Research Report #1

Version 2.0 [29/03/2019]

Collaboration between local governments and community-led initiatives can be considered a wicked problem. Municipalities in Transition is a grassroots policy innovation that looks for synergies by using systems thinking and finding innovative ways to govern transformative change.

Municipalities in Transition

Local collaborative transformations

Existing experiences and a new systemic framework for reflexive governance

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"Sustainable development is more about the organisation of processes than about particular outcomes. It is about the modes of problem treatment and the types of strategies that are applied to search for solutions and bring about more robust paths of social and technological development"
(Voß & Kemp, 2006)

Abstract

This work explores the possibilities of promoting synergies between local governments and community-led initiatives in their transformative efforts. A new framework is proposed that can foster local partnerships for sustainable development. Explorative research was used to define a Compass for Transformative Collaboration, learn from existent experiments and finally codesign the framework. This included assessing quantitatively and qualitatively 71 cases of local or regional collaborations happening in 16 countries in America and Europe.

The innovative framework for local transformative collaborations is based on systems thinking and has a relational vision, being embedded in theories of adaptive governance and arenas of development. It allows to map and measure collective transformative action and it is expected to bring institutional and cultural change by providing a 'learning arena'. Its simplicity makes it usable in all sort of contexts, enabling conditions for systemic change arising from this new shared meaning of transformation and a rationale for taking collective decisions. The development of local coalitions supported by mutual principles is expected to lead to a new culture of collaboration.

The framework was grounded in learnings born out of a collaboration on energy and climate issues between the Transition Movement, a Municipalities Association and Research partners in Italy. New efforts are being developed to test and refine this systemic instrument for local reflexive governance and explore possible ways to integrate it within global action on sustainability.

Content

A. Introduction and Background

Facing limits, such as planetary boundaries, is an opportunity to reimagine society. The present research intends to explore partnerships between local governments and community-led initiatives that meet the needs for transformation towards sustainability. It is focused in looking for practical solutions that can move beyond the dichotomy of governmental versus non-governmental and avoid the ephemeral nature of experiments (focusing on improving permanent processes and not transitory projects). It is therefore an empirical study looking for instruments that can be used locally to promote transformative collaborative governance.

In this section we present a review of scientific literature, crossing the three dimensions connected to this study: transformation, localism and collaboration. We provide an overview of (1) the current quest for understanding and governing transformations; (2) the transformative efforts promoted at local level; (3) collaboration in the sustainability field.

In next section ('moving beyond') we (1) deepen the research goals; (2) conclude that partnerships between local organizations can lead to significant synergies but can also be seen as a 'wicked problem'; (3) express the research questions. After presenting the methodology and the rationale behind it, we share the results so far.

In 'results and discussion' we present the 'Compass for Collaborative Transformation' coming from the efforts to develop, based on exploratory research, tentative guidelines for designing a multidimensional assessment of collaborations between local actors, in terms of transformation towards sustainability. The paper then presents explorative analyses of 71 cases collected in America and Europe.

Finally, an innovative framework for local transformative collaborations is presented, and the potential outcomes are discussed. These include the possibility of evaluating transformation, guiding action and steering systemic change. A plurality of conceptual approaches is used for bringing complementary insights avoiding 'blind spots' (Feola, 2015).

This research is integrated with the project 'Municipalities in Transition', started within the Transition Movement, which can be considered a grassroots policy innovation. It looks for practical knowledge that tries to respond to the urgent need to move from examining transformation to accelerating learning about facilitating it (I Fazey et al., 2018).

The quest for transformation

The world is changing faster than at any time in human history. The obvious corollary to this statement is that we must also adapt faster than ever. It is not our intention here to discuss this argument, that some consider just a cliché (Frederik, 2016) and others call the "the great acceleration" (Steffen, Broadgate, Deutsch, Gaffney, & Ludwig, 2015). Nor the inequalities 'hidden' in this narrative (Malm & Hornborg, 2014). Faster or not, there is a wide consensus on the fact that "many households, communities, organizations, countries, and regions are confronting a confluence of economic, political, demographic, social, cultural, and environmental changes" (IPCC, 2014, p. 1121). Adding climate change to the equation, we can conclude that sustainable development is clearly being put in jeopardy (*idem*).

These changes are also considered by many, including scientists, activists and politicians, as the necessary impulse to improve society. Maja Göpel claims that we are facing a "renewed window of opportunity for the radical changes that in essence the sustainable development agenda always held" (2016, p. 2). Naomi Klein, in the documentary 'This Changes Everything' (inspired by her bestselling book), asks "What if global warming isn't only a crisis? What if it's

the best chance we are ever going to get to build a better world?" (Lewis, 2015). The former United Nations Secretary-General Ban Ki-moon, in the road to the Sustainable Development Goals, went further by calling us to "embrace change" and adopt transformation as our collective watchword (Ki-moon, 2014).

Not surprisingly, a growing field of transdisciplinary transformation research is dedicating its efforts to sustainability challenges (EEA, 2018; D. Loorbach, Frantzeskaki, & Avelino, 2017; Markard, Raven, & Truffer, 2012). Researchers try to understand the dynamics of change (focusing on patterns) and explore possible ways of influencing it, looking for answers that might be useful for decision-makers and practitioners. Taking the risk of oversimplifying, we can identify (at least) three main approaches. The socio-technical (ST) approach is grounded in evolutionary economics and technology studies and focus on innovation processes. Narrative explanations describe change as pathways relating emerging niches, regimes and external landscapes – the so-called multi-level perspective (Frank W. Geels & Schot, 2007). The co-evolution of technologies, institutions and practices is underlined. The socio-technical approach includes strategic niche management research (Schot & Geels, 2008) and the related perspective on technological innovation systems (Markard & Truffer, 2008).

A related field of research can be named as socio-institutional (SI) (D. Loorbach et al., 2017) and brings significant inputs from social sciences and governance studies. The focus is on roles, power struggles and agency. Research is often action-oriented and relates to specific geographical areas. Several frameworks for intentional governance of change were designed and tested, namely transition management (D. Loorbach, 2007), including transition arenas and experiments as tools (Frantzeskaki, Loorbach, & Meadowcroft, 2012). Other significant contributes come from practices theory (Shove & Walker, 2010), geography of innovation (Hansen & Coenen, 2015), institutional theory (Fuenfschilling & Truffer, 2014), policy studies (Hendriks, 2009) and social innovation (Avelino et al., 2017). These follow from (sometimes) opposing ontologies (Frank W. Geels, 2010).

Finally, a distinctive approach of transformation research comes from ecology and environmental studies and is based in resilience theory (Holling, 1973), focusing on socio-ecological systems (SE). The concept of panarchy (Gunderson & Holling, 2002) is used to describe dynamic equilibriums through nested adaptive cycles of growth, accumulation, collapse and renewal. The focus is in keeping systems in a 'safe operating space' related to planetary boundaries (Rockström et al., 2009), avoiding thresholds and tipping points in face of disruptive change. Adaptive governance (Folke, Hahn, Olsson, & Norberg, 2005), stewardship (Chapin et al., 2010) and several pathways approaches (Eisenhauer, 2016) were developed as transformative frameworks.

Transformation research applied to sustainability face several challenges, namely its normative (therefore controversial) goal and the amplitude, interconnectedness and diversity of problems and possible solutions (Frank W. Geels, 2010). Regardless of useful insights relating to governance issues (presented later), these different perspectives agree on the serious limitations in planning or managing the transformation to sustainability, due to complexity and intrinsic uncertainty, integrating concepts like nonlinearity and emergence (Göpel, 2016; D. Loorbach et al., 2017; Turnheim et al., 2015). Theories have been refined through criticism, interdisciplinarity and insights from practitioners (Frank W. Geels, 2011; Olsson, Galaz, & Boonstra, 2014). Several efforts have been done in order to compare (EEA, 2018) and integrate different theories (Olsson et al., 2014), including the creation of a shared analytical approach on governance (Turnheim et al., 2015). The 'spheres of transformation' (O'Brien & Sygna, 2013) - practical, political, and personal - have been proposed as an "heuristic device" that

could be considered transversal to the several approaches previously mentioned (O'Brien, 2018).

In conclusion, transformation is the new buzzword in sustainability research and policy (Feola, 2015; Hölscher, Wittmayer, & Loorbach, 2018; Patterson et al., 2017). It can be defined as a "change in the fundamental attributes of natural and human systems" (IPCC, 2014, p. 1122) and is usually used with a positive connotation (EEA, 2018, p. 28). Transformations have a wide spectrum and may occur in any place, dimension, scale or sector, involving "energy and agricultural systems, financial systems, governance regimes, development paradigms, power and gender relations, production and consumption patterns, lifestyles, knowledge production systems, or values and world-views" (O'Brien, 2012). Equally wide are the scientific and political approaches. The word is generally used as a metaphor for disruptive change and a way to distinguish from more incremental processes that are considered insufficient. Its growing use is probably a consequence for a more generalized sense of urgency in tackling sustainability issues and the need for radical and 'deep' change (e.g. Amundsen, Hovelsrud, Aall, Karlsson, & Westskog, 2018; Bendell, 2018; I Fazey et al., 2018).

Developing the 'local globe'

We now turn to a selective review of the literature on transformative efforts at local level (our empirical setting). Localism is a political concept that promotes a place-based approach on issues like economy (e.g. supporting local food production and creating complementary currencies), democracy (e.g. promoting self-government and participatory decision-making) or culture (e.g. appreciation for identity and distinctiveness). It has been defended by a wide range of actors and can be promoted at any level of government (Pugalis & Bentley, 2014). Localism can also be seen as a social discourse and somehow a reaction to the process of globalization, associated with popular images of growing homogeneity and loss of control in our individual lives (O'Riordan, 2001). These fears are supported, for example, by warnings on the rate of languages' extinction - one every two weeks (Wilford, 2007) - and dystopian books like 'Globalia' (Rufin, 2003).

The most relevant ideas behind localism are that problems at 'local level' can be more easily definable and solutions created (therefore relating to the concept of subsidiarity) and that it can be an effective way of engaging citizens and organizations since they are directly affected by decisions and the impact of (in)action. It has been considered a new economical paradigm contributing to increase sustainability (Curtis, 2003) and a way to preserve heritage and activate endogenous potential (a fact highlighted by European policies). In the case of climate change, local organizations are considered key actors in adaptation, which is always "place- and context-specific" (IPCC, 2014, p. 85). However, localism does not come without critiques (DuPuis & Goodman, 2005; Marvin & Guy, 1997; Newig & Fritsch, 2009; North, 2010), namely of being a sort of reactionary politics leading to protectionism (Hinrichs, 2003), not being inclusive (Chaffin, Gosnell, & Cosens, 2014) and lacking the necessary capacity for a wider transformation.

Using systems thinking we might conclude that dualities of global-local (or top-down and bottom-up) are easily disputed. As Tim O'Riordan concludes, "we are all global beings, acting out our consumerism and citizenship at a local level" (2001, p. 237) and we should expect the 'local globe' - the localization of globalization - to develop (p. XIX). Maybe the spatial differentiation of global and local does not make sense anymore in a hyperconnected world where governance is no longer hierarchical (p. 22). In any case we might guess that the

emancipatory motto 'think global, act local' will keep its romantic and appealing figure for some time to come.

We will now look at transformative efforts coming from civil society and local governments.

Civil society driving sustainability

An increasing number of groups of citizens are proactively and voluntarily joining together in their local communities to give rise to positive change within their places of living, becoming drivers of sustainability transformations (e.g. O'Hara, 2013). These so-called bottom-up civil society organizations, citizen-led/community-based initiatives or grassroots movements have a multitude of aims (Celata & Sanna, 2014). Researchers from several projects went together to systematically examine recent publications based on worldwide case studies (Frantzeskaki et al., 2017) and concluded that there are three main roles played by civil society. First these initiatives advocate for and give rise to radical innovations and find ways to empower communities, contributing to challenge values and beliefs. Second, they co-provide alternative services that support and make feasible more sustainable practices. And finally, they might focus on promoting their autonomy through integral approaches, acting as 'disconnected innovators' ("disconnected from other social, cultural, and ecological systems and cross-scale dynamics"). These different roles are not mutually exclusive and often priorities change during the initiatives' life cycle or between individual projects and their networks. However, as a reasonable generalization, we could say that permaculture or degrowth initiatives are more focused on cultural change; energy cooperatives and community-supported agriculture try to support sustainable lifestyles; ecovillages and transition initiatives are typical examples of 'niche' innovations.

How to evaluate the impact of these community-based initiatives (CBIs)? By starting from a climate change perspective, we can see a significant potential to reduce carbon emissions, specially from initiatives providing electricity and heat from renewable sources, sustainable transport and vegetarian/vegan meals – up to a quarter of the carbon footprint of the CBIs´ beneficiaries (TESS, 2017). Moreover, civil society "already have significant and positive roles in support of adaptation planning and decisions" and provide solutions ready to be mainstreamed (IPCC, 2014, p. 580 and 849). But besides more tangible and direct environmental and economic benefits (like creating local livelihoods and regenerating ecosystems), CBIs are contributing to community resilience by promoting healthy engaged lifestyles, a creative inclusive culture and cross-community links (Revell & Henderson, 2018) – these dimensions are crucial from a systems-thinking perspective concerning the community's 'transformability' capacity. Using the multi-level perspective we might argue that CBIs act as innovation 'niches' with the capacity of destabilizing the lock-in of regimes and transform cultural values (Celata & Sanna, 2014; D. A. Loorbach & Lijnis Huffenreuter, 2013; Seyfang & Smith, 2007).

In any case, we must consider that CBIs cannot promote a sustainability transformation by themselves due to the inherent complexity. A connection to global efforts is similarly considered needed (Leach et al., 2012), namely to adequately consider the planetary boundaries. There are also unintended results that might arise from CBIs work, namely in terms of increasing inequality between communities (Frantzeskaki et al., 2017). In fact, many initiatives benefit most areas with already high social capital and attract extra national and international funds to already economically privileged neighbourhoods.

Local governments are coming back

In this study we consider as 'local government' any formal institution created for decentralized decision-making and delivery of services to a relatively small geographical area (could be a village, a city or one of its subdivisions). The size and power of local governments (LGs) differ according to countries and have changed throughout history – they emerged before nation-states, declined their importance with wars and conquests, and are regaining importance with globalization (Shan & Shah, 2006). They play a crucial role, through what they "do, encourage, allow, support, and control" (IPCC, 2014, p. 575) and are in charge of 70% of public investment and half of public spending on the environment (OECD, 2010). They are usually valued for the proximity with people and the efficiency in resources used. In past decades local governments have proactively faced the sustainability challenge by adopting policy innovations (Pinto, Macedo, Macedo, Almeida, & Silva, 2015).

LGs are subjected to several factors that can act as barriers or enablers for their work on sustainability. Besides the obvious access to resources (financial; human) and information, there is a great dependence on issues like leadership, institutional context and competing agendas (Aguiar et al., 2018; Measham et al., 2011). These factors include the political environment and turnover or the skills to work collaboratively.

The leading action of LGs concerning sustainability has been facilitated by transnational nongovernmental organizations and initiatives like 'ICLEI - Local Governments for Sustainability' and '100 Resilient Cities', that provide tools, networking and services and promote advocacy (Spaans & Waterhout, 2017; Yi, Krause, & Feiock, 2017). Joint efforts with academia also promote significant researcher-practitioner collaboration for knowledge exchange, thus supporting local governments in their action (Schmidt et al., 2015).

A new vision of local governance can be centred around citizens, with LGs assuming leadership in a polycentric system – maybe the biggest role should be to act as a catalyst, looking for a synergies that may reveal the energies of the entire community (Amundsen et al., 2018; Shan & Shah, 2006). Additionally, transnational municipal networks (Fünfgeld, 2015) – along with similar networks of non-governmental organizations - might put cities in a position to "redefine the rules of the game" in terms of global sustainability governance (Toly, 2008).

In the next section we move to the topic of collaboration in the sustainability field.

Collaboration on the way

Should we collaborate towards sustainability? Why? As Vangen (2017) argues:

> *"Society's most challenging issues are complex and multifaceted beyond the reach of any single organization to tackle effectively on its own. Regardless of problem domain—be it poverty, health, education, terrorism, migration, or climate change—the boundaries between states, markets, and civil society in addressing challenging social issues are increasingly blurred. Collaborations, in the shape of formalized joint working arrangements between independent public, private, and nonprofit organizations, are thus seen as necessary means of addressing major issues facing society today."*

Collaboration has an ubiquitous presence in our lives (Patel, Pettitt, & Wilson, 2012) and is critical to any community, translating into the capacity of its members to collectively set and pursuit shared goals. Consequently, collaboration captures the attention of many research fields, from game theory to strategic management. Probably due to its intrinsic complexity,

currently there exists no unified theory of collaboration. We should also mention that collaboration is no *panacea* to advance governance (Forsyth, 2010). As research showed extensively, collaborations are not easy tasks, they take time and resources, require working with complex human interactions around power relations and do not necessarily lead to synergies and advantages (Vangen, 2017; Westman & Broto, 2018). The contributions to sustainability lack evidence (Van Huijstee, Francken, & Leroy, 2007).

Collaboration is well studied under public administration (e.g. Bryson, Crosby, & Stone, 2015) as a way to deal with cross-sectoral issues like sustainability. Policy studies also shown that collaboration can mitigate conflict, therefore enabling collective action (Weible & Sabatier, 2009). Partnerships, as collaborative arrangements, can produce and catalyse synergies by way of pooling resources and skills (Frantzeskaki, Wittmayer, & Loorbach, 2014).

The business sector is likewise aware for a long time of the value of collaborations, especially in the context of sustainability and with increasing demands from society. Collaborations can have positive impacts on environmental, economic and social performances, by way of sharing knowledge and resources or improving legitimacy of new technologies (Niesten, Jolink, Lopes de Sousa Jabbour, Chappin, & Lozano, 2017). Special attention to collaborations has been given in the context of sustainable supply chain management (Govindan, Seuring, Zhu, & Azevedo, 2016). The studies include inter-firm relationships (e.g. alliances, joint ventures or cooperatives) and between companies, governments (namely public-private partnerships), research institutions and non-governmental organizations.

Recently, research has also been focusing on the role of intermediaries that can act as “key catalysts that speed up change”, namely by promoting collaboration (Kivimaa, Boon, Hyysalo, & Klerkx, 2019).

We now ask the questions: Are LGs and CBIs collaborating in a meaningful way towards sustainability? How? What are the outcomes? A recent review of 147 local climate adaptation strategies in Europe showed that around half of them were involving interest groups, including nongovernmental organizations (NGOs) and industries (Aguiar et al., 2018), while a research on community energy in UK showed that around 60% of the initiatives were partnering with local authorities (Seyfang, Park, & Smith, 2013). The BASE research project also studied 23 European cases of climate change adaptation, trying to address integration of top-down policies and bottom-up initiatives (Ng, Campos, & Penha-Lopes, 2016). They found that key solutions used to overcome barriers were “participatory approaches or stakeholder engagement, institutional changes, networks or cooperations” (Rendon et al., 2016). Namely, dedicating efforts to promote forums for dialogues between groups was considered critical, having return in terms of “enhancing common understanding of the challenges and by improving public acceptance and implementation” of the necessary actions (BASE, 2016). Innovative participatory methods like scenario workshops and adaptation pathways were experimented in the context of action groups involving both LGs and CBIs (I. Campos et al., 2016).

Partnerships between LGs and CBIs to promote local resilience and climate protection were also identified outside the ‘western’ context and in cities around the world (Castán Broto & Bulkeley, 2013) – when LGs lead they usually partner with private actors but also civil society, while CBIs mostly partner with LGs. In some case studies (World Bank, 2015), CBIs gained the opportunity to access public resources and participate in decision-making processes that could help them to sustain their practices and scale up. Their legitimacy also increased. LGs benefited because they could ground their policies and actions in local realities (increasing efficiency and responsiveness) and use communities’ knowledge and capacity, including field-

tested solutions. These collaborations showed the potential to transform relationships and promote the recognition of communities' capacity to deliver positive change.

Nevertheless, recent studies coming from several European research projects also demonstrate that interactions between civil society and governments can have negative impacts (Avelino et al., 2017; Frantzeskaki et al., 2017). CBIs can suffer from over-exposure and compromise their limiting resources, being moved away from their primary missions. They can also be 'captured' by political agendas. Henfrey & Penha-Lopes (2018) mention several risks including co-optation, resources-dependency and 'coercive isomorphism', in which CBIs are pressured to conform to requirements and expectations of incumbent regimes (e.g. to adopt a legal structure or fit within the parameters of the political agenda). On the other hand, governments could complain of a lack of effort to engage from civil society and that these processes often lead to the capture by special interests and bureaucratization (Rydin & Pennington, 2000).

The coproduction of (hopefully transformative) public services may be the decisive step in a collaboration between local governments and grassroots movements. Bovaird (2007) concluded that supporting coproduction should be the "new public service ethos" - he proposes the establishment of a "coproduction development officer" to work internally and within partnerships. In particular, the coproduction of goods and services by different actors organized into polycentric systems can be "crucial for achieving higher levels of welfare in developing countries, particularly for those who are poor"(Ostrom, 1996). Some advances have occurred in the last decade, especially in 'community energy'. In this field, three factors were identified as essential for initiating and nourishing initiatives - trust, motivation and continuity – and a set of multi-sector recommendations have been distilled (Avelino et al., 2014).

The case of Transition Movement

The Transition Movement, also called Transition Towns, was founded in Totnes, Devon (United Kingdom) and presents itself as "a movement of communities coming together to reimagine and rebuild our world" (Transition Network, 2016). They now have more than "10 years' experience of making Transition happen in 1,400 communities in 50 countries" (Hopkins & Thomas, 2016) and follow an exponential growth (O'Hara, 2013). It has been considered a successful social movement (Fernandes-Jesus, Carvalho, Fernandes, & Bento, 2017) and a good example of transformational social innovation (Longhurst & Pataki, 2015, pp. 6, 67).

The movement comprises the local Transition Initiatives (TIs), regional or national-level Hubs (with some degree of self-coordination) and Transition Network (international charity based in the original location) with supportive and accreditation roles. The reasons people present for joining range from "get to know their neighbours" to "making a difference in the world" (Hopkins & Thomas, 2016). Besides contributing to climate change and community resilience, initiatives internally (and predominantly) focus on social connectivity and empowerment (Feola & Nunes, 2014). Through their actions, they promote self-sufficiency (e.g. locally grown food, complementary currencies) and optimism (John-Paul Flintoff, 2013) and advocate "the power of just doing stuff" (Hopkins, 2013). The movement has deliberately chosen a non-confrontational, non-partisan and constructive approach, which sometimes leads to tensions and critiques (Biddau, Armenti, & Cottone, 2016).

Looking at the interactions between local governments and community-based initiatives in the context of the Transition Movement we find examples that range from groups of citizens 'taking over' the municipality administration by supporting independent candidates standing for elections to town councils that deliberately appropriate the transition concept (MiT, 2018). Creating networks and partnerships and collaborating with others is considered one of the

seven essential ingredients in a transition initiative (Hopkins & Thomas, 2016). Specifically, to "build a bridge to local government" used to be one of the twelve steps (Hopkins, 2011, p. 78), which was considered to be "somewhat of an oxymoron" (Smith, 2011). Research shows that a majority of TIs establish some sort of cooperation with local authorities, which has proven to be an essential factor of success (Feola & Nunes, 2014).

Governing transformations

Are there significant differences between the several research perspectives in what concerns governance for sustainability transformations, and in particular the role of local entities and the importance of collaborations? Did they generate distinctive frameworks or tools or provide any kind of differentiated prescription?

In an effort to try to answer these questions, we analysed and compared three well-known models for governing transitions, relating the three research perspectives mentioned earlier - socio-technical (ST), socio-institutional (SI) and socio-ecological (SE). The results are summarized in Table 1. Adaptive governance (AG) might be considered a "purer" systemic approach that focus on changing interactions that might lead to emergent properties, contributing to maintain system functions. Strategic Niche Management (SNM) has greater directionality in the transformation process and focus on experimentation and steering long-term changes, while Transition Management (TM) have the "social transition" as the central role, giving emphasis to collective efforts. Accordingly, TM advocates for concrete and solid structures to steer transformation (therefore more instrumental) while AG has a more flexible approach. They are often used in distinctive domains, with SNM studying the development of new technologies and AG focusing on environmental topics.

It has been argued that these models can learn with each other (Foxon, Reed, & Stringer, 2009) and surely none of them holds the 'silver bullet'. In fact, studies on the comparison of different frameworks for governing sustainability concluded that practice usually does not meet the expectations of transformative change and that potential lays on the 'cross-pollination' between approaches (J.M. Wittmayer, van Steenbergen, Rok, & Roorda, 2016).

Table 1 – Different approaches to governance of sustainability transformations and their characteristics.

Governance model and research field	Transformation processes and agency	Key elements	Considerations on collaboration
Adaptive governance (AG) – SE approach (Chaffin et al., 2014; Folke et al., 2005; Olsson et al., 2006; Radywyl & Bigg, 2013)	AG is a range of dynamic cross-scale interactions between individuals, organizations, agencies and institutions possibly leading to an emergent state with new feedbacks and controls. Three phases are prescribed: (1) preparing the system for change (building knowledge and networking; exploring alternative approaches for governance); (2) navigating (establishing new social structures and processes) and (3) increasing the resilience of the new governance regime.	Leadership and shadow networks (operating outside conventional decision-making spaces) are able to prepare a system for change by using and creating 'windows of opportunity' – they are critical to change phases. They explore alternative system configurations and possible futures. Providing leadership includes trust, vision, meaning and a learning environment. Nature-society interaction is also a key element, specially in the context of governing the commons.	A collaborative management is critical. Participation can be promoted by devolution of management rights and power sharing. Necessary to change attitudes towards a shared vision. Differences are not bad, but polarization should be avoided. Conflict needs to be accepted but transformed, keeping open channels and communication face to face. Flexible processes of collaboration are preferable to the creation of fixed structures.
Transitions management (TM) – SI approach (D. Loorbach, 2007, 2010; D. Loorbach & Rotmans, 2010; Nevens, Frantzeskaki, Gorissen, & Loorbach, 2013)	TM focus on the role of a team of leaders in collaborative visioning and steering of experiments. TM prescribes four sequential steps or activities in a cyclical and iterative process: (1) strategic (creating a multi-actor network, structuring the problem and envisioning); (2) tactical (developing coalitions and a concrete transition agenda with possible paths); (3) operational (mobilizing actors and executing experiments to scale-up promising options) and (4) reflexive (monitoring, evaluating and learning).	A key issue is the selection of frontrunners for the 'transition arena'. Several competencies are considered crucial, e.g. being open for innovation. Methods used in the selection to compose a balanced group include in-depth interviews, setting concrete criteria and psychological tests. The network should be relatively small (10–15 actors).	Within the 'transition arena', frontrunners and innovative individuals come together. Participants should have a diversity of backgrounds (government, social movements, business, science and consultants) and perceptions of problems and possible directions (to be deliberately confronted and integrated). They participate on a personal basis and not as representatives (able to operate autonomously) and should be opinion leaders. Emphasis on consensus.
Strategic niche management (SNM) – ST approach (F. Geels & Raven, 2006; Kemp, Schot, & Hoogma, 1998; Raven, Bosch, & Weterings, 2010; Schot & Geels, 2008)	SNM encompasses creating and experimenting promising technologies in 'protected spaces' (e.g. research and development laboratories), followed by niche proliferation processes. These radical innovations will eventually influence incumbent regimes and replace dominant practices. Five steps are considered: (1) choosing the technology; (2) selecting the experiment; (3) setting-up of the experiment; (4) scaling up and (5) the breakdown of protection (using policy tools).	There elements are considered crucial. First, the articulation and adjustment of expectations or visions. Secondly, the building of social networks by way of enrolling new actors, which expands the resource base. Finally, the learning process about social challenges and the desirability of the new technology.	Different actors (private organizations, policymakers, entrepreneurs or users), embedded in networks, can join resources in experiments when sharing ambitious visions. Articulating expectations can also provide direction to development, together with shared rules and institutions. Powerful actors can add legitimacy and bring significant resources. Municipalities are well placed to manage local networks, providing space for local activities. Regional and national levels can assure that a broad learning process happens.

Keeping with the risk of over-generalization, we can conclude that, despite their differences, the governance models share essential insights, namely:

- Appraisal for (local) social innovation – in the ST approach, technological and social innovations co-evolve through the work of communities acting as emerging niches with the potential to disrupt regimes and transform cultural values (Raven et al., 2010); scholars from SE approach also highlight the role of social innovation (Patterson et al., 2017), being one of the focus of SI research (Haxeltine et al., 2016); the possibility of this innovation to emerge in local settings is transversal to the different approaches (EEA, 2018, p. 26);
- The crucial role of complex connections, interdependencies, networks and collaboration – 'transition arenas' are described as societal networks of innovation (D. Loorbach, 2010); niches are considered "platforms for interaction" (Kemp et al., 1998); in AG, social networks can provide "arenas for novelty", bringing flexibility and increasing social capital (Folke et al., 2005);
- The need for polycentricity and multi-scalar processes – polycentric governance favours multiple governing authorities at differing scales instead of a centralised unit (Ostrom, 2010b) and translates the potential of polycentric systems of communities to deal with global issues; it is the bases for AG, which relies on "polycentric institutional arrangements" (Folke et al., 2005); similarly, SNM is seen as a "collective endeavour" and the outcome of interactions at different levels (Kemp et al., 1998); "multiple systems and multiple actors at various governance levels" are also considered in TM studies (Nevens et al., 2013); in fact, many similarities exist between models like the multi-level perspective (Frank W. Geels & Schot, 2007) and the panarchical connections between levels (Gunderson & Holling, 2002, p. 75), for instance.

The critical role of leadership is also common in SI and SE perspectives (Brown, Farrelly, & Loorbach, 2013). Summing up with the fact that SNM, TM and AG all have a systemic approach and appraisal for visioning, experimenting, learning and other participatory processes, we might conclude that, overall, similarities are greater than differences.

B. Moving Beyond

Besides all the accumulated scientific knowledge about the imperative need of transformation to sustainability and possible pathways, the challenge remains without clear answers. This could be considered a result of the "failure of sustainability science to engage with the root causes of unsustainability" and the need to "identify solution-oriented approaches to transformational change" (Abson et al., 2017). Patterson et al. (2017) cites several studies to conclude that there is the need to "place governance and politics at the centre of research on transformations towards sustainability".

The present research tries to respond to these challenges by focusing on local collaborations or partnerships that might be the basis for an innovative governance model that leads to a more sustainable society. This intention is backed up by a recent European report entitled 'Transforming cities in a changing climate' that calls for "new ways of collaboration" and "innovative partnerships" between different stakeholders at local level (EEA, 2016, p. 48 and 60).

The research aim is to develop practical knowledge rather than epistemic, in a phronesis approach (Ioan Fazey, Moug, et al., 2018). We try to answer the question: how can we generate, in practice, local action that can potentially create global positive transformation in an effective and efficient way? Surely many solutions have already been explored and there is not one single answer (nor a 'silver bullet'). What (possibly) makes this research distinct is the starting point: we assume that a great potential for transformation rests in the joint action between local authorities and civil society. This is a journey to look for synergies.

Wicked problem

We consider that institutional synergies at local level have not yet shown their potential due to the simplistic, and somewhat patronizing view, with which they are sometimes studied and often implemented. We propose that, to start with, the collaboration between local governments and community-based initiatives need to be recognized as a wicked problem. We will now discuss this argument, leaving the implications for research for the next section.

As previously argued, assessing these local collaborations is not as clear and straightforward as it might look. Having any kind of collaboration might even be considered undesirable. To start with, we can reason that being institutionally and politically independent is, in fact, the main strength of community-based initiatives – they "have the potential to be less constrained by structural processes than top-down policies for transitions and can spur large-scale changes" (TESS, 2017). We also empirically see that some CBIs grow out of conflict with authorities, with positive results (Aylett, 2010). On the other hand, "when citizens start putting their ideas and ideals into practice, they organize things in their own way, which may conflict with policy" (van Dam, Salverda, & During, 2014).

Differences between LGs and CBIs (e.g. know-how, values, goals or assets) are, therefore, simultaneously obstacles for collaborations (creating tensions) and the main reason to foster them (since they can complement each other, delivering synergies). Similarities work in the same paradoxically way - they can help collaboration to happen more smoothly, but also lead to competition for resources. Siv Vangen called this the "goals paradox" (2017).

Experience shows that these interactions can even completely obstruct the process of emergence and persistence of community-based initiatives… or act as powerful enablers. But despite this overall frequent and intense relationships, these interactions are in general perceived by community-based initiatives as their least important aim (TESS, 2017). The reverse is most frequently also true – regardless all the *apologia* of the merits of public participation, it has long been recognized that these processes quite often are mere objects of rhetoric and "empty rituals" (Arnstein, 1969). "All talk and no action", how has been putted (Weible & Sabatier, 2009).

The difficulties in rising collaboration towards sustainability are deeply connected to our decision-making processes. Since they demand for extra efforts and the results are non-excludable and indivisible, it might be rational to free-ride – the problem of collective action (Rydin & Pennington, 2000). This can lead to the capture by special-interest groups compromising inclusion (Few, Brown, & Tompkins, 2007) – public-private partnerships are probably much more common between governments and profit organizations than between governments and community initiatives. We also saw that in some cases the collaborations between LGs and CBIs can bring unintended results (e.g. disempowerment), which might increase the collaboration costs even more.

We can therefore conclude that transformative collaborations between community-based initiatives and local governments demonstrate the characteristics of a wicked problem (Rittel & Webber, 1973) – nothing unexpected since they are embedded in social and political contexts. In fact, according to the arguments above and due to complex interdependencies, these collaborations are hard to define, demonstrate several contradictory features and have no obvious or definitive solution. Since barriers are linked to intrinsic characteristics of the systems, efforts will probably lead to other difficulties. In sum, they are inherently wicked, and therefore demand for a system innovation (Schuitmaker, 2012).

Research Synthesis

Local organizations have proven that they can create a positive change for sustainability. But they still have to demonstrate they can create change together in a suitable way (according to previous mentioned research, many tensions and obstacles to partnership still exist and results are far from meaningful).

By investigating the potential synergies between local organizations, our purpose is to find a practical way to promote a better collaboration between citizen-led initiatives and local governments, in the context of transformation. Specifically, the research aim is to identify, formulate and validate frameworks and tools that can be used to boost the transformative reach of cooperation between these local actors of sustainability.

Our research questions are:

1. What are the dimensions that we should use to assess collaborations between local governments and community-based initiatives that meet the needs for transformation towards sustainability?
2. How much can we learn from the existing collaborative experiences at the municipal level?
3. What would be an effective framework and set of tools to improve those experiences by promoting synergies?

Our hypothesis (assumption) is that, by using an appropriate framework and tools based on cocreation, innovation and mutual support, local organizations can effectively create an enhanced combined effect that enables transformations towards sustainability across multiple scales.

C. Methodology

The ongoing research includes the following main steps, methods and techniques (Figure 1):

1. Preliminary formulation of a partnership model, to be used as a basis for assessment of experiences – we use an explorative approach, including as techniques literature review and theorization, with knowledge coming from personal empirical experience and informal discussions within the project core team;
2. Collating and assessing existing experiences that already achieved significant results (mapping exemplary cases) – using both quantitative and qualitative methods; the investigation was developed in two phases, (1) general harvesting by observation and questionnaires (to increase reach and get quantitative data) and (2) in-depth study of the selected cases using semi-structured interviews to main stakeholders (to get

detailed information and different points of view); a snowball sampling was used starting from Transition Hubs and spreading to TIs and correspondent networks, in a way to make good use of their resources and knowledge – they were responsible for the data collection in both phases; inductive analysis was used to interpret data; it was considered a necessary step since most case studies already explored in literature do not focus on local multi-actor collaborations towards sustainability;

3. Co-designing an agreed framework and set of tools, trainings and guidance that could enhance synergies - using sociocratic techniques within the steering group and information from the mapping and literature;
4. Testing and refining the agreed framework and tools in pilot areas to develop a shared evidence base, including a revised partnership model – case study method using participatory action-research, initially for the period of one year; action and monitoring is implemented by local governments in partnership with civil society and supported by core team and Hubs; final evaluation uses multicriteria analyses;
5. Reaching out to experts, decision-makers and practitioners.

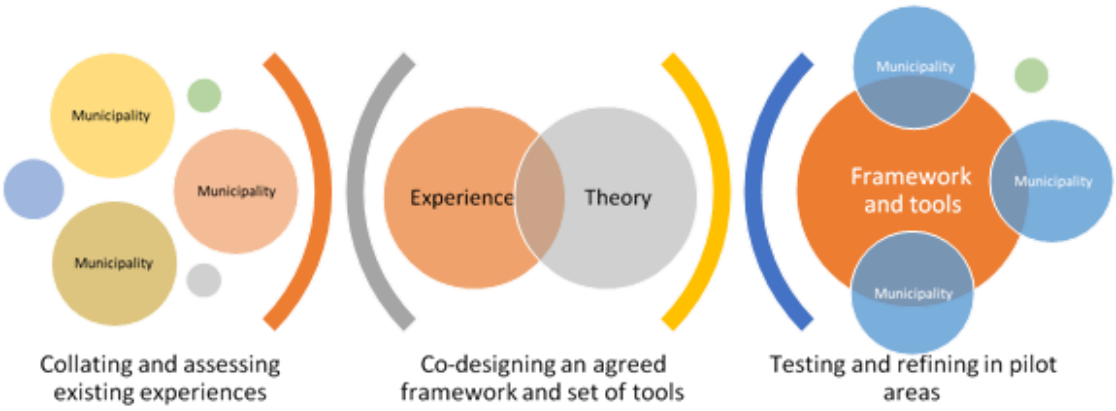

Figure 1 – General scheme of research (municipalities refer to experiences of collaboration between local governments and transition initiatives).

In this first report we present the results from steps 1-3.

The following working definitions are used:

- Transformation (towards sustainability) – a deliberate and profound change in human systems (a change in the fundamental attributes, as previously mentioned) leading to positive environmental, social, political and economic impacts;
- Local governments – part of the public administration with the smallest geographic jurisdiction, within a given state (municipality refers to the administrative division itself);
- Community-based initiatives – actions initiated and managed by groups of civil society actors/individuals with the purpose of collectively solving socio-environmental problems (aimed at sustainability), regardless of having a legal status or having received public support and commonly being non-profit organizations;
- Collaboration – the act of working together, promoting concrete joint initiatives that are expected to lead to synergies; partnerships is sometimes used referring to 'strong' collaborations (with significant interdependencies).

This research is fully integrated in a project named 'Municipalities in Transition' (MiT) started in 2017 by Transition Network and Transition Hubs. The main objective is precisely "to create a clear framework for how Transition groups and municipalities can create sustainable change together" (MiT, 2018). This 'collective learning by doing' process is jointly steered by the 'core circle' (a team of 'transitioners' mostly connected to Hubs, with support from the Transition Network) and an independent researcher connected to *academia* (the author of this paper). The researcher has a dual role, being an actor but mostly a 'fly-on-the-wall', in a simultaneous effort of observing closely and deeply and influencing by informal knowledge sharing and active participation. In other words, acting as change agent, knowledge broker and reflective scientist (Julia M. Wittmayer & Schäpke, 2014). Project's governance is based in sociocracy (Bockelbrink, Priest, & David, 2018). See acknowledgements for more information.

Rationale

As previously argued, the Transition Movement is considered one of the most significant examples of local communities leading the way to a post-carbon society, at least in Europe (Grossmann & Creamer, 2017; O'Hara, 2013). These initiatives are spread world-wide (see https://transitionnetwork.org/transition-near-me/) and demonstrate a distinctive openness for collaborations and partnerships. They are, therefore, a pertinent and suitable 'starting point' for the present research (that does not restrict itself to the Transition Movement), providing an experimental space with transformational ambitious (Longhurst & Pataki, 2015, p. 6). Nevertheless, a bias toward Western countries might be expected. It should also be considered that these experiences not always reflect the diversity of the communities in which they thrive (Feola & Nunes, 2014; Smith, 2011), despite their efforts on inclusivity (Grossmann & Creamer, 2017).

We try to keep a systemic thinking, accounting for all the interrelated sustainability questions, institutions and actions, at different 'scales'. In particular we try to avoid the binary and antagonist categorization of LGs versus CBIs. They are not separated systems, and many interconnections occur (even the same individuals keep significant roles on both organizations). We can also argue that LGs are an intrinsic part of the local community and cannot be labelled as external counterparts. Even though separate analyses from the actors' perspective can be useful (for instance to understand tensions), the research focus in on the transformative power of local collaborations, namely of the systemic influence these joint endeavours can have.

In this study we use participatory-action research (PAR), since it has proven to be valuable in supporting sustainability and transformative efforts at local level by mixing the production of knowledge and societal action (I. S. Campos et al., 2016; Köhler, Geels, Kern, Onsongo, & Wieczorek, 2017; Ng et al., 2016, p. 133; Page et al., 2016; Wilding, 2011, p. 15). We also consider that to be part of the necessary social transformation and simultaneously allowing communities to take ownership of the research is somewhat a moral imperative to researchers (Chatterton, Fuller, & Routledge, 2007). In PAR, research and action co-evolve through reflective interactive cycles that can include diagnosis, planning, implementation and evaluation, with a deep and continuous involvement of social actors (I. S. Campos et al., 2016). These kinds of cycles are used in the research project as an all and also within pilots' experiments.

Hopefully we will manage to address most of the challenging "ten essentials for guiding action-oriented transformation" (Ioan Fazey, Schäpke, et al., 2018) in order to maximize the societal outcomes. As previously mentioned, the research focus on practical knowledge (how to implement change) and an iterative 'learning by doing' approach. All the participants in this experiment are also researchers, taking a diversity of multiples roles in an intentional immersed position within the communities and systems they are trying to change. We will try to keep a transdisciplinary perspective, using the knowledge from the several scientific approaches mentioned earlier in this text, embracing reflexivity. Likewise, as outlined earlier, the research tries to maintain a double perspective on partnerships, both institutional (as new arrangements on governance regimes) and from the actors' viewpoint (as a tool to own performance) (Van Huijstee et al., 2007). The institutional perspective will be the predominant one.

We already concluded that collaborations between LGs and CBIs should be considered a wicked problem. This is especially true when sustainability issues are concerned because of their normative dimension. So we will need to use "paradox lens" in our work (Vangen, 2017), namely to anticipate, explore and navigate through the inevitable tensions arising from competing agendas and processes, in an effort to generate useful knowledge, both from the science and practice perspectives. In this context, the sociocratic principles and methods adopted in the project – namely the guidance from 'Sociocracy 3.0' (Bockelbrink et al., 2018) – can be particularly useful and interesting to use. Sociocracy 3.0 (S3) provides a structure of patterns to make collaborations more effective (*idem*).

D. Results and Discussion

Transformative collaborations

Collaborations between local governments and community-based initiatives can lead to significant synergies (Krishna, 2003). Several factors can influence the results and are differentially valued according to collaboration arrangements – some were already mentioned in the introduction. In an effort to systematize these factors a 'Compass for Collaborative Transformation' is proposed. This heuristic will be used in the research process as an assessment framework of existing experiences of collaboration and the monitoring and evaluation of pilots' experiments (and the research itself). A revised version will be prepared as a research output (formulation of an ideal collaboration model). In that sense it is a provisional answer to the first research question.

Based on literature review (Beers, Sol, & Wals, 2010; Bryson et al., 2015; Hassink, Salverda, Vaandrager, van Dam, & Wentink, 2016; Patel et al., 2012; Revell & Henderson, 2018; Spurling, Mcmeekin, Shove, Southerton, & Welch, 2013; TESS, 2017; Van Huijstee et al., 2007; other) and experience, the following dimensions are considered to be significant in evaluating any transformative collaboration between local governments and community-based initiatives (Figure 2):

- Cocreation ('making it together'), by using collective intelligence in addressing the following features:
    - Shared understanding and analyses of the problem;

    - Clear purpose, common shared vision/narratives and long-term commitments;
    - Strategy development and effective joint implementation;
    - Monitoring and evaluation;
    - Clearly defined and complementary roles;
    - Taking joint decisions;
    - Suitable level of bureaucracy and formality;
    - Legitimacy (internal and external);
    - Inclusion and representativeness;
    - Transparency and accountability;
- Mutual support ('win-win situation') with reciprocity in mind, leading to cross-fertilization, fulfilling relationships and empowerment, including:
    - Permanent, enduring, structured and interpersonal dialogue;
    - Handling conflict;
    - Sharing goods and services;
    - Help to get access to assets and space;
    - Mutual fundraise (e.g. grants, joint applications, crowdfunding);
    - Cross marketing (promoting and participating in each other's activities);
    - Information and knowledge sharing (e.g. two-way training);
    - Suitable regulations (e.g. avoiding coercive isomorphism);
    - Equally shared risks, efforts and benefits (fairness);
    - Mutual trust;
    - Commitment;
- Coproduction, especially cooperatively delivering goods and services aiming at caring for people and the planet ('community resilience'):
    - Well-being and personal growth (e.g. learning opportunities, community engagement);
    - 'Green' economy (e.g. entrepreneurship, localization, circularity)
    - Vibrant culture (e.g. local heritage, creativity)
    - Social Capital (e.g. extent of networks, density of relationships);

- Justice and equity (e.g. deliberate redistributive efforts, inclusion);
- Ecological restoration;
- Climate mitigation and adaptation.

- Open innovation ('deliberate disruption'), making transparent and explicit what is to be transformed and for whom and promoting the destabilisation of existing regimes:
  - Cultural change;
  - Social innovation;
  - Technological disruption;
  - Reshaping practices;
  - Networked governance;
  - Institutional change;
  - Social learning.

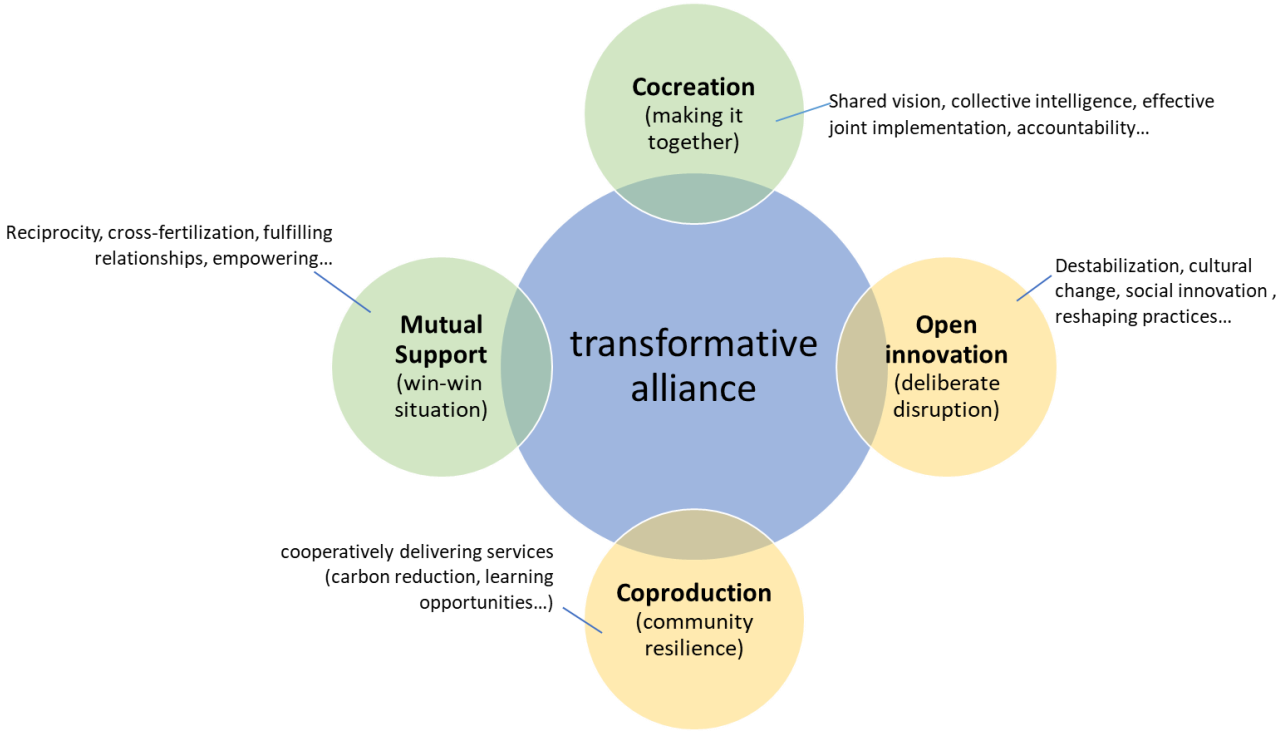

Figure 2 – What makes a successful transformative collaboration? The 'Compass for Collaborative Transformation' allows a multidimensional assessment of collaborations between local governments and community-led initiatives, in terms of transformation towards sustainability. The green circles relate primarily to the quality of the process and relationships established and the yellows to outcomes, including concrete outputs and more intangible impacts.

There is the need to look for indicators and measurable variables (or proxies) for the several factors included in the framework. In some cases, this can be problematic. How can we measure innovation? Or how can we assess the depth, breadth and speed of intended change? (Ioan Fazey, Schäpke, et al., 2018). Can we use indicators as the endorsement of the New Ecological Paradigm (Dunlap, Van Liere, Mertig, & Jones, 2000) to evaluate cultural change (F.W. Geels & Verhees, 2011)? Future work will focus on this challenge.

Mapping exemplary cases

Phase 1

With the aim of learning from the existing cases of transformative collaboration at local level, an on-line survey was prepared and sent to Transition Hubs in the beginning of July 2017. Until the beginning of October 2017, 71 cases were collected, currently active in 16 countries (Figure 3 and annex): Belgium, Brazil, Chile, Colombia, Denmark, France, Germany, Hungary, Italy, Mexico, Netherlands, Portugal, Spain, Sweden, United Kingdom and United States. Most of the cases were "well established and running" (40), while some were still in design stage (10) or just had started (21). A summary of all the cases is available at http://municipalitiesintransition.org/about-the-case-studies/.

Data was collected mainly by people connected with the Hubs (63%) and/or TIs (48%). Most of them state that they could be perceived as neutral to the cases, but some degree of bias is expected to occur.

Figure 3 – Geographic location of the 71 cases harvested in the research (some overlap).

The two main criteria to select the cases to be collected were the enrolment of local governments and civil society (not necessarily TIs) in a transformative process and additionally to be part of a "wider systemic design". To comply to the latter premise, cases would be expected to demonstrate (1) systemic approach in the design and management, (2) Head, Heart, Hands approach and (3) long-term vision. The Head, Heart, Hands principles (HHH) were adopted by the Transition Movement (Hopkins & Thomas, 2016, p. 9; Rusman, 2012, p. 36) and respectively correspond to the ideas of acting on the basis of the best information available, taking care of relationships and looking for tangible results. There are similarities with the dimensions included in the Compass for Collaborative Transformation (Head/Cocreation, Heart/Mutual Support, Hands/Coproduction).

The 71 cases collect were mostly located in urban context (around three-quarters) with population ranging from 200 to 12.000.000 (frequently between 1.000 and 40.000). The main area of activity (multiple choice possible) was raising awareness (77%). Cases also mostly dedicated themselves (>50%) to food and agriculture; education; participatory democracy and planning and community work (Figure 4). Other topics mentioned included inner transition; aboriginal culture assessment; empowerment of women with a vision of peace; social innovation; ethnography; volunteer nature conservation; cooperativism and solidarity economy; tourism; commons (like optic fibre); international relations; air quality; sustainability pollinators; adaptation to climate disruption. Relating beneficiaries, the cases were mostly aimed at a general public (65%), followed by (44%-32%) adults, families, elders, young adults, teenagers and children. Other publics mentioned included ethnic or social minorities; people with disabilities; LGBTQ+; mothers heads of household; peasant families and cooperatives; people with respiratory problems; nonhuman beneficiaries.

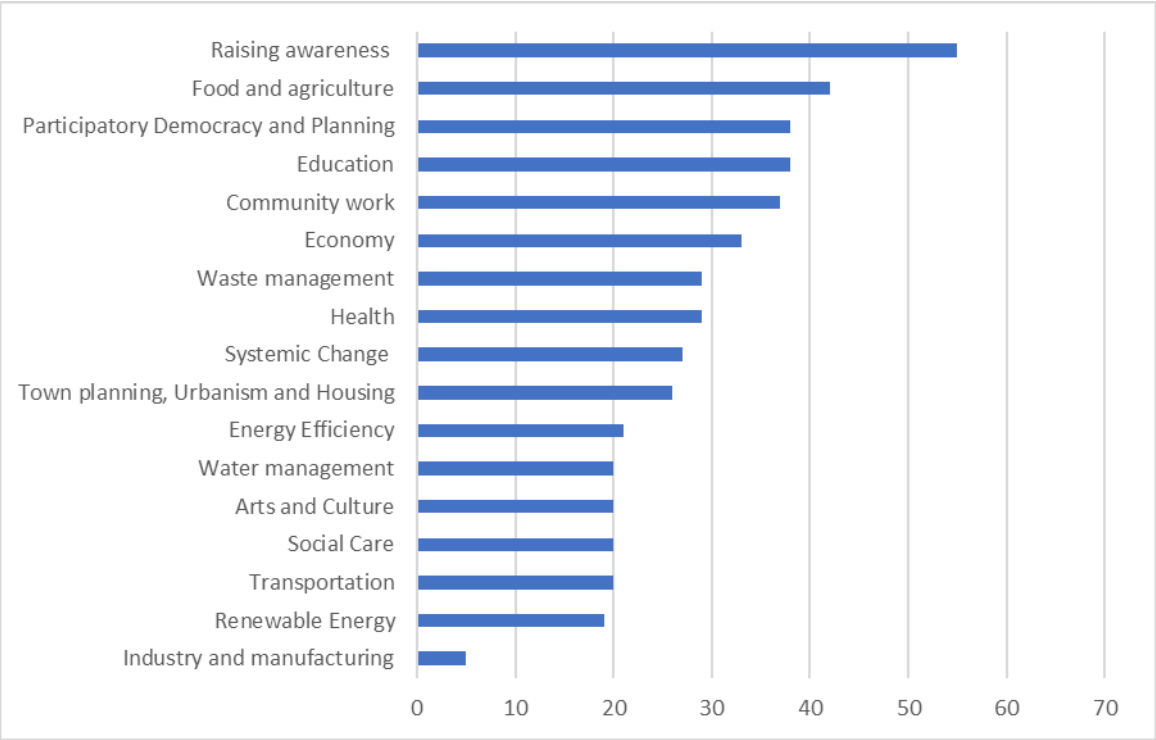

Figure 4 – Main domains (main subjects that the case study focuses on) (n=71).

Cases were also asked about self-assessment relating the main domains of the Compass, namely the degree of (1) cooperation between actors; (2) disruption (providing new products, services, ideas or social processes that radically change 'business-as-usual'); (3) improvement of local economy (creating significant locally-based livelihoods and entrepreneurship that stewards the local environment and resources); (4) people support in leading a healthy and engaged lifestyle (including physical and psychological well-being, strong relationships, connection to nature, learning and sharing new skills, political mobilization, activism, etc.); (5) promotion of equity and social justice (including social inclusion and deliberate redistributive efforts). Results are presented in Figure 5.

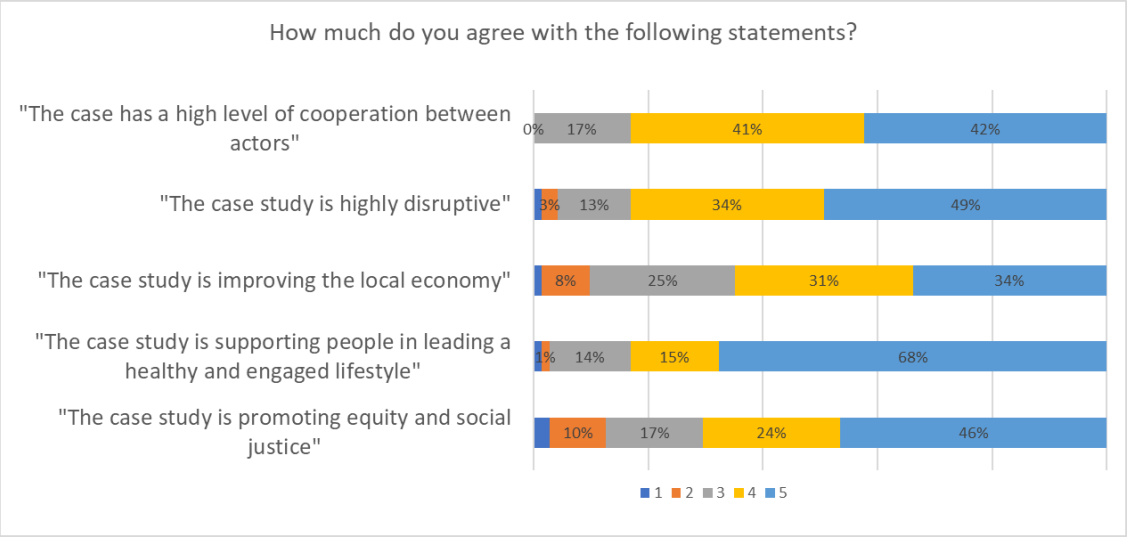

Figure 5 – Answers to the question "How much do you agree with the following statements?" (1 = Fully disagree; 5 = Fully agree).

In terms of climate change mitigation and adaptation the initiatives stated that their contributions were mainly by institutional and behavioural change or reinforcement, followed by producing local and/or organic food and promoting healthy and sustainable diets, preventing waste and recycling (circular economy), promoting sustainable mobility (cycling, public transport, electric and shared cars...), creating green infrastructures, and generating heat and electricity from renewable sources (Figure 6). Other ways mentioned include supporting local actions (e.g. funding, benchmarking, tracking impacts, inspiring, developing community capacity, promoting partnerships and support networks between social entrepreneurs and actors of change, offering tangible and paradigm shift solutions, gathering people and celebrating) and local economy (e.g. local trade networks, support to 'green' entrepreneurs). Other topics included personal health, regeneration of river basins, relationship with other movements from the global south, reducing the use of petrol lawn mowers, increasing pollinator resources and honouring aboriginal heritage.

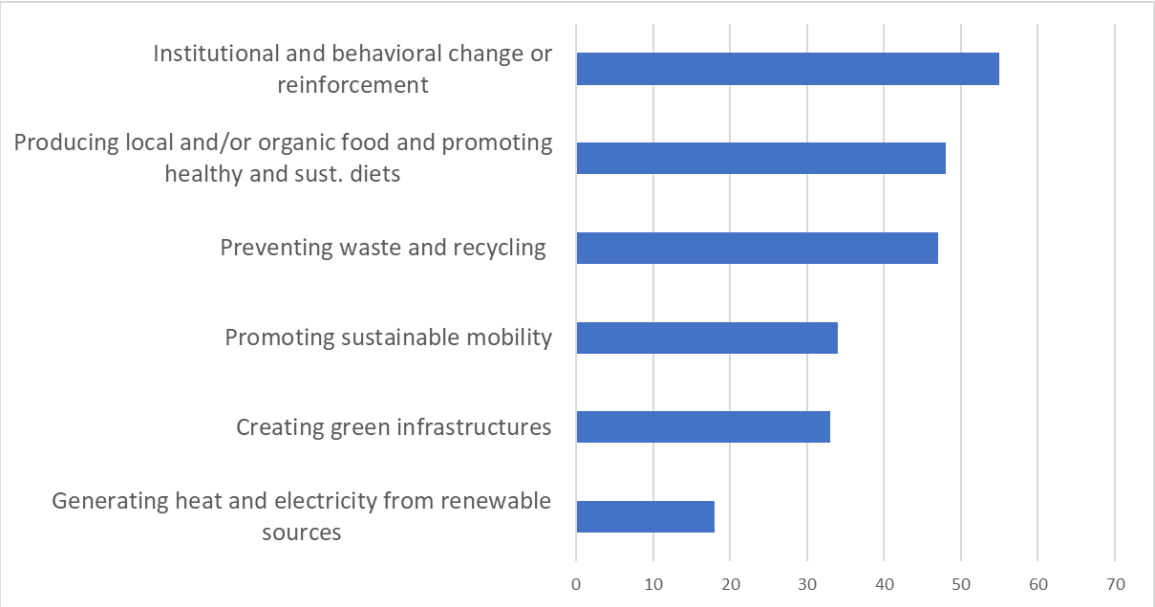

Figure 6 – Contributions to climate change mitigation and adaptation (n=71).

Cases surveyed are quite diverse, including in their governance systems. They span from grassroots eco-neighbourhoods in S. Paulo to a well-structured transformation initiative at city level in Dresden with governmental support, an ecovillage in Colombia managed by women or cooperatives to produce energy and promote local food. Some cases focus on the collaborative promotion of concrete activities or topics (e.g. cycling, circular economy, urban agriculture) or more spiritual experiences (e.g. inner transition). In most of the cases it was possible to identify some novelty in the way that local governments and civil society work together with a transformative aim. Besides partnerships, spaces for dialogue and learning, action groups are quite common ('local innovation committee', 'neighbourhood environmental committee', 'neighbourhood assemblies', 'schools of life', 'living classrooms', 'future city team'…) as well as the creation of networks connecting change agents. Ample alliances uniting municipalities, TIs, ecovillages and indigenous groups are also referred. Some of the tools used to promote transformative collaboration include sharing land and other resources, demonstrative centres, coworking spaces, convergence events, social currencies, distribution of small grants, shared social media platforms, ethnography approaches, communitarian management of public spaces, etc. Tools like Dragon Dreaming, Sociocracy, Theory U and Nonviolent Communication are also used.

Most of the cases (73%) have some connection to the Transition Movement (e.g. partnership with TI or Hub) and several active collaborations with municipalities are presented. Most of the cases also declare to belong to some local, regional, national or international network (e.g. Covenant of Mayors), while a few created their own networks. Funding comes from municipalities, private sector, cooperatives, non-governmental organizations, crowdfunding and users, besides other national and international levels (e.g. European Union).

In order to further examine the governance imprint of these collaborations we decided to use a tool presented by one of the cases, the so-called 'Energy Function' (Rossi, Pinca, Cavalletti, Bartolomei, & Bottone, 2014). According to this methodology, the occurring processes can be mapped according to the actors involved and transformative actions developed (or planned) in each experiment (Figure 7).

	Actors Categories						
Actions Categories	Municipality Political	Municipality Organization	Controlled Entities	Suppliers	Organizations	Public	Networks
Vision	++				+		
Organization		+					
Planning	+	++			+	+	
Technical aspects							
Relations							
Cultural change					+	++	
Networking							

Figure 7 – Design grid of the Energy Function for the development of system or individual targeted actions. Adapted from (Rossi et al., 2014).

The Actors' categories are:

- Municipality: Political level (who institutionally contributes to defining policies, e.g. council, commissions, parties);
- Municipality: Organizational structure (technicians and other civil servants responsible for performing municipal functions);
- Controlled Entities: entities that are in some way controlled by the municipality;
- Suppliers: public and private suppliers of the municipality;
- Organizations: economic, social and cultural organizations, profit and non-profit (e.g. business, schools, environmental organizations);
- Public: families and citizens;
- Networks: other municipalities and actors outside the territory (e.g. other municipalities, levels of government, partners in international networks).

And the Actions' categories:

- Vision: actions and processes that tend to create a vision;
- Organization: actions and processes that tend to create or modify the governance (e.g. creating a new office or procedures);

- Planning: actions and processes that tend to create a plan (e.g. setting goals, drafting of documents);
- Technical aspects: actions that modify the system through technology;
- Relations: actions and processes that want to create or improve relationships, namely acting on human and social aspects;
- Cultural change: actions and processes that tend to lead to a "paradigm shift" (including communication and educational activities);
- Networking: actions and processes that tend to create stable connections and comparisons (e.g. benchmarking).

The empirical observation of the Italian experience in using the Energy Function shows that the crucial factors leading to real changes in the way a community organizes itself are new visions developed at the political level, planning occurring at the municipalities' organization level and a cultural change at the public level. In the grid those cells have a 'higher' value (++). A second group of 'key' cells are marked (+) and considered as other activation areas with a high potential for change. For example, it is assumed that when organizations develop a new vision, change their culture and plan accordingly we can observe an evolution in the community.

In order to fill the grid for each case, we used the qualitative data collected on the survey, namely the cases' description (including governance) and the observants' perspective on the HHH approach ("Where do you see the "head/heart/hands" part in this case?"). We performed a content analyses by assigning a code for each cell in the grid. The frequency of occurrence of each code in the total number of cases (71) is presented in the following table (Table 2):

	Actors Categories							
Actions Categories	Municipality Political	Municipality Organization	~~Controlled Entities~~	~~Suppliers~~	**Organiza-tions**	Public	Networks	total
Vision	24 $^{++}$	18	~~2~~	~~1~~	35^{+}	24	6	110
Organization	**46**	**46^{+}**	6	~~2~~	**55**	**46**	4	205
Planning	26^{+}	22^{++}	~~2~~	~~1~~	**32^{+}**	**22^{+}**	6	111
Technical aspects	15	19	4	~~2~~	34	25	3	102
~~Relations~~	12	12	~~1~~	~~0~~	33	33	~~0~~	91
Cultural change	35	36	5	~~1~~	**62^{+}**	**63^{++}**	8	210
Networking	31	26	4	~~1~~	**39**	28	32	161
total	189	179	24	8	290	241	59	

Table 2 – Mapping of the collected cases (n=71) according to actors and actions involved. Cells with double borders and bold font correspond to values one standard deviation above mean. Strikethrough numbers correspond to values one standard deviation below mean.

We can conclude that apparently the actors that are more actively involved in the cases are organizations and the general public, followed by local governments. Controlled entities and suppliers are not usually mentioned which can demonstrate that initiatives like green procurement or life-cycle assessments are rare. Often these controlled entities manage critical sectors relating sustainability, like water, waste or energy. Cultural change and new governance schemes (involving many actors) are the kind of goals most often pursued, followed by networking activities. Caring for relations looks like a less developed area of work. Visioning and planning can also be considered in relative deficit taking into account the leverage power attributed to these activities.

Finally, a grid score was produced for each case by counting the number of filled cells. A factor of 3 was applied to cells marked with "+" and 5 with "++". The score (or "cases' range of impact") vary between 6 and 59 (average=26), for a maximum value of 73. This score, we could argue, can be considered a proxy of the degree of transformative efforts happening in the community. However, we should not forget to mention that lower values can correspond to cases where insufficient information is available and not necessarily cases with smaller impact.

Phase 2

In order to select the cases to go through a deeper study, the following quantitative data was used:

- Cases' range of impact (provided by the grid), as a proxy of the degree of transformative collaborations happening in the community;
- Cases' self-evaluation (Figure 5), with differentiated weights (integrated score = 'cooperation between actors' x 3 + 'disruption + 'improvement of local economy' + 'support of people in leading a healthy and engaged lifestyle' x 2 + 'promotion of equity and social justice' x 2).

Final decision was made based on the core team and researcher's subjective and consensual analyses of novelty and interest for research (this included a free discursive evaluation with a proposal on "how to proceed" prepared by each member, a voting process and debate). Cases with sectoral approaches or too context-specific were avoided. Location and population were also used as criteria in order to maximize the contextual diversity. Some cases were considered interesting as a 'tool' and not as a 'framework', so a third phase on the research was decided in order to learn also from these cases[1].

Finally, 8 cases were selected (Table 3).

All cases are "well established and running", are located in six geographical regions (Northern, Central and South America; Northern, Western and Southern Europe). Half of them have concrete connections to the Transition Movement. Overall the range of impact is comparatively high in the context of all the 71 cases.

The objective of phase 2 was to look deeper into existing frameworks of collaboration and tools between civil society and local governments in order to (1) inform the design of the

[1] In 24 cases we did not identified a structured process to promote collaboration ('framework') but instead concrete and valuable solutions to solve specific problems ('tool'). A survey was used to collect information, including an on-line questionnaire with guidance and interviews. It was only possible to collect information from 4 cases.

framework to be tested in pilots and (2) share to all interested parties detailed descriptions of interesting and effective practices. Detailed information collected included (1) how and when the cases emerged; (2) methodologies and tools used; (3) activities developed and their impact; (4) governance model. We were also interested in knowing how different actors perceive the case study, so semi-structured interviews were conducted with people active in the project (one from the LG and one from the CBI) and a third person from 'outside' (not having a coordination role; could be a beneficiary or participant in the activities). Questions in interviews included topics as benefits, challenges, support between actors and potential for replication.

A specific 'research pack' was prepared for each case - including background and contextualization information; interview's guides and templates; consent forms and contract – and delivered to the Transition Hubs which operated the data collection, directly or through contracted members. The interviews and other data collection were performed in November and December 2017. Data collected was analyzed and discussed between core team and researcher in order to identify patterns (e.g. challenges, power relationships, processes, values). The comparative analysis is presented in Table 3.

	Case history	Governance model	Methodologies and tools	Work in progress
Daily Acts, Sonoma, United States of America	Founded in 2002, Daily Acts (DA) is an educational NGO whose purpose is to be a catalyst for personal and community transformation. After running community-based sustainability education programs for five years, DA recognized that partnering with LGs was a critical pathway to build organizational capacity and affect systemic change. Meanwhile LGs recognized that DA could offer (1) a unique ability to engage the community; (2) sustainability expertise; (3) operating in a cost-effective way. The first contract for a joint educational program was signed with the city of Petaluma in 2007 and others followed. The main barrier initially was valuing DA's services.	Government partnerships are based on regularly yearly financial contracts to implement sustainability programs. DA engages sustainability experts and a wide range of non-profits, businesses, government agencies and other organizations across the gamut of sustainability-related issues. DA works with approximately a dozen different alliances and networks. Beyond flattening leadership and moving it to the edges of the organization and working in coalitions, DA is moving in a programmatic direction that more deeply engages the leadership of communities.	DA was born out of a permaculture design approach with the underlying ethical principles of earth care, people care and fair share and the primary methodology being to take an integrated and holistic approach. DA work with government agencies is a core strategy to affecting wide-scale community transformation while building organizational and movement capacity in the community resilience field. Some of the core operating principles are (1) shared leadership; (2) nurturing non-profit networks; (3) working with business and government; (4) doing both program implementation and advocacy work.	DA promotes 'Homegrown Programs' transforming homes and landscapes into productive, resilient ecosystems – educational tours expose people to inspiring and practical examples; workshops help people develop practical skills; garden installations and landscape transformations help people work together to create practical acts of transformation. 'Community Resilience Challenge' is an annual campaign to inspire wide-scale collaborative action. Activities promoted range from planting fruit trees to installing greywater and rainwater catchment systems to committing to reduce waste, shop local and hosting neighbourhood potlucks.
Ecobairro, São Paulo, Brazil	Inspiration to Ecobairro came from educational experiences related to Ecovillages (2004). The initial founders (Lara Freitas and Paulo Santos) got together with other people and presented the program in 2005, receiving institutional support from the City Council and United Nations. Biggest challenge in the beginning was the lack of public awareness. The program is now also operating in Salvador and Feira de Santana.	Ecobairro is an enduring program from the Roerich Institute of Peace and Culture of Brazil. In São Paulo it is hosted by the organization Casa Urusvati. There is a structure of coordinators, advisers and nucleators, with a systemic approach to leadership. Decision-making is always in group.	Focus on urban sustainability and eco-neighbourhoods, while connecting different levels, from personal to planetary. Project is grounded in the 'Mother's Pedagogy', based on an analogy with motherhood (fostering values as deep inclusion, care, intuition, openness and flexibility). Use tools like Nonviolent Communication or Open Space and the framework of SDG.	Activities include recruitment of volunteers; active dialogues with local agents and universities; campaigns, trainings, exhibitions and workshops on environmental practices and topics; networking with the Global Ecovillage Network and Transition Movement; collaborating in local public initiatives like UMAPAZ (Open University for Environment and Culture of Peace) and Municipal Council for Environment and Sustainable Development.

	Case history	Governance model	Methodologies and tools	Work in progress
Energy Function, Emilia Romagna, Italy	In 2008 “Monteveglio Città di Transizione” was the first Transition Initiative in Italy and started its activity with a quite visible, official and unusual strategic partnership with the Municipality. Together they led action on the Covenant of Mayors and succeeded in involving the whole ‘Unione di Comuni’ (6 municipalities). This was the basis for a partnership with the regional branch of ANCI (National Association of Municipalities), in 2009, aimed at replicating this example and create support tools. CURSA (University Consortium for Socioeconomic and Environmental Research) joined the effort on the behalf of the national Environmental Ministry. After a few years of experiments was evident the need of a general framework to make easier the day by day challenges posed by the complexity of the different contexts.	It is believed that energy issues (and the necessary transition to a low-carbon economy) brings new challenges to local governance and should be included as a new municipalities’ function (changing legislation). The Energy Function (EF) should be a local policy transversal to all existent policies; focused on facilitation and support of families and businesses; grounded in multi-level governance; strictly dependent on the peculiarities of the territory (natural and social capital); urgent while having a medium-long term perspective.	The principle for designing the EF were: having a general, systemic framework easy enough to be understood with a simple learning curve and having a way to organize all the available tools, methodologies and needed information for those trying to “work in the field”. In spite of the name, the actual model for the EF can hold much more than “energy issues” being a systemic tool strongly inspired by the Transition work, system thinking and various theories of change approaches. It has a stochastic design.	The Energy Function approach is based on a relationship grid that holds the “scenario” and a pattern language database that contains tools and needed information. All is designed to be practical and grounded on reality but without simplifying the complex environment and set of conditions and relationships real life presents. The EF was indicated as a necessary tool on the Regional Energy Strategy of Emilia Romagna but kept underdeveloped.
Future City Dresden 2030+, Dresden, Germany	In 2015, the Federal Ministry of Education and Research (BMBF) launched the Future City for Sustainable Development competition. Three phases were considered: (1) development of a common vision; (2) planning; (3) implementation. Dresden’s government decided to apply in 2015 and is one of the 7 finalists going for phase 3 in 2019, receiving around 1 million euros for that purpose.	The process is driven by the Municipality through a project manager who formed a ‘Future City team’. First project partners were 2 scientific bodies, the Leibniz Institute of Ecological Urban and Regional Development and the Knowledge Architecture at the University of Dresden (with experience in designing processes for working with people). In phase 2 other partners joined (e.g. public transport company and energy provider) and a group was formed. Involvement was restricted to some meetings and a conference. Stronger collaborations are expected in phase 3, with joint implementation of projects. People from civil society were involved and there is a sense of excitement with the possibilities to collaborate.	The initiative follows the inspiration from the Transition Movement, empowering people to act at their own places, creating rooms where they can meet (“people own the city, and they should be the ones developing it”). In this way, it is considered a pioneering project in the government. Discussion rooms have been streamlined to support people in the process of creating projects. For example, identifying objectives, problems to solve, useful personal experiences and skills, evaluation criteria, etc.	The initiative concentrates on the process as designed by BMBF, following what was included in the application. In this phase (2) efforts are directed to codesigning projects. Although this planning phase is considered too abstract by some participants, it is believed that it is affecting how people face sustainability issues and their own role in the city. Stronger connections are believed to be the greatest outcome at this stage. A catalogue was prepared will all the ideas relating education, campus and citizen knowledge; neighbourhood; energy; sustainable economy and business model; mobility; urban space; citizen participation; culture and capital of culture.

	Case history	Governance model	Methodologies and tools	Work in progress
Jungapeo en Transición, Jungapeo, Mexico	The NGO 'Pro Desarrollo Integral del Municipio de Jungapeo' was created in 2015 (grassroots' activities started in 2005), focused in local, integral development. In 2016 the local mayor challenged the NGO to transform Jungapeo into the first official Transition Town in México, which led to a signed agreement. Barriers are mistrust based on previous bad experiences; apathy by the population; short exercise of power of the municipal authorities; lack of continuity due to overwork.	Jungapeo en Transición (JET) is managed by a full-time staff dependent on the CBI. It is grounded in a matrix organization with 3 axes (social, agriculture and tourism) and 5 components that interact with the axes (ecology, culture, health, education and sports). Collaboration with Municipality is supported by regular briefings and by inviting members of the municipality to workshops and activities. Local agents are involved, also through focal groups (children, students, business, teachers, elders).	Inspiration comes mainly from the Transition Movement. It intends to "eradicate the mentality of assistencialism and dependency" and empower the community to identify their needs and help to resolve them. Collaboration between LGs and CBIs is expected to grow based on trust and confidence arriving from joint successful activities – small initial steps with big visibility. Tools like sociocracy, coaching and Robert's Rules of Order are used to foster inclusion and participation.	Organized activities range from cleaning rivers to competitions to honouring the dead (embedded in Mexican culture), local markets to dry toilets. An educational approach is the focus, including workshops for elders, youth and other groups. Regardless of the several results that have emanated from own projects, they have been able to observe recent "outbreaks" of spontaneous and orderly teamwork among the local population, "as if the Transition Effect were contagious". Monitoring includes regular and extensive surveys to partners, beneficiaries and public.
MARES, Madrid, Spain	The economic crisis of 2008 increased unemployment and urban social-spatial segregation. Dinamia (social consulting) joined the municipality, Tangente and Vivero de Iniciativas Ciudadanas (two collaborative platforms) with the idea of supporting existent CBIs related to social and solidarity economy. Other partners joined the initiative.	MARES is a partnership centralised in the Council. Several partners participate in the executive, economic and finance committee (with voting rights) and steering groups (led by different partners). Control processes were defined, such as management plan, quality plan, risk assessment plan, evaluation system and monitoring, handbook of internal communication and decision making.	The focus is on urban economic resilience. It intends to strengthen the emerging opportunities in strategic sectors (Transport, Food, Waste, Energy and Care, MARES in Spanish). It seeks for cooperation among local actors, social innovation and the active productive involvement of citizens. The base is to "put the people before the profit". Use tools like the co-design for the reuse of disused buildings and public spaces; mapping citizens' competencies; analysis of care needs and proposal for value chain; learning communities.	Initiatives of collective self-employment by means of increase awareness, training and support to citizen groups. The biggest challenge is the generation of real participatory public policies in the functional and social fields. There are expects outcomes like a change of transport to low emission models, implementation of renewable energies and energy efficiency, improved care for older people and for the infancy, consume of local products and agroecologic food, hopefully generating employment.

	Case history	Governance model	Methodologies and tools	Work in progress
Rubí Brilla, Rubí, Spain	In 2008 the Rubí Council joined the Covenant of Mayors, within the European initiative to reduce carbon emissions. A Plan of Action for Sustainable Energies was prepared externally, with the support of Barcelona Council. The Rubí Brilla initiative started in 2011. Angel Ruiz, working for the municipality and private entrepreneur, played a key role by bringing expertise and a business perspective.	Rubí Brilla is a service provided by the Municipality and managed by a working group of eight internal technicians. Energy experts have been hired in 2013 and several collaborations are established with external entities. A specific partnership is built with schools and other public organizations, where decisions are taken collectively – in this context savings from investment in energy efficiency are locally reinvested (50% in new measures for energy saving, leading to a positive feedback loop).	The initiative uses the economic factor as the leading motivational factor and prioritizes economic tools commonly used in the business sector. Using the 'pareto principle' they focused on energy efficiency in public buildings. Substantial emissions and cost reduction were achieved so 'profits' were reinvested in new actions (energy efficiency and renewable energy). The clear cost-cutting is used as an argument to convince private partners.	A major part of the work done relates to the private sector (industry accounts for 40% of emissions). This is mostly done by promoting technical meetings with the biggest energy users, were learnings are shared and support is provided. This includes collaborations with the Polytechnic University of Catalunya. Other activities include providing monitoring apps to families, energy centres at neighbourhood level and buying electric vehicles. Data monitoring is a key activity, including real time checking of consumption and efficiency indicators. Citizens are provided with information on energy costs in public buildings and street lighting.
Växjö, Sweden	The municipality saw a need to restore the local lakes in 1969 and the environmental focus has continued since then. In 1993, LG approved a local environmental policy and in 1996 decided to become a fossil fuel-free municipality. In 1999, a Local Agenda 21 strategy for Sustainable Växjö was adopted. In 2006, the LG's Environmental Program was agreed (updated in 2010 and 2014). Several participatory efforts (polls, meetings…) have been tried but the results were unsatisfactory.	The development has been driven by municipal departments and municipally-owned corporations. Since May 2016 there is a sustainability group which is part of the development unit of the municipal management. The group has two politicians assigned to it and formulates the Environmental program. It is up to each operation unit to break this down into actionable, budgeted steps with measures related to the goals.	The main principle is to promote a strong political leadership with bold decisions. The basic approach, since 1969, has been a sequence of political decision > steering documents > goals > municipal boards/ corporations plans > budgets > follow up> publication in annual report with goal scorecards. To assure continuity three main factors are considered: (1) consensus among parties; (2) direct involvement of politians; (3) strong management structure in place. Work is underway to align the program with the SDGs (ready 2019).	The environmental program's measurable goals are planned and monitored through Växjö municipality's management system. Each municipal steering board and company are responsible for fulfillment of the goals as well as to deliver statistics. The annual report is publically available. Multiple outcomes are visible, like better air and water quality, green spaces, or sophisticated waste sorting. There is a feeling of pride in being at the forefront of environmental development.

Table 3 – Analyses of 8 cases.

Using the 'Compass for Collaborative Transformation' as a framework analysis and focusing on the collaboration between LGs and CBIs, we can conclude that cases are quite valuable. For example, and looking at cocreation, the Ecobairro case in São Paulo started in civil society, bringing inputs from international networks and sustainability educators and designers from all over the world (through the Gaia Education training). But meanwhile a structured collaboration with the municipality was established based on a consultative and deliberative body, the Municipal Council for Environment and Sustainable Development (CADES). The Ecobairro had the opportunity to draft the CADES regulations and to participate in the strategy development (e.g. Strategic Master Plan, Zoning and Regional Plan linked to the Sustainable Development Objectives) and effective joint implementation (e.g. green corridor for pollinators). In Jungapeo, Mexico, it was the local mayor that invited an NGO to cocreate a common initiative to establish the first official 'transition town' in Mexico. Efforts to share understanding and analyses of the problem are evident in cases like the Italian Energy Function (it might be considered the main goal) and MARES, Spain. The latter case is a good example of clearly defined and complementary roles, with collaboration happening between the municipality and consultants (previous experience of working together) and also collaborative platforms and citizens. It is also a case where formal monitoring and evaluation plays a key role. The same happens in Växjö, Sweden, and probably it is the main factor leading to success, also because the monitoring and evaluation comes from a clear purpose, common shared vision and long-term commitments (although restricted to the political context). A similar clear visioning and pragmatic monitoring process occurs in Rubí, Spain, with collaborations between the municipality, schools, industries and other agents. Here transparency and accountability are also clear key factors.

Focusing on the dimension of 'mutual support', we can highlight the case of Dresden, Germany. The Municipality is putting their efforts in raising funds for civil society initiatives, and to support and train groups in using them. In Sonoma, United States of America, the Daily Acts NGO and Municipalities are supporting each other, sharing educational skills and funds, and jointly resourcing civil society. In MARES the aim is also on providing access to assets and space (e.g. disused buildings) and sharing knowledge. Rubí uses a very clear approach to further equally shared risks, efforts and benefits, namely with the 50:50 partnerships between the Municipality and schools (savings from energy use collaboratively achieved, are divided equally and reinvested with joint decisions). Cross marketing is a strategy used in Mexico to consolidate the collaboration: members of the municipality are regularly invited and participate in workshops about Transition and related activities. The previously mentioned CADES, in Brazil, is a good example of a permanent space for dialogue, even though it faces the contingencies of political turnovers.

Coproduction efforts are significant in several cases. Daily Acts emphasises social capital, putting great effort in developing networks. They also put emphasis on providing learning opportunities, like Jungapeo. Ecobairro also considers that the most significant contributions are on education, along with the generation of transformative public policies. MARES is equally generating social capital and learning opportunities, with a focus on equity. Rubí and the Energy Function focus on decarbonization, while Växjö looks mainly for environmental improvements. Collaboration between LGs and CBIs is expected to grow based on trust and confidence arriving from joint successful activities, as stressed in Jungapeo's case.

The transformative potential is connected with reshaping practices (e.g. Rubí, Daily Acts or MARES) or mainly institutional change (e.g. Energy Function and Vaxjo). Energy Function (EF)

also aims at cultural change, as well as Ecobairro ("culture of peace"), Jungapeo (autonomy) or others. Transformation through the creation of a networked governance is the underlying goal in Dresden's Future City. Daily Acts (and MARES) similarly account for the power of working with the entire ecosystems of actors and fostering networks of social innovation. They highlight how "large-scale social change happens through more collaborative approaches to scaling impact" and use tools like a Community Resilience Challenge. These efforts are expected to bring the emergence of widespread change. In Jungapeo they explicitly report the "outbreaks of spontaneous and orderly teamwork among the local population, as if the Transition Effect were contagious". Social learning can be, in fact, the main outcome of this cases.

Several cases have already manifested capacity for replicating. This is the case of Ecobairro, Daily Acts and more significantly Rubí. In the latter, a political turnover in 2015 become a window of opportunity – the person in charge of the project left the Municipality and joined a cooperative that spread the model to around 30 municipalities in Spain. The Rubí's bet on 100% renewable sources of energy was also replicated by Catalan Municipalities and others.

Designing a framework

This research asked the question: "what would be an effective framework and set of tools to improve the existing experiences by promoting synergies?". In order to answer this question, we were, until now, focusing on answering the preceding one: "how much can we learn from the existing collaborative experiences at the municipal level?". Assumingly, there was the hope to find an already existent framework that could fit our purpose.

From the empirical mapping exercise, we concluded that there is great diversity of contexts and transformative local collaborations in place. In many of them the resources are quite scarce. This led to the first preconditions to the framework to be:

(1) Easily adaptable to a wide variety of very different contexts;
(2) Simple enough to be relatively easy to learn and to use in real life;
(3) Low level of preconditions for implementation (low resources, low technology).

We also concluded that in the cases studied, power is distributed between local authorities and civil society in a similarly diverse and complex way. The power to take decisions and influence processes can concentrate in each one of the 'sides' or be 'equally' distributed. Also, many times this power balance is not evident or explicit, and often changes in time. Therefore, the following preconditions were added to the design requirements:

(4) Suitable for use in a context of shared/diffused governance;
(5) Implementable both in a top-down and a bottom-up approaches;
(6) Powerful enough to cope with high levels of complexity and uncertainty.

Finally, we assume that the framework should improve collaborations, bring concrete transformations and be able to adapt and change in time. We then add the following necessary features:

(7) Capable of improving the quality of the cooperation between the involved actors;
(8) Effective in transformation;
(9) Designed to be iteratively evolved by the users;
(10) Closely linked to the 'Transition principles' (use best information available, take care of relationships, look for tangible results).

Looking back to the cases mapped and the frameworks analysed, the core team concluded that the Energy Function could match these preconditions and be used as a basis for design. In fact, this framework has been developed deductively and inductively in Italy, aiming at designing a model to provide guidance to municipalities in their transformation efforts, assuring great flexibility and organized tools regardless of the starting situation of the municipality. It takes into consideration that Municipalities have similar structures but very different sizes and local context. By using it in the cases analyses (see "phase 1" topic), we could also conclude that it is easy to use, still providing a useful overall picture of the spectrum of transformation. Additionally, as referenced in Table 3, the EF includes a database of operational tools that can be used in daily activities. We can therefore conclude that the EF meets the first set of preconditions (1-3).

The central element of the EF framework is a grid or matrix based on actors and types of management actions, the building elements of governance. Actors are organized according to their relational proximity, from the Municipality point of view (Rossi et al., 2014). Gradually moving from left to right (Municipality-Political > Municipality-Organization > Controlled Entities > Suppliers > Organizations > Public > Networks), the various subjects have, hypothetically, a smaller proximity and a less formalized relationship with the Municipality – this concept of relational proximity is expected to eliminate the hierarchical model. As developed later, this approach has a systemic design, capable of leading with the complexity of transformative processes happening in a community. When mapping processes, it is not significant the 'place' where they started (can be a political visioning process, the introduction of a new technology from a company or a campaign from a NGO). What matters is the range of actors and actions that are involved – in other words, the systemic impact. We can consequently argument that it also meets the second set of preconditions (4-6).

Besides a quantitative assessment of transformative governance in place, the framework also integrates a qualitative evaluation mechanism. This is accomplished by a set of two proposed evaluation cycles (Rossi et al., 2014) considered critical for the effectiveness of processes. In the first cycle, users are challenged to ask: "Who is there? Who should be there? Who is missing?" – maximizing inclusiveness is considered to be a way to bring diversity and guarantee legitimacy. In the second cycle it is used the HHH approach described earlier to emphasize the need to bring to the process the best data available, the emotional variable and the focus on tangible outcomes – hopefully this will help to avoid preconceptions and imposed ideologies, marginalization or manipulation, or unfruitful initiatives. We can prudently suggest that this framework also fulfill the last set of preconditions (7-10).

In December 2017 the core team and researcher decided that the EF would be used as the basic element for the MiT framework, to be tested in pilots. In fact, one of EF's limitations was that it had not yet been significantly tested, although it was built on the experience of multiple municipalities.

The EF's creators (Rossi et al., 2014) recognized that there was "the need to configure a place, a group, a system ... something able to follow the process, measure its effectiveness, understand its state of maturation, decide how (and if) to continue" and that "partial answer will be found only by observing and supporting the experiences of the Municipalities that will be able to interpret, with regard to the territory and their community, the role of facilitators[2]".

[2] free translation

The MiT framework (MiTF) was under development until February 2018 with the main goal of creating a system that could facilitate this necessary learning space. The beta version included:

- The transformation grid (similar to the one presented in Figure 7);
- An online structure for the database of tools;
- A guide for experiments comprising a governance proposal for a joint work between LGs and CBIs and an implementation methodology, including the cycles of diagnosis (baseline), planning, acting and evaluation using the grid;
- The tutors for supporting pilots' experiments;
- An intended Community of Practice.

According to the sociocratic pattern of consent decision making, this framework was considered "good enough for now and safe enough to try" (Bockelbrink et al., 2018, p. 29).

How it is expected to work?

Systemic change

It can be argued that MiTF is a systemic instrument in the sense that it rests on the assumption that altering the nature of interrelationships between elements (in this case, organizations acting on the territory) is a key way for a system change. Therefore, it is not primarily targeted at altering the way LGs, CBIs and other actors perform their own specific functions, but in changing quantitatively and qualitatively the interconnections between them. By using the grid in a learning space, as previously discussed, the focus becomes the creation of processes that include a diversity of actions and the greatest number possible of actors – in a 'perfect world' the grid would see activities happening in all the cells, and especially across cells. The quantity and the quality of relations between actors is enabled to evolve by bringing in the already mentioned evaluation cycles and networking is also included as a key action to foster new connections. Summing up, the MiTF considers relations, or the social capital of that community, the ones that must be modified so that change can occur (Rossi et al., 2014).

By helping to organize the activities happening in the community, the MiTF hopes to bring an ordered structure to the transformation process, therefore reducing entropy and promoting efficiency (organizations agree on the same model of reality and share a methodology to identify desirable options for change). New properties are created in interventions/connections (namely the HHH principles) expectantly leading to synchronization between the work of LGs and CBIs, reinforcing synergies and leading to emergent patterns of networked governance. These properties are expected to diffuse to other actors in the transformation 'playground'. As a systemic instrument, MiTF helps to stimulate networks of inter-dependent actors exhibiting system-like properties and acting in a synergistic way – consequently MiTF help these networks of actors to effectively become a (change) system (van Mierlo, Leeuwis, Smits, & Woolthuis, 2010).

This structuration approach can be named as 'embedding' ("alignment of old and new ways of thinking, doing and organising in order to integrate them into city-regional governance patterns") and is considered the most effective mechanism in accelerating the sustainability transformation (taking into account the pace and scale of systemic change) (Gorissen, Spira, Meynaerts, Valkering, & Frantzeskaki, 2018).

Learning arena

The transformation grid can be seen as an instrumental representation of the 'Arena of Development' (AoD), concept proposed by Jørgensen (2012), based on actor-network theory, actor constellations and collective sense-making. In this sense, the 'arena' made visible by the grid, it is the place and space in which strategic interventions aiming at transformation towards sustainability happen. Here the term 'actor' has a broader meaning that the one used until now and included in the grid (actors as individuals and organizations). As Jørgensen states, "actors on an arena comprise a heterogeneous set of entities, which include humans, technologies, institutions, visions and practices". In our grid these entities are referenced not only in the actors' categories but mainly in actions' categories. All these elements are interconnected in the networks that the MiTF intends to reinforce.

The 'arena' metaphor can positively bring the idea of a place where actors (broader sense) interact and perform, but also connects to the attributes of 'sand' (related to the word's etymology). This metaphor is particularly useful to highlight the fluidity of the phenomena happening in this field characterized by "spatial and relational temporality" (Jørgensen, 2012). The MiTF is therefore a navigational instrument (or heuristic) that can help the local organizations to "navigate in a field in flux" (*idem*). This instrument is useful not to 'get lost' (it brings a clear picture of 'where' the organizations are in the complex 'map of transformation') and to decide where to go (supporting the design of strategic interventions intended to fill the gaps in the grid).

But, as previously noted, it is not only a question of doing more things involving more organizations. It is mainly a question of doing things differently. By actively and jointly using the 'evaluation cycles' in baselines, plans and actions, LGs and CBIs are able to change the arena's boundaries and configurations through alignment and mediation. The MiTF is therefore a process of social ordering, stabilisation and restructuring of the arenas of transformation, helping to maximize their performance (as previously noted).

The 'navigational' metaphor is also used in the context of adaptive governance (Olsson et al., 2006). Here, new system configurations linking organizations and agencies are considered necessary to bring transformation and arise from building knowledge and networking around sorted alternatives. We can then argue that the MiTF is an instrument that can be used to allow adaptive governance to emerge, generating what Olsson et al. refers as a 'shadow network'. These informal networks provide "a platform/arena for collaboration" (*idem*) that is somehow made operational by the MiT's grid. LGs and CBIs use this instrument to represent the existing social capital related to transformation and are challenged to reorganize and expand it, building the stock of change actions and related experiences. The transformation grid stores the collective learning that can be mobilized in turbulent times, increasing the resilience of the overall system by nurturing renewal and facilitating reorganization (Folke et al., 2005). The power of self-organization, as Donella Meadows (1997) would call it.

This process of confrontation between different knowledges shared by collaborating actors to produce solutions is what scholars call 'social learning' (Beers et al., 2010) and it has been considered a critical precondition for tackling sustainability (Sol, Beers, & Wals, 2013). The social learning process, in the context of the MiTF, is expected to expand outside the boundaries of the experiments by way of the community of practice – these communities have proven to be crucial in the processes of scaling and challenging of dominant system configurations (Radywyl & Bigg, 2013).

Reflexive governance

The MITF can be regarded as a meta-collaboration – different organizations work together focusing on transformative collaborations happening in the community. In this sense, it is essentially an exercise of 'reflexive governance' (Feindt & Weiland, 2018). By making sense and exploring how different organizations are jointly putting in place their decisions on sustainability, the MiT is a practical way of operationalizing the reflexivity of steering strategies. In other words, it centres the attention of transformative governance in the governance system already in place to promote transformation, questioning it and adapting it, and hopefully affecting the community and its capacity to steer. In that sense, it should lead to a new institutional arrangement and new design rules.

Cultural change

We adopt the definition and framing of 'cultural change' proposed by Geels & Verhees (2011): "cultural change is a contested process, in which various groups perform on public stages to influence the attitudes and opinions of relevant audiences who provide financial resources, protection or support relevant for innovation journeys". A cultural change has been assumed as the purpose of the MiT project: "we seek to support systemic change, by fostering values, and frames that encourage a cultural shift from separation to collaboration" (MiT, 2018).

The shared principles that the MiTF hopes to bring can be divided into three groups:

- Systemic thinking – the transformation grid brings the possibility of grasping the complex interconnections between actors and their actions in the arena of transformation; the focus moves from the set of individual organizations and their isolated activities, to the dynamics coming from collaborative interventions;
- Inclusive culture – the first evaluation cycle brings the idea that everyone affected by the interventions should participate in their development;
- Head/Heart/hands – these set of principles included in the second evaluation cycle bring in the values of rationality in taking decisions (using the best information available), a culture of caring for people and being productive (generating tangible results).

With this shared understanding, a new vision on transformative collaboration is expected to emerge and inform the way public policies and social innovations are crafted, framing processes and dynamics. Similar sets of action-oriented beliefs and meanings promoted by social movements have been called by scholars as 'collective action frames' (Benford & Snow, 2000). The above list is very much aligned with the pragmatic pedagogy of the Transition Movement (McGregor & Crowther, 2016).

The uncertain and complex times in which we live in (Davoudi et al., 2012) require people and communities to become comfortable with change (Revell & Henderson, 2018). The MiTF can use this 'political opportunity' (Benford & Snow, 2000) to bring a necessary sense of agency and empowerment that "can come through working together to bring about change" (TESS, 2017). Cultural change is not easy to accomplish but it can be highly powerful in triggering large-scale transformations (Köhler et al., 2017, p. 24), particularly when it relates to creating new behavioural patterns (Nyborg et al., 2016). And this is why cultural change is also included in the grid as a critical type of action, especially when related to wide audiences. Cultural change can also be understood as the product of the social learning processes mentioned before.

Global impact

Can the MiTF create a global impact? Three complementary strategies for wide systemic change have been proposed for social innovations: scaling out, scaling up and scaling deep (Moore, Riddell, & Vocisano, 2015). Scaling out refers to replication, with a greater number of communities possibly adopting the framework. Scaling up would imply a change in policies, laws and/or regulations (something that was tried in Italy with the Energy Function). Scaling deep assumes that "durable change has been achieved only when people's hearts and minds, their values and cultural practices, and the quality of relationships they have, are transformed" (*idem*).

The MiTF can be adopted by communities as the central strategy on sustainability. Or its principles and tools can be incorporated into existent municipal initiatives. It might be adopted as a standard on networks of local action, like Transition Initiatives or Global Covenant of Mayors. Transnational networks like Ecolise can help in scaling efforts. As previously argued, the MiTF mainly aims at creating a cultural change, so scaling deep is necessarily the underlying choice, something fostered by a community of practice. The grid's last column makes sure that the importance of external actors, namely networks, is not forgotten.

Should we adapt the MiTF to be used in different levels (regional, national…)? It is a generally accepted notion that smaller sub-systems have faster adaptive cycles, so we can argue that the local scale is the more effective one for applying the MiTF, and that through "higher level infrastructures" it can create change at the global system (Revell & Henderson, 2018). This can be accomplished by institutional arrangements like polycentric governance (Ostrom, 2010a).

Why it is special?

Born out of a collaboration

We can find several frameworks created to foster transformation at local level. Some have their origin in the public sector (e.g. Covenant of Mayors), civil society (e.g. Ecovillages) or the private/philanthropic sector (e.g. 100 Resilient Cities). Most of them, if not all, advocate for collaborations and intersectoral partnerships.

In the case of Municipalities in Transition, the Transition Movement challenges Local Governments to work together with civil society, designing a framework with that purpose in mind. In this sense, the MiTF can be considered a grassroots policy innovation aiming at collaborative governance. Transition Movement acts as a bridging or boundary organization creating space for institutional innovation and the reinforcement of social capital, therefore reducing the costs of collaboration (Brown et al., 2013; Folke et al., 2005).

Even more significant, the Energy Function, integrated in the MiTF, was developed in a partnership between the National Association of Italian Municipalities, the Italian Transition Hub and a University Consortium supported by the National Government (Rossi et al., 2014).

Managing fluxes

As previously mentioned, the MiTF is designed to help navigating in the flux of transformation happening in the community. Therefore, contrasting to other approaches, the MiTF:

1. Does not include a visioning step, setting goals or identifying pathways;
2. Does not rely in the establishment of an action-group or concrete governance model;
3. Rejects siloed approaches.

These properties are discussed below.

No single vision

In a 'traditional' approach to sustainability, creating a shared vision is considered a fundamental step and even the steering factor (Vergragt & Quist, 2011; Wiek & Iwaniec, 2014). It can also be considered illusionary and manipulative (Few et al., 2007). The MiTF embodies the challenge of transcending paradigms, "the highest leverage of all" (Meadows, 1997). It is not about (the impossible task of) 'getting rid' of paradigms, it is about embracing the diversity of worldviews. And it is not a rejection of the importance of visioning, planning or altering governance models (these activities are included in the grid) – the MiTF is an instrument to capture and make sense of all these efforts with a holistic view. This means that it is assumed that individual interventions are so intimately interconnected that can all be interpreted by reference to the whole transformation process. Nurturing a diversity of visions is also a way to increase resilience by promoting redundancy (Folke et al., 2005).

Previously we mentioned the MiT efforts for bringing a cultural change, which can be used as an obvious counterargument to what we have just written. Here we should consider the MiT's principles restricted to the uncontested ways we should work (in cooperation, with best information, with intended results) and not related to a particular worldview. If any, the only paradigm inherent to the MiT approach is systemic thinking.

No pathways

Again, we can point that setting goals and pathways is a necessary action in many contexts, and so included in the transformation grid. But, against other perspectives for sustainability transformations (Leach et al., 2012), the MiTF does not demand for concrete and explicit goals or directions for change. As Voß & Kemp (2006) phrases: "sustainability cannot be translated into a blueprint or a defined end state from which criteria can be derived and unambiguous decisions taken to get there. Instead, it should be understood as a specific kind of problem framing that emphasises the interconnectedness of different problems and scales".

In the MiTF, trajectories of change are not defined, expressing a pluralist approach to social change (Patterson et al., 2017). There is not an end point and not even the formulation of a desirable starting point. Action can start from any of the grid cells (Rossi et al., 2014). In agreement with the AoD approach, a identified pathway is not delivered, only an instrument to interpret and navigate changing relations – this can be considered a distinctive feature comparing to the multi-level perspective (Jørgensen, 2012). In the grid, transformative actions gradually being produced are ordered but not in a temporal or hierarchical way as it occurs in a traditional planning process: this is expected to lead to emerging opportunities.

It should be mentioned however that in the case of experiments, a prescriptive approach is used. Yet, it is not connected to the fundamental attributes of the framework. The aim is not therefore to create a model or a 'good practice' that can be replicated as such, but to provide the tools to govern complexity that can be effectively adapted to the different situations of the local context (Rossi et al., 2014).

No hierarchies

The use of the MiTF, namely the transformation grid and database of tools, are open equally to all the actors. As noted by Rossi et al. (2014), a Mayor, an administrative official or an activist in a NGO, they all can use these instruments to map their current policies and activities and confront them with the overall context of the transformation. They do not need to wait for managerial directions or conform with any kind of leadership. Unlike in the TM approach, for

instance, there is not a group of specific actors formulating long-term directions without much wider involvement, potentially jeopardizing democracy (Hendriks, 2009; see also Jhagroe & Loorbach, 2015).

In this sense, it can be classified as a 'flat' approach, denying any kind of hierarchy (Frank W. Geels, 2011; Jørgensen, 2012). Actors or actions are not classified in levels or assume differentiated 'powers'. The focus in more on their performance than in their specific roles. Nevertheless, we should state, as Jørgensen, the analytical usefulness of leves in undestanding the outcomes of this approach. This is the case, for instance, of the 'reconfiguration pathway' formulated by Geels & Schot (2007) where symbiotic innovations developed in niches are adopted by regimes to solve local problems, leading to subsequent substantial changes in the regime's basic architecture.

No silos

Taking the case of the Sustainable Development Goals, we see that actions are contained in thematic boxes (e.g. health, education, and even partnerships). Even in the case of 100 Resilient Cities, defending a "holistic cross-sectoral city vision" (Arup, 2015), the framework is based in four dimensions (health & wellbeing; economy & society; infrastructure & environment; and leadership & strategy). In the transformation grid, cells are not there for the purpose of individually addressing actions or actors. They are a way to organize information with the purpose of 'spreading' transformation. Categories of actions are merely instrumental and based mainly in common management systems (Rossi et al., 2014) for the sake of usability.

MiT shifts the strategic development from a focus on specific problems (possibly labelled as environmental, social or other) towards a greater accent on how our communities are responding.

A practical tool for change

Usability was a critical design feature of the MiTF, as previously mentioned. It can be easily used without previous knowledge or experience on systemic change or similar topics. And it is flexible enough to adapt to different contexts (even the ones leading with scarcity) and in every day practices. From this perspective it can be contrasted against approaches like social network mapping (and other equally sophisticated quantitative systems modelling). This is not to say that it cannot be useful and effective in supporting transformation efforts.

Let's imagine that in a community a group of people decide to use the MiTF with the purpose of reinforcing climate action. They can start by listing the actions that they are aware of that contribute to this. Twenty actions are identified, including a climate adaptation plan, an energy cooperative, a project on green roofs and a campaign for using public transports. They take a blank paper, design the grid and find the place for each action (relating the actors and actions involved). In order to complement the information, they might decide to do some informal contacts, an online survey, interviews to key stakeholders or a workshop, ending with fifty actions. With a relatively low effort, they have a first clear and 'big picture' of what's happening. Maybe it is not totally accurate and surely not complete, but probably it is an image reflecting the larger reality. With no great efforts, they spot that 'controlled entities' are not really participating, so they might decide on a new action to evolve the public water distribution company (which holds significant resources and where the Municipality has a place in the administration) or to connect it to an existing action that already exhibits great impact (e.g. a local conservation area). They use the evaluation cycles for the latter and reach

the conclusion that relations, namely with people living inside the area, are not being looked after (maybe they heard about complains relating marginalization) and that information coming from the adaptation plan, namely climate projections, were not adequately integrated in the strategy for the local area, which is vulnerable to flooding. In the end a new action emerges based on river margin restoration, with the active participation of citizens and the financial support of the Water Company - they now proudly announce that they deliver services on the full water cycle! This is accounted in the grid as bringing cultural change. This example can be summarized in simple terms: connecting what was not previously connected, finding gaps and opportunities and promoting synergies.

The capacity of the MiTF to be effective in supporting transformation processes is amplified by the use of the database of tools connected to the grid. This is not merely a repository, embedding guidance according to the structure of pattern language (Alexander et al., 1977).

Measuring transformation

In their paper related to the evaluation of sustainability transitions, Turnheim et al. (2015) express that "in addition to the societal challenge, there is also a serious analytical challenge" and that we lack a practical approach that "involve the ability to capture analytically as robustly as possible the current state of transitions processes, through an assessment of the current scale, scope, and momentum of transitions".

Apparently the MiTF can provide this practical tool. As previously stated, it is possible to easily calculate a grid score that can be considered to provide a proxy of the degree of transformative efforts happening in the community. By using the evaluation cycles, it can additionally provide a qualitative evaluation. This measurement can be used to monitor and evaluate specific interventions and transformation as a whole, something that is considered to be a key theme related to societal transformation (Ioan Fazey, Moug, et al., 2018). Eventually this framework can help transformation becoming the new system goal acting as a powerful leverage (Meadows, 1997).

Limitations and open questions

One possible critique to the MiTF would relate to the lack of explanation of how these local embedded experiments can lead to wider and significant change (see 'global impact'). It could be claimed the need to 'overcome' the situatedness, something common to action-oriented approaches, and find (more) convincing explanations (EEA, 2018, p. 115). Additionally, we should discuss how a demanding social tipping-point (Centola, Becker, Brackbill, & Baronchelli, 2018) can be achieved in practice. Will these local activities be a 'leading edge' or just an 'irrelevant fringe' (O'Riordan, 2001)? Can they thrive, or even 'survive' in the complex and turbulent social times we live in? In which conditions? Can we be accused of being too optimistic?

It has also been argued that transformation implies challenging the status quo in a profound way (Patterson et al., 2017) and so the present approach might not look radical enough, lacking a strong normative perspective. In our defence, we could argue that the focus on transformative interventions is inherently contentious or that, for the sake of wide acceptance, we pragmatically need to avoid a 'political' dimension – this is something that could be associated to the Transition Culture (McGregor & Crowther, 2016). In fact, for some in the Transition Movement, the 'Municipalities in Transition' initiative is expected to act as a 'trojan horse', as described by Leach *et al* (2010, p. 100), intended to lead to the uptake of the

Transition principles by incumbent actors through unfolding practice. This approach can bring the risk of co-optation, with “apparent acceptance and silent neutralization”, but simultaneously opens possibilities for transformative action (Pel, 2016). This kind of institutional engagement, concurrently disruptive and conciliatory, might minimise the risks and maximize the opportunities (Henfrey & Penha-Lopes, 2018).

In this analysis we also mentioned that the MiTF does not deliberately include a visioning process, using a plural approach – it intentionally favours a diversity of worldviews to maximize resilience. However, ‘sacrificing’ a visioning component might compromise the transformative goal, excluding the imagination and creativity needed to consciously build a desired alternative future (I Fazey et al., 2018). Not to mention it can make the framework less appealing. Confidently it is a subject that asks for extra reflection.

Another possible critique relates to the consideration and integration of the planetary boundaries (Galaz et al., 2012). Does the MiTF adequately integrates the challenges of environmental limits? We can reason that this concern is included in the evaluation cycle related to the ‘head’ principle, namely using information concerning environmental impacts. Should this be made more explicit? Should we consider only local or also global impacts, since some actions can generate locally desirable outcomes but bring significant environmental and social trade-offs at a global perspective (EEA, 2018, p. 23)? Could we include ecosystems as an actor? Should the social boundaries (Leach, Raworth, & Rockström, 2013) also be stressed (namely social and gender equity), possibly inside the ‘heart’ principle?

We can also question the feasibility of collectively gathering ‘all’ the transformation happening in the community, not being overwhelmed by the objective or lost in considerations and ‘infinite’ discussions around what to include (not to mention, how to evaluate). Do our communities have the necessary resources and skills (transformation concepts, systems thinking…) for this challenge? Will they show the commitment to work together and developing trust that are key conditions in developing good collaborations (Hassink et al., 2016)? Surely it is something to closely observe during piloting. It is also an open question on how to make this gathered information, namely the grid, visible and usable for many concurrent users in the community.

Piloting will hopefully bring clarity about the institutional designs that can amplify (or block) concrete results, transforming these collaborations in effective partnerships that go beyond rhetoric and enhance local deliberation (Forsyth, 2010). Can power struggles affect the use of the MiTF? Can the MiTF lead to a more equitable distribution of power? What are the other contextual factors that can influence (and be influenced), positively or negatively, (by) the use of this instrument? What is the desirable connection between the MiTF and formal governance structures?

We can additionally ask if it is possible to further develop the algorithms to provide more integrated indicators of transformation and prescriptive results that can lead to optimized change. Can the grid be used in a local system of governance supported by artificial intelligence? Can this process of capturing change be used in modelling the societal response to global change, allowing, for instance, the construction of scenarios based in agent-based models (e.g. De Cian et al., 2018; Köhler et al., 2009)?

Finally, we should not forgot that the grid can be useful is guiding change, but that “maps are never the territory, especially when navigating uncharted waters” (Wilding, 2011).

E. Conclusion

The present work is an exploratory research looking for practical knowledge on how to promote synergies between local governments and community-based initiatives in their pursuits of (local) sustainability. A key feature is that it is not looking for a new 'recipe' for promoting local collaborations but instead a framework that can help existent collaborations to foster their transformative impact.

We started by exploring the scientific knowledge on understanding the dynamics of transformation towards sustainability, including the comparison between several approaches on how to govern it, namely transition management, strategic niche management and adaptive governance. We then investigated what local organizations are doing in practice, namely local authorities and civil society organizations. And finally, we tried to assess the current state on collaborations between them.

We argued that collaborations between local governments and community-based initiatives should be considered as a wicked problem since they are hard to define, have several paradoxical features and many times possible solutions bring new challenges.

Using this findings, personal experience and explorative literature review concerning areas like policy (e.g. public administration) or business and management research, we propose a Compass for Transformative Collaboration. This includes the dimensions that we consider as critical for assessing and developing effective partnerships, namely, to be cocreated (using collective intelligence), taking care of relations (by mutual support), delivering goods and services that foster local resilience and proving disruption relating to incumbent regimes.

The design of a new transformative framework started with mapping efforts to collect knowledge from existent collaborations at local level. We used the resources of the Transition Movement which is a wide spread network of local initiatives promoting resilience by fostering collaborations, between individuals but also organizations. We collected and studied 71 cases happening in 16 countries using observation, surveys and interviews. The cases ranged from grassroots eco-neighbourhoods in S. Paulo to a well-structured transformation initiative at city level in Dresden with governmental support. We have found a case in Italy, the Energy Function (Rossi et al., 2014) that met the design requirements so it was incorporated in our framework.

In the core of the 'Municipalities in Transition framework' we have a grid that accommodates the transformative efforts that can be recognized as happening in the community. These actions occupy different cells in the grid corresponding to their categories (e.g. using new technologies or fostering relations) and the actors involved. We can therefore use the grid to get an overall perspective of the governance imprint of these change initiatives. Additionally, evaluation cycles are included to assess the quality of the actions in terms of inclusiveness and how much they are educated, care for participants needs and bring tangible results.

The framework is comparable to a cooperative board game. The grid acts as the board, and the first step is to set out the main transformative initiatives already happening in the community, providing a baseline. The game unfolds by using joint efforts to occupy new "squares", some of which are considered to be leverage points (therefore providing extra "points"). From each house players can get access to "cards" (organized in a database that uses pattern language) presenting a diversity of tools and guidelines on how to use them. The rules of the game also include a governance model.

So, what exactly is the MiT framework? Several possible answers were presented in the paper and can relate to the functions it performs in the transformation systems:

1. Make sense of (and measure) transformation – an instrument for the community to (1) capture the dynamics of the local transformation system, making sense of the change efforts; (2) easily evaluate interventions on a gross but sensible way; (3) keep track of the progresses and changes over time; (4) spot the places where more energy is converging, resources available and gaps where more action is needed;
2. Support systemic change – The principles and the database of tools provide guidance to reshape change efforts and to design new interventions that are aligned with the existent work, reinforcing complementarity, interdependencies and bringing collaborative efforts that are synchronous and optimized to create wide transformation;
3. Leverage institutional and cultural change – 'transition principles' are imbedded in the collective performance of local organizations, therefore changing the rules of the system, increasing the capacity of self-organization and eventually leading to emergent patterns of sustainability.

Additionally, the governance proposal and the facilitation included in the MiT framework are expected to reinforce the social learning process and lead to a new culture of collaboration. This is expected to cross the boundaries of the experiments by way of the community of practice.

We can than argue that MiTF can both be used as a transformation tool (making sense of how transformation processes happen) and a transformative tool (developing strategies for enhancing transformation processes). It is therefore a systemic instrument for governing collaborative transformation at local level toward sustainability.

Connecting theories of change

The MiTF is inspired by an ontology of relationism expressed in the actor-network theory, assuming that "interaction is all that there is" (Law, 1992). Transformation (towards sustainability) is seen as the possible outcome of "local processes of patterning, social orchestration, ordering, and resistance" (named as translation) involving a vast set of elements including individuals, organizations, visions, technologies, practices and the natural elements (e.g. climate). In this sense, the transformation grid can be seen as a material representation of the 'development arena', a "cognitive space that can contain these processes analytically as well as enable change management" (Jorgensen & Sorensen, 1999). In this context 'transformation' relates to the concept of 'adaptive governance', a "range of interactions between actors, networks, organizations, and institutions emerging in pursuit of a desired state for social-ecological systems" (Chaffin et al., 2014). The MiTF is expected to increase the resilience of the 'local transformation system' by proving an instrument to monitor, evaluate and adapt local interventions through collective action. This also relates to the concepts of transformability (Walker, Holling, Carpenter, & Kinzig, 2004) and also the notion of institutional thickness coming from economic geography and innovation studies (Coenen, Benneworth, & Truffer, 2012). The kind of dynamics that MiTF potentiates can be described as a "self-organized process of learning by doing" also named as 'social learning' (Folke et al., 2005).

From collaboration to governance

We saw that collaborations between local governments and citizen-led initiatives can be seen as a wicked problem, with a persistent and systemic nature. Therefore, to convert these problematic collaborations into transformative partnerships we must use systems thinking. The MiTF does not focus in 'fixing' actors and their specific roles or in trying to promote illusionary consensus. Instead, it concentrates in fostering interdependencies and synchronous action with a pluralist perspective. The MiTF works by (1) improving the ability of the change system to self-organize; (2) setting new rules (through evaluation cycles) and goals (a measurable transformation score); (3) spreading a paradigm of collaboration and transcending the (sometimes) oppositional norms and values that puts us in apparent oppositional barricades. These are the leverages (Meadows, 1997) to change the system of local transformative collaborations and bring emerging opportunities.

This partnership approach can be the basic design for sustainability governance (Westman & Broto, 2018) and in general for a system of what political science describes as 'interactive network governance' (EEA, 2018, p. 62) or 'polycentric governance' (Ostrom, 2010a). More important, MiT is an instrument that promotes reflexivity in governance – collaborations are set to take stock and learn with the transformative collaborations already happening.

Next steps

The Municipalities in Transition framework is itself still in development. Next step will be to apply it in pilots, assess results and refine it. We need to address the critical design principles associated with nurturing these partnerships in practice (revising the 'Compass for Collaborative Transformation') and study the range of background conditions and institutional arrangements that can influence them. We need to answer questions like how to articulate the initiative's informal world and the formal world of local authorities. Similarly, we want to identify the evolutionary patterns that might emerge from the experiments (e.g. power dynamics).

Additionally, we want to explore the possibilities to further discourage unsustainable regimes and accelerate what has been called 'glocal governance' (D. A. Loorbach & Lijnis Huffenreuter, 2013), in a integration of 'bottom-up' and 'top-down' systemic change.

Epilogue

Ecopsychology bring us the notion that many people are overwhelmed with the complexity and enormity of crises like climate change, leading to anxiety, despair and apathy. This feeling of powerlessness and 'environmental melancholia' blocks vast resources of creative potential for engaging in change actions (Lertzman, 2015; Macy & Brown, 2014). But even when we find ways to deal with these paralysing concerns, we still must face with the complexity of solutions out here, including all the planning, technology innovations, changing lifestyles or new social configurations. The MiTF is expected to be powerful enough to cope with these high levels of complexity and uncertainty and simultaneously simple and flexible enough to be relatively easy to learn and to use in 'real life'. It should bring us hope and optimism by allowing to 'watch' the build-up of momentum for systemic change (D. Loorbach et al., 2017) and the unfolding patterns of transformation towards sustainability. Additionally, it should motivate us to 'step in' into the process with self-reliance based in the previous knowledge of how we can 'make a difference'. In synthesis, probably the major value of this new framework rests in the possibility of bringing order to the chaotic transformation we see in our world, connecting what was not connected and unleashing the creativity and power that lies in our communities.

Annex

Case ID	Name of the case study	Country	Location	Population (approx.)	Summary
Belgium_01	PAED - Plan d'action énergie durable (Convenance of the Mayor)	Belgium	Ath, Hainaut	28.000	The Town is building an action plan to decrease CO2 emissions and to build sustainable energy systems.
Belgium_02	Halle aux Saveurs - Local Producers Market	Belgium	Soignies, Hainaut	27.000	Monthly local producers' market, with focus on artisanal production, geographical proximity (about 20 km around Soignies) and conviviality.
Belgium_03	La Ruche qui dit Oui (The food assembly)	Belgium	not defined		City connects with farmers for good, fresh & healthy food and farmers meet the citizens for sharing knowledge and understanding.
Belgium_04	Cre@farm + Liège district territorial development scheme	Belgium	Liège	620.000	CATL (bottom-up transition initiative) collaborating with municipalities for access to agricultural land and other resources.
Brazil_01	Ecobairro São Paulo	Brazil	São Paulo	12.000.000	Transition to a local, circular and participatory governance in which community members are encouraged to act responsibly and consciously.
Brazil_02	Bairro Vivo Project	Brazil	Grajaú, Rio de Janeiro	40.000	Neighbourhood project promoting the awakening of individual consciousness and the preservation of the planet and its biodiversity.
Chile_01	Balloon Latam	Chile	10 municipalities in 3 regions	30.000	Development of local economies in a dynamic of shared creation between change agents, social entrepreneurs, municipalities, universities and other institutions.
Chile_02	Challenge in search of an eco-neighbourhood	Chile	Bancaria and Santa Elena, Macul, Santiago	6.000	Eco-neighbourhood: in every house a garden, every neighbour a recycler.
Chile_03	Transition Rukapillan	Chile	Kurarrewe, Panguipulli, VIllarrica and Pucón (4 municipalities)	120.000	Linking and strengthening of sustainable initiatives in an area that is a world-renowned touristic destination surrounded by a rich indigenous cultural heritage.
Chile_04	Santiago en Transición	Chile	Santiago de Chile (multiple Municipalities)	7.000.000	Unifying the collective genius to remember that we are paradise on earth.
Colombia_01	Escuelas de Vida (Schools of Life)	Colombia	Manizales	400.000	Union of different organizations, foundations, collectives and transition initiatives from Manizales that join forces around a common purpose.

Case ID	Name of the case study	Country	Location	Population (approx.)	Summary
Colombia_02	Community Living Classes	Colombia	San Miguel, San Francisco, Cundinamarca	1.500	The living classroom is an intervention to strengthen the community tissues in favour of sustainability and good living.
Colombia_03	Nashira a song of love project for peace	Colombia	Palmira, Bolo San Isidro.	400.000	Ecovillage - Nashira a sustainable model of peace led by women for a better quality of life.
Colombia_04	Promotion of Healthy lifestyle challenges of formation for the reception of childhood	Colombia	Arauca, Palestina, Caldas.	9.500	Generate new teaching and learning possibilities that make visible the transformation of healthy lifestyles as a meaning of education.
Colombia_05	7RíosFest of Asociación 7Ríos	Colombia	Cali	2.400.000	Making river protection and river basin regeneration of the 7 rivers in Cali fashionable.
Colombia_06	Uelkom	Colombia	Manizales Caldas	400.000	Social innovation project towards the transformation of the reality in vulnerable contexts, based on ethnography and models of communication.
Colombia_07	Madre Kumbra - Ecovillage	Colombia	Manizales, Caldas	400.000	Madre Kumbra: territory for meeting, understanding and sharing with yourself, the other and Nature.
Colombia_08	Conservation and sustainable production for the collective "good living"	Colombia	San Carlos and San Rafael, Antioquia.	30.000	Creating sustainable development in socially and culturally diverse rural community, around biodiversity conservation. We seek to unite.
Denmark_01	Det Fælles Bedste (The common best)	Denmark	Vejle	52.000	A Convergence on solutions for a green sustainable organic transition.
Denmark_02	The Impact Farm	Denmark	Nørrebro	80.000	Designing an ambitious urban greenhouse as a Hub for transition.
Denmark_03	Transition Town Silkeborg - The Local Bicycle Infrastructure Plan	Denmark	Silkeborg	91.000	Collaboration between organizations and municipality to deliver a local bicycle plan.
France_01	La filière de la graine à l'assiette (The process of the seed to the plate)	France	Ungersheim	2.400	Short circuit for production of organic food, in a wide context of transition.
France_02	Short supply chains House	France	Sucy-en-Brie, Val-de-Marne, Ile-de-France, France	26.000	A market hall for local food just born in a collaboration between municipality and associations.
France_03	Vélo-école	France	Ménilmontant, 20ème arrondissement, Paris	200.000	Teaching adults to cycle - can be a source of autonomy and freedom for adults who never learned when they were younger.

Case ID	Name of the case study	Country	Location	Population (approx.)	Summary
Germany_01	Zukunftsstadt Dresden 2030+ (future city Dresden 2030+)	Germany	Dresden, Saxony	550.000	Involving the people of Dresden into a strategic transition-process from visioning via planning to action and transformation, with scientific monitoring.
Germany_02	Stadtgärtle	Germany	Esslingen	90.000	Promoting a public green space to grow vegetables with the neighbourhood.
Hungary_01	Transition Wekerle	Hungary	Wekerle, Kispest, Budapest	11.000	A transitioner trainer was elected as councillor and promotes sustainability issues.
Italy_01	Comune di Santorso	Italy	Santorso (Vicenza)	6.000	Facilitating the access of the public to technologies like renewables. It also promotes the integration of refugees, which is a distinctive feature.
Italy_02	Energy Function	Italy	Emilia Romagna Region	4.400.000	Development of a theoretical and operative framework to address "sustainability and resilience" at local government level in a systemic way.
Italy_03	Livorno	Italy	Livorno (City)	160.000	Emerging new relationship between local government and citizens searching for new methodologies and tools to develop and thrive.
Mexico_01	La Coope - Comunidad de Intercambio Ecológico y Solidario	Mexico	Querétaro	958.000	A recent cooperative-community dedicated to the local food system.
Mexico_02	Asociacion Projungapeo: JET (Jungapeo en Transición)	Mexico	Jungapeo, Michoacán	20.000	An ongoing community project seeking an integral local development.
Mexico_03	Bacalar en transición	Mexico	Bacalar, Quintana Roo	15.000	Working together to protect the lagoon of Bacalar and the communities that live here.
Mexico_04	El Itacate	Mexico	Tepoztlán, Morelos	37.000	Transition Reconomy project based in Tepoztlan settled as a think tank lab for helping food gardening, permaculture and educational projects.
Mexico_05	Architecture for sustainability	Mexico	Guadalajara Jalisco	8.061.728	Social enterprise oriented to sustainable architecture and dissemination of tools for resilience.
Netherlands_01	Achterhoekse Groene Energie Maatschappij (Achterhoek Green Energy Cooperative - AGEM)	The Netherlands	Achterhoek (region)	390.000	Regional energy cooperative owned and managed by municipalities.
Netherlands_02	Buurtfonds Dichters-Rivierenwijk (Neighbourhood Fund)	The Netherlands	Dichters and Rivieren, Utrecht	15.000	Neighbourhood initiative fund aimed at distributing small grants.

Case ID	Name of the case study	Country	Location	Population (approx.)	Summary
Netherlands_03	The Aardehuis project	The Netherlands	Olst	18.000	Sustainable living project with 23 houses and a community building; municipality, transition initiatives and other partners are involved.
Netherlands_04	Blue City	The Netherlands	Rotterdam	600.000	Breeding ground in Rotterdam for innovative companies that try to connect their loops together: one company's output is another company's input.
Portugal_01	Parceria Local de Telheiras (Local partnership)	Portugal	Telheiras, Lumiar, Lisbon	17.500	Neighbourhood partnership that resulted from a transition initiative and a local agenda 21 promoted by the municipality.
Portugal_02	Coimbra em Transição	Portugal	Coimbra	143.500	Designing a local hub for transition.
Spain_01	Zero Waste Village	Spain	Orendain, Gipuzkoa	210	Project based on waste management/circular economy.
Spain_02	La Garrotxa Territori Resilient	Spain	Garrotxa (21 Municipalities)	56.000	Rural region that is home to 21 municipalities and over 500 local community organisations that work together towards a sustainable and well-networked society.
Spain_03	Mares Madrid	Spain	Province of Madrid	6.500.000	Urban transformation by promoting social economy and collaboration (energy, recycling, food, mobility and social care economy).
Spain_04	Almócita, semilla en transición	Spain	Almócita, Almería, Andalucía	140	Municipality actively participating in the transition movement, in aspects such as energetic self-sufficiency, composting and car-free.
Spain_05	Iniciativa Rubí Brilla	Spain	Rubí, Barcelona, Catalunya	76.000	Local strategy to change the energetic model, promoting energy saving and energy efficiency in all the sectors of the city.
Spain_06	Descarboniza! Que non é pouco	Spain	Santiago de Compostela, Galicia	100.000	Organise and give support to groups of people who are willing to "decarbonise" their lifestyles.
Spain_07	La Colaboradora	Spain	Zaragoza	660.000	First Coworking P2P that promotes a collaborative economy in the city through a time bank of voluntary exchange of services and knowledge.
Spain_08	Citizen initiative to improve people´s lives in the municipality	Spain	Quéntar, Granada	980	Citizen education for improving community living.
Spain_09	Comunidades en transición	Spain	Zarzalejo, Madrid	200	Transition Initiatives, CSA, collective space, transportation, waste management, participatory budgets.

Case ID	Name of the case study	Country	Location	Population (approx.)	Summary
Spain_10	Red Huertos Urbanos Comunitarios	Spain	Madrid	3.000.000	Many small gardens will grow small people who will change the cities.
Spain_11	Turuta Social currency	Spain	Vilanova i la Geltrú	66.500	Promoting collective citizenship projects, including social currency.
Spain_12	Sierra Oeste Agroecologica	Spain	Sierra Oeste de Madrid (19 Municipalities)	40.000	Regional partnership for agroecological development.
Spain_13	Montequinto (Dos Hermanas)	Spain	Seville	36.000	Permaculture project for local resilience.
Spain_14	Jaén en Transición	Spain	Jaén	114.000	Transition Initiative. The project opts for local initiatives that are moving towards economic degrowth and good living.
Spain_15	Murcia IT - Innovación y Tradición	Spain	Murcia	441.000	Participatory Integrated Sustainable Urban Development strategy.
Spain_16	Implementation of the local digital currency in the context of intelligent public spending	Spain	Santa Coloma de Gramenet, Barcelona, Cataluña	120.000	Local currency to promote social and democratic economy.
Spain_17	Móstoles en Transición	Spain	Móstoles	210.000	Transition initiative with the participation of the municipality; implementation of a new city model that faces the ecosocial challenges.
Spain_18	Vilawatt	Spain	Viladecans, Barcelona	65.000	Reduction of energy consumption with innovative tools (local currency).
Sweden_01	Växjö	Sweden	City	65.000	More than 30 years of work on sustainability
UK_01	Air quality: an engaging narrative	United Kingdom	Southampton	250.000	Concerns about poor local air quality and health have helped create closer collaboration between local officials, councillors and groups of residents.
UK_02	Caring Town	United Kingdom	Market Town of Totnes (and surrounding district), South Hams, Devon	28.000	Local network of public, voluntary and private organisation coming together to pool resources, skills and ideas.
UK_03	Pollinator Preservation	United Kingdom	Monmouthshire	92.000	Preserving bees in a transition context.

Case ID	Name of the case study	Country	Location	Population (approx.)	Summary
UK_04	Town Orchards	United Kingdom	Chepstow	10.000	The planting of orchards on Town Council land giving the community the opportunity to pick sustainably grown local fruit.
UK_05	Walking Bus	United Kingdom	Chepstow	10.000	The creation of a walking Bus to encourage school children to walk to school reducing emissions and creating a healthier lifestyle.
US_01	Climate Protectors	United States of America	Sonoma County, California	500.000	The “climate protectors” is a well-structured collaboration in terms of promoting climate action, both from public and governments, with 7 years of experience.
US_02	Sanctuary School	United States of America	Milwaukee	600.000	Promoting healing arts with public, special “underserved communities” and “minorities”. Creativity seems to play a great role.
US_03	Transition Centre Emerging Sustainability Culture	United States of America	Centre County, Pennsylvania	160.000	The project´s focus is on promoting a shared vision, planning and networking. They give great importance to economy.
US_04	Compost pickup in Media PA	United States of America	Media, Pennsylvania	6.000	Recycling food waste in a transition context and collaboration with municipality.
US_05	Transition Streets pilot project - Des Moines Climate Action Plan	United States of America	Des Moines, Iowa	235.000	Climate Action Plan with a transition context.
US_06	Building Community Resilience through Grassroots and Government Collaborations	United States of America	Sonoma, California	500.000	Decade of successful collaboration between grassroots and local government that catalyse wide-scale community action.

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Acknowledgments

The author of this paper wishes to thank all the collaboration of the core team of the MiT project, Ana Huertas, Cristiano Bottone, Josué Dussolier, Juan del Río and Tommaso Brazzini, all experienced transitioners and skilled practitioners. The support from Transition Network, particularly Claire Milne, Filipa Pimentel, Nicola Hillary and Sarah McAdam, was equally valuable. In the paper I use the personal pronoun 'we' because, despite being the only accountable for the scientific research, the MiT is a collective effort and learning process. To be concise I will not mention the dozens of people involved, namely in the pilots, but surely all the possible merits of this work should be attributed to them, the ones that dared to fully welcome this experiment in their lives and communities. Many other participated, namely in data collection, so this research is equally theirs. I also wish to thank my supervisors, Gil Penha-Lopes from the University of Lisbon, Portugal (Climate Change research group) and Julia Wittmayer from Erasmus University Rotterdam, The Netherlands (The Dutch Research Institute For Transitions), for their indispensable support and wisdom. All my research colleagues, professors and support team in CCIAM and the PhD Program in Climate Change and Sustainable Development Policies also made this a much more enjoyable and inspiring path. For my dearest family, a big thanks in the form of an apology for everything they had to put up with. Last but not least, I should also mention the funders that made this research possible, namely KR Foundation (supporting MiT) and the Fundação para a Ciência e a Tecnologia, the Portuguese public agency that supports science, technology and innovation (scholarship PD/BD/128170/2016).