strategic or anticipatory dimension. The prospective aim of design through speculative and fictional dimensions enriches the participatory process. Our approach is close to the co-design approach (Abrassart et al., 2017), mobilized in different fields of intervention, those of social action and public policies (Kerspern et al., 2017). This approach “is based on several principles, at the intersection of design, participation, and foresight: the mobilization of scenarios of uses and unknown prototypes as vehicles of discovery and exploration (the ‘ design’ dimension); a collective creativity process with participants from local communities and various experts” (Abrassart et al., 2017). It thus renews the dimension and the tools of classic foresight usually engaged in a strategic perspective, using creative and participatory activities mobilizing stakeholders’ imaginaries. Design fiction can be a tool for the representation of futures at the same time as science fiction authors have influenced collective imaginaries and forward-thinking (Minvielle & Wathelet, 2017). Through the project practice and relying on user experience and prospective storytelling, social design can help participants project in a diegetic space with a view to sustainability. In this perspective, social design mobilizes representations of the future through fiction. In addition, these representations can be supports for participatory design and support the capacity of participants to act.

The view given by speculative design and fiction proposes a post-modern perspective of future actions and prospective by offering a narrative of opposition. Speculation in design needs in-between steps to get to this stage from a traditional design perspective by engaging and integrating discursive and critical design practice (Mitrovic, 2015). These in-between practices participate in structuring scenarios to fictions and discourses to speculations. Speculative design can therefore push forward participatory methods and engagement in this array of experiences given and proposed to participants and any stakeholders. For this reason, our interest in prospective co-design, as developed by Christophe Abrassart (2017), can be enriched through the lens of speculative design. It becomes as much a useful tool as a critical mindset on social and sustainable ideas, leading to innovations.

Rethinking social solidarity economy, communities and commons through prospective design

Our experience in foresight through participatory design leads us to reconceive the collaborations and solidarities between actors and participants driven by a social aim and project. In this respect, we would like to argue in this section how prospective co-design can reshape our understanding of the SSE as a major element of social innovation. For this, we will explain first how social design participates in building commons and activating the SSE.

Social design offers an alternative path to the project for the implementation of this ideal and societal aspiration activated by the values of the SSE. The sense of community identity is the result of a subjective

feeling of belonging or the object of a structured relation made through an organization, such as a community of interest.

The notion of creative communities developed in the field of design (Manzini, 2015; Meroni, 2007) thus joins the notion of the creative city (Florida, 2005; Vivant, 2009) to the emergence of communities. Without defining the notion of creativity, this notion is seen as a solution that participates in the collective imagination and is illustrated by a multiplicity of projects, initiatives and social and solidarity actions. Social innovation led by local communities takes off through these creative communities as well as through collaborative networks, local action and tools of governance and collective decision-making (Manzini, 2015). These communities are therefore the subject and object of social design. Sometimes, they can also be activated by new economies (collaborative, self-initiated or even self-managed) for which design is also mobilized to guarantee their sustainability. Forms of communities linked to sustainable consumption evoke these initiatives of social and solidarity economies through the creation of cooperatives, systems of goods exchange and services such as community-supported agriculture sharing and/or repair of goods within a local territory.

Social design participates in the creation of these new services and in the establishment of the communities associated with them, whose objectives direct collective action towards a committed and protesting horizon (Dubuisson-Quellier, 2009). In itself, it joins utopia and the societal ideal by putting forward the social economy and associationism. This economy and social organization of collective organization constitutes a founding element of social innovation and a vector of new economic and social practices, regulated and emancipatory (Laville, 2016). Design also intervenes to rebuild capitalism through the collaborative economy or social and economic innovations by responding to the imperatives of sustainability. Community construction then takes shape through these economic exchanges of local and decentralized capital (resilient and resistant) stimulated by design practices (service design and strategic design) and supported by social design (Bauwens, 2015). The social relations created by this action indicate the aim of disseminating common use value and distributing exchange value. It is illustrated by the social and solidarity systems of good economic practices, such as sharing land and implementation of commons. The collective imagination and the participatory project help through social design to make these collaborations a reality.

Beyond social design, support for the creation of communities is also manifested by the articulation between different scales of action, both local and global levels. This articulation between these two scales can contribute to the sustainability of the initiatives put in place by perpetuating them in one territory or by deploying them in other territories with similar social, cultural and political issues. Indeed, this articulation of local and global scales, as well as the value of communities and their power of action, are also at the heart of the six principles of systemic design (Design Council, 2021). One of them is precisely the back and forth between the micro and macro analysis, referred to as “zoom in and out”. The other three involve inclusion and the building of collaborative, connected, circular and regenerative communities that involve humans but also the planetary environment, as shown in the diagram below (Fig. 3).

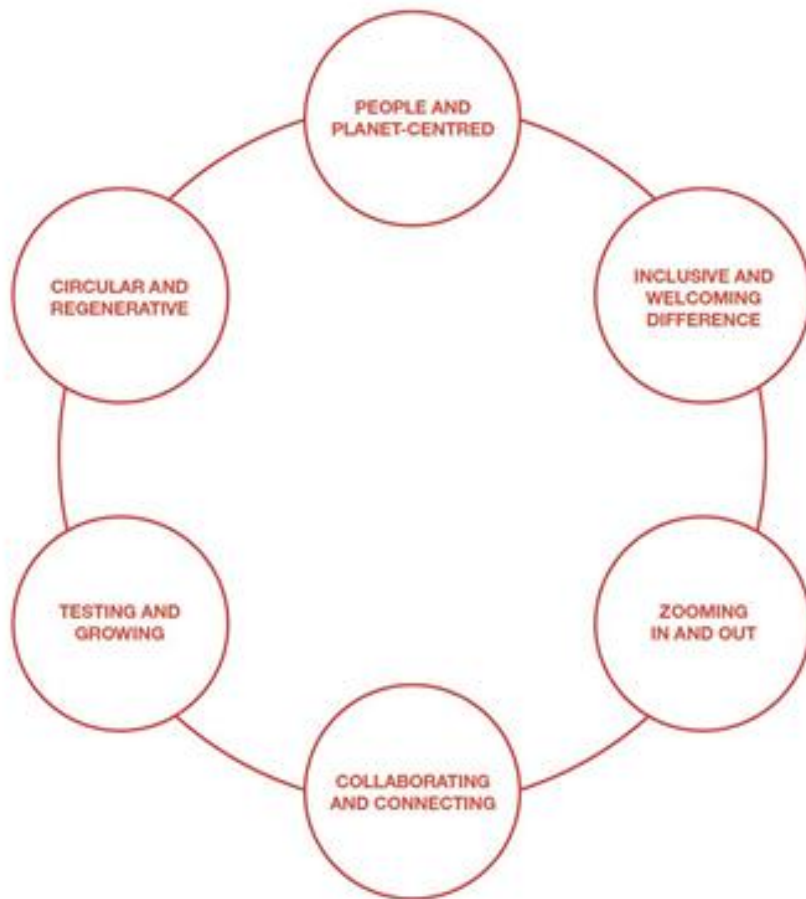


Figure 3: Six principles for systemic design.

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Design methods, skills and tools can be used to sustain social and sustainable innovations. Durability also challenges design to find assets instead of problems to face the situation to cope with. Asset-based community development (also called ABCD) argues for a renewed perspective of community development (Kretzmann & McKnight, 1993). Instead, ABCD offers an asset-driven action as a strategy for community development usually driven by issues and problems. This community-building approach can inspire social design action and discourse. The focus moves from problem-solving to solutions generated with the participants as well as sustainability, which implies combining strategic design and design fiction. The current development of the SSE and durability engages design in other orientations and narratives, especially fiction.

The communities organized and supported by the approaches of social innovation through design have common characteristics with those initiated in the field of communication for social change (Gumucio-Dragon & Tufte, 2006), in which the role of communication is to “solve collective social problems” by considering it as a praxis, i.e. “a reflection in the action of human beings on the world to transform it” (Freire, 1970). In this perspective, communities are at the heart of communication for social change with the objective of “stimulating processes of transformation, in which, from the articulation between citizenship and social networks, communication strategies based on more horizontal and participatory models and styles are carried out to anticipate other ways of living and lead to the transformation of dominant economic and political structures” (Tufte, 2015). Then, communities can have a power of action and design in the co-creation of counter-hegemonic media supports that give visibility and legitimacy to

these communities. The production and dissemination of communication devices also participate in the creation of social ties and the involvement of participants in the communities of interest created.

Communication for social change and co-design approaches have in common this role attributed to communities to transform their environment by stimulating action at local and global levels. This also refers to cosmopolitan localism (Manzini, 2015) and to a design that takes a systemic interest in the relationships between humans and their environments by integrating ethical, social and environmental imperatives: “ [...] it is possible to sketch out a design scenario to build a culture uniting the local and global (cosmopolitan localism) and a resilient infrastructure capable of requalifying work and bringing production and consumption closer together (distributed system)” (Manzini, 2015).

Finally, social design anticipates and rethinks community building by communities, but also by the constitution of commons. Forms of cooperative and local economies make it possible to put the commons back at the centre of society's ecological and sustainable proposals. Social design through PGR finds in associationism and the structuring of social links a democratic societal and environmental ideal stimulated by the collective and shared resources of the commons. Benjamin Coriat thus offers fruitful avenues for this construction of the commons which fit in well with the project advanced by social design, in particular by putting nature at the centre as an object of law or even associating goods and services with fundamental goods organized in the form of commons (Coriat, 2017).

Thus, there is an interest in social design in questioning environmental transitions and therefore resources and natural environments. Here, so-called participatory and forward-looking design in the service of social design would make it possible to orient design practices towards a new paradigm of action. This design of transitions (transition design) opens up, as we will explain later, new avenues of reflection for research (Irwin, 2015). It seems to us favourable to articulate it with a prospective aim based on fiction, which makes it possible to experiment with other ways of building durable territorial solidarities. In this regard, in the following section, we set out avenues for research where prospective design is part of social design to imagine supportive and lasting relationships in the territories.

That is why we propose to open the discussion on the links between the SSE and social innovation through social design and foresight. As we explained, sustainability in social innovation can take place in third spaces and activities. Therefore, prospective solidarity design implies merging social design and design fiction to generate social and sustainable innovation. Moreover, this prospective solidarity design-driven research seeks third spaces to open the relation with the SSE for the common goods. This new paradigm on design and the SSE can be conceptualized with a scheme to visualize how this prospective solidarity design is nourished by other emergent approaches (Fig. 4).

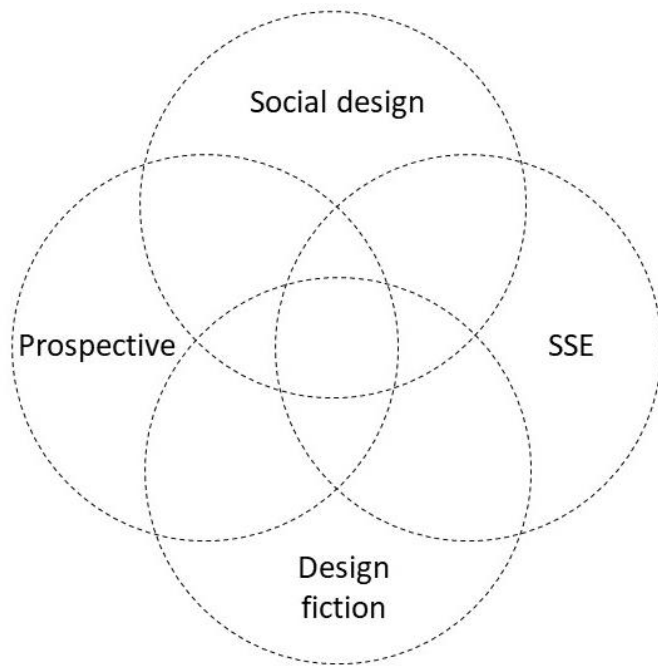


Figure 4: Prospective solidarity design at the crossroads of emerging approaches.

Discussion and conclusion

Finally, social design is emerging as solidarity design that builds and maintains economic and territorial solidarities. And social sustainability refers to the ability of project actors to maintain the engagement of participants, who create transformations beyond the research project in organizations and territories. This solidarity design would thus constitute a particular dynamic of research aimed at creating and stimulating economic and social actions to activate solidarities and social ties through structured forms of emancipatory organization (Escobar, 2020). Therefore, social design focuses on sustainable development and the SSE and also enters into a dialogue with other approaches such as transition design (Irwin, 2015) and autonomous design (Escobar, 2020), while re-defining its specificities. Emerging approaches in design are raising this topical issue of sustainability (such as transition design), and some research methods are being renewed (such as PGR). Findeli (2021) argues for an expansion of PGR by relating it today to these new emerging trends in social design facing uncertainty and the ecological collapse of the world but also the design itself. It is very important to deal with both at the same time with sustainability and social issues instead of opposing them. In this perspective, the emergence of transition design does not invalidate the approaches that have been developed before, such as social design. Instead of building walls between humans and non-humans, design can build bridges and be handled with a mix of approaches (co-design, transition design, prospective, etc.) to cope with current issues.

Thus, it could be useful to deepen the analysis of the way sustainability raises questions for design as practice and research through the diversity of the tools and perspectives combined. This situation is a wonderful opportunity for design to find complementarities and play a significant role in interdisciplinarity with other fields.

Before identifying the contributions of prospective social design to the fields of sustainable development and the SSE, we can identify the limits of this work. On the one hand, it would be relevant to study other

research projects in these two disciplinary fields to see how the links between social sustainability and the SSE are woven, both semantically and methodologically, in particular through prospective co-design. This reflection on a larger corpus of projects could also extend to an epistemological perspective based on a systematic literature review, which could be the subject of dedicated research. This inspiring horizon of transition in design is also challenging the evolution of the methods and tools in design to cope with emerging sustainability issues, such as risks and instability.

However, at the end of this article, we have also shown how PGR in social design could initiate a participatory process in the SSE in a united manner. We explained how social design could invest in sustainable development and the SSE by taking the example of commons and community building. Finally, we opened social design with a sustainable and united aim through the prospective approach illustrated by two case studies engaging prospective co-design for sustainability and, to a lesser extent, SSE.

PGR in social innovation through design is also redefined by the fields of reflection and intervention relating to transition, such as the design transition (Irwin, 2015) which is characterized by a new paradigm of research and design, which pushes the aim of social design and social innovation through design to take into account as many natural ecosystems and environmental parameters as possible to think and produce differently for a more habitable life, living ecologies and sustainable exchange systems.

It therefore seems relevant to question the links between the processes of innovation, transformation and transition and how they are mobilized at different, sometimes simultaneous, stages of a PGR in social design. The analysis we have proposed has shown how prospective co-design devices can put research into action with a view to the sustainability of social innovation.

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