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Abstract

The aim of this paper is to study how sustainability transitions analytical framework can help to make other concepts of sustainable socio-economic development more specific and operational. Specifically, we investigate the linkages between sustainability transitions and degrowth. Both approaches to transitions – degrowth and sustainability transitions – are closely related. Ideologically, degrowth represents one of the most far-reaching forms of sustainability transitions, yet it would benefit from a more stringent conceptualization using the analytical framework of sustainability transitions. Based on a literature review of both degrowth and sustainability transitions, we distinguish several aspects which provide a common ground for both approaches. We apply some conceptual notions from sustainability transitions theory to describe the idea of a degrowth transition. Then, we analyse case studies of degrowth practices (mainly in an urban context), which demonstrate that they may be understood and managed as transition experiments.

Keywords

Niche, regime, landscape, transition experiment, degrowth practices, transition management.

1. Introduction

Concerns about adverse environmental impacts of economic development and even about the limits to further economic growth have been an important part of academic debates since the second half of the 20th century, resulting in the emergence of concepts such as sustainable development or steady-state economy (Daly, 1977; Georgescu-Roegen, 1971; Meadows et al., 1972). Over time, transition to sustainable development has become a global goal for the UN and other international organizations (United Nations, 2015, 1992; World Commission on Environment and Development, 1987).

However, sustainable development cannot be achieved solely by setting long-term targets, without developing theoretical and practical knowledge about how to achieve them. The sustainability transitions research area developed in response to the recognition of the above and as a result of multiple (academic and political) failures to deal with transformative change towards sustainability. With its own specific vocabulary and analytical frameworks, sustainability transitions research area is more formalized in comparison with other approaches to socio-economic transformation towards sustainability. What also makes sustainability transitions approach different and broader than other frameworks of socio-economic transformation is that it "captures the co-dynamics of technologies, institutions, social and economic sub-systems and conditions" (van den Bergh et al., 2011, p. 8). Finally, sustainability transitions are at the same time a research area and the subject of that research area. According to Markard et al. (2012, p. 956), sustainability transitions are long-term, multi-dimensional, and fundamental transformation processes through which the established socio-technical systems shift to more sustainable modes of production and consumption.

The push for substantial transformation towards sustainable society closely links to the concept of degrowth which calls for a radically different organization of the modern society and economy. From an activist slogan, degrowth evolved into "an interpretative frame for social movement" (Demaria et al., 2013, p. 194), and a field of academic research. Similar to sustainability transitions, degrowth is both a research area and the process it studies. According to the Degrowth Declaration, degrowth is defined as "a voluntary transition towards a just, participatory, and ecologically sustainable society" (Research & Degrowth, 2010, p. 524). The main idea of degrowth movement is to fairly downsize the global and national economies and thus reduce

ecological footprint to a sustainable level (Research & Degrowth *ibid*). Such downsizing must be voluntary and democratic, with the emphasis on social and environmental justice (D'Alisa et al., 2015a; Demaria et al., 2013).

Although degrowth is a bold proposal and it is sometimes presented as an ultimate objective of circular economy (Schulz et al., 2019), it is not a complete and codified paradigm and does not aspire to become one, remaining a loose combination of ideas and postulates, "a confluence point where streams of critical ideas and political action converge" (Demaria et al., 2013, p. 193). Indeed, very few attempts have been made so far to operationalize degrowth, for example in business, which is a driving force of the modern economy (Khmara and Kronenberg, 2018).

The aim of this paper is to study how the analytical framework of sustainability transitions can help to make other concepts of sustainable socio-economic development more specific and operational. In particular, we investigate the linkages between sustainability transitions and degrowth (in the sense of being both the processes and academic fields) to formulate a common ground for both of them, i.e. to indicate the similarities in approaches to various ideological, conceptual and practical issues, despite using different "language". As degrowth still remains a loose collection of ideas rather than a well-theorized and formalized concept, we suggest that it would benefit from formalization within the framework of sustainability transitions.

Based on the review of literature on both degrowth and sustainability transitions, we distinguish several aspects which provide a common ground for both approaches. To support our assumption, we apply some conceptual notions from the sustainability transitions field of research (such as multi-level perspective, multi-phase perspective and co-evolution) to describe the degrowth transition. Then, we analyse case studies of degrowth practices (mainly in an urban context) which demonstrate that degrowth practices may be understood and managed as transition experiments.

We find out that both approaches – degrowth and sustainability transitions – are closely related. Ideologically, degrowth represents one of the most far-reaching forms of sustainability transitions, yet it would benefit from a more stringent conceptualization using the analytical framework of sustainability transitions. Meanwhile, sustainability transitions research can also benefit from degrowth inspiration, especially in terms of broadening the scope of its interest in social innovations and enhancing participation of various actors in transition governance.

The article is structured as follows. In Section 2 we introduce sustainability transitions and degrowth and briefly analyse previous attempts to link them. Then we elaborate on a common ground of both field of study by providing similar approaches, ideas and postulates and finally describe degrowth with the terminology and analytical frameworks of sustainability transitions. In Section 3 we introduce transition experiments, their characteristics and mechanism of their contributing to transitions, simultaneously linking them to the degrowth initiatives. In Boxes 1 and 2 we analyse two example of degrowth initiatives with the framework of transition experiments. The paper finishes with discussion and conclusions in Section 4.

2. Linking degrowth to sustainability transitions

2.1. What are sustainability transitions and degrowth?

Although the idea of sustainable development is not new, there were few attempts to theorize the transformative process that it involves. The emergence of sustainability transitions field of research is one of such attempts. An interdisciplinary academic community was formally inaugurated at the 1st European Conference on Sustainability Transitions in Amsterdam in 2009, though research on sustainability transitions reaches the early 2000s (Elzen et al., 2004) and links to studies on

evolutionary economics (van den Bergh and Gowdy, 2000), complex adaptive systems theory (Loorbach, 2007; Rotmans et al., 2001), innovation and technology studies (Rammert, 1997) etc.

Sustainability transitions research area studies the transformation of socio-technical systems consisting of actors (individuals, firms, organizations, government structures), institutions (societal and technical norms, regulations, standards), material artifacts and knowledge.

The field of sustainability transitions research may be divided into two sub-fields: Transition Dynamics and Transition Management. Transition Dynamics develops fundamental knowledge about transition processes, and Transition Management develops both fundamental and practical knowledge for steering these processes (Frantzeskaki, 2011; Van den Bosch, 2010). Sustainability transitions research area has developed conceptual notions and analytical frameworks to analyse transformation towards sustainability, such as co-evolution, multi-level perspective, multi-phase perspective and transition experiments.

Its own specific vocabulary and a set of analytical frameworks distinguishes sustainability transitions as more formalized in comparison with other approaches to socio-economic transformation towards sustainability, one of which is degrowth. Though for the first time the term appeared in the 1970s as a French word “décroissance”, it gained popularity only at the beginning of the 2000s as an activist slogan calling for voluntary shrinking of production and consumption (Demaria et al., 2013). The term reached academic journals mostly after the first degrowth conference in Paris in 2008 which could be associated with the establishment of degrowth as a new field of academic research which links to studies on social movements, ecological economics, bioeconomics etc.

Degrowth is rich in its meanings, identifying a research area and a social movement, as well as a process. In the socio-economic change sense, we mostly refer to the definition of degrowth proposed in the Degrowth Declaration from the abovementioned conference, which classified degrowth as a transition process: “We define degrowth as a voluntary transition towards a just, participatory, and ecologically sustainable society. The objectives of degrowth are to meet basic human needs and ensure a high quality of life, while reducing the ecological impact of the global economy to a sustainable level, equitably distributed between nations… Once right-sizing has been achieved through the process of degrowth, the aim should be to maintain a “steady state economy” with a relatively stable, mildly fluctuating level of consumption” (Research & Degrowth, 2010, p. 524). Other authors, such as Kerschner (2010), also promoted the understanding of degrowth as a transition process to a steady-state economy.

However, the concept of degrowth has received some critique for being an ambiguous and rather confusing (van den Bergh, 2011) and logically incomplete in its current form (Tokic, 2012). A blog series on strategy for degrowth has been initiated in reaction to the movement’s “strategic indeterminence” (Barlow, 2019) meaning its “all-encompassing nature” and desire to act as an umbrella for a variety of concepts, theories etc. (Herbert et al., 2018). Hence developing an understanding of a systemic transformation for degrowth is of high importance.

2.2. Previous attempts to link degrowth and sustainability transitions

Some implicit attempts have already been made to link degrowth and sustainability transitions. For example, Gibbs and O’Neill (2017) analysed different approaches to green economy, placing low-carbon but still growth- and consumption-based economic agendas on the one end, and degrowth on the other end. They used sustainability transitions as a framework to conceptualize potential shifts

in economic policies towards a greener economy. Based on Bina (2013) and Ferguson (2015), Gibbs and O'Neill (2017) divided discourses on green economy into three groups; those which are conventional pro-growth oriented/almost business as usual; those based on selective growth and greening the economy; and finally those based on limits to growth and socio-economic transformation. While the beginning of the spectrum is frequently articulated in policy, it only suggests incremental change and is based on a *fit and conform* approach. The end of the spectrum is most rarely articulated in policy, and proposes transformative change and represents a *stretch and transform* approach. The authors included steady-state economy, prosperity without growth and degrowth in the last group, along with social well-being, alternative food networks, and eco-housing developments, though prosperity without growth (D'Alisa et al., 2015a) and alternative food networks (Anguelovski, 2015) typically fit under the umbrella of degrowth discourse.

Gibbs and O'Neill (2017) brought about two examples from the opposite parts of the spectrum – the Green Tech Valley in the Austrian province of Styria and various degrowth-related initiatives. They used sustainability transitions analytical framework to look at both case studies. In this way, sustainability transitions served as a "useful perspective" to explore and interpret the issues of disaggregation and contestation of the green economy discourse which can be applied to diverse kinds of initiatives – those based on clean-tech ecological modernization (Styria), as well as the alternative ones (degrowth initiatives).

Haberl et al. (2011) also combined the notions of transitions, regimes and degrowth, though not explicitly using the sustainability transitions analytical framework. They mentioned two major transitions that have occurred in the social metabolism of human societies – the transition from a hunter gatherer regime to an agrarian regime, and the transition from an agrarian regime to an industrial one. The authors claimed that the new development model is needed, a "Third Transition", and suggested that degrowth would fit as such a notion. Following this, O'Neill (2012, p. 222) proposed that "degrowth may be seen as an attempt to envision this third transition, and a steady state economy an attempt to operationalise the new regime."

However, both authors define regime as socio-metabolic, not socio-technical (as in the traditional sustainability transitions discourse). Moreover, in our understanding steady-state economy should become the new regime itself, not just a way to operationalize it (see subsection 2.4).

Similarly, Gibbs and O'Neill (2017) applied the sustainability transitions framework to look at degrowth in a rather general way, which may be explained by their specific research objective, while our perspective is different. We strive to find more links between the two approaches from the theoretical and conceptual points of view and apply the vocabulary of sustainability transitions to degrowth in more detail, for making degrowth more concrete and clear for potential decision makers and, thus, more operationalizable. Distinguishing common ideas of both research areas is the first step in this direction.

In one of the newest works bridging degrowth and sustainability transitions an attempt was to "reconceptualize degrowth as a radical niche innovation to the capitalist-growth regime" (Vandeventer et al., 2019, p. 272). Here, we provide broader understanding of degrowth, explore the links between both fields in a deeper way and propose a different conceptualization of degrowth in the context of sustainability transitions.

2.3. Common grounds of degrowth and sustainability transition

Based on a review of key publications from degrowth and sustainability transitions fields of research, we distinguished several aspects which provide a common ground for both degrowth and sustainability transitions, and illustrated them with specific approaches to particular issues from both research areas (Table 1).

Although using different language and having different levels of formalization, they ultimately converge. What distinguishes them the most is the role of technology. Sustainability transitions research gives a prominent role to technology as the tool fulfilling societal functions, and treats it in a more "instrumental" manner (new technological artefacts are part of system innovations ensuring the transition to sustainability (Geels et al., 2004; Rip and Kemp, 1998). Meanwhile, a huge ideological debate takes place in degrowth research on the role of technologies in society and which technologies are acceptable in the context of planetary limits (Kerschner et al., 2018).

Table 1. Common grounds of degrowth and sustainability transitions

Aspect	Degrowth	Sustainability Transitions
1. Creating and advocating for an alternative value system	• Emphasizing doing *different*, not only *less*, not only reducing production and consumption but also changing production and consumption patterns (Kallis et al., 2015); • Expressing the need for the change in the structure of values and the change in value-articulating institutions (Demaria et al., 2013)	• Understanding sustainability transitions as a quest for new value systems which are more in tune with sustainable development (Geels, 2010; Grin et al., 2010a); • Assuming not only change of the system but also change of users' criteria of judging products, services and systems (Kemp and van Lente, 2011);
2. Placing unsustainable production and lifestyle patterns as reasons for modern economic crisis	• Pursuing of growth and limits to growth as the reason of the current economic crisis (Jackson, 2009; Kallis et al., 2015);	• Current economic crisis as a symptom of a deeper-lying systems crisis rooted in the misbalance between unsustainable consumption and production patterns (Grin et al., 2010a; Loorbach and Lijnis Huffenreuter, 2013);
3. Looking at a crisis as an opportunity to change	• Seeing current economic crisis as an opportunity "to invest in change" (Jackson, 2009, pp. 15, 172) (an opportunity to address financial and ecological sustainability simultaneously (Jackson, 2009, p. 18)); • Understanding the goals of the degrowth movement as not only surviving the resource depletion with the least social cost, but as using this crisis "to stimulate the creation of a more equitable and sustainable world that questions the current modes of socio-economic organization and a civilization based on the careless over-exploitation of non-renewable resources" (Kerschner, 2015, p. 132);	• Claiming that in systems terms, crisis (including tensions in regimes and landscape pressures) is not negative and provides an opportunity to transform the system (Grin, 2010; Loorbach and Lijnis Huffenreuter, 2013; Swilling, 2013);
4. Stressing the importance of voluntary democratic transitions regardless of the perceived	• Emphasizing that process of reducing production must be voluntary and fair and distinguishing it from an involuntary and harmful process of economic recession (acknowledging that the latter might happen if the economy	• Transition initiatives advocating for attention "to issues in the absence of a perceived crisis" (Bettini et al., 2017); • Emphasizing that transitions are not the processes unfolding as a result or in the aftermath of a crisis (Grin et al., 2017; Kemp and Rotmans, 2004);

inevitability of crisis	continues to grow) (Research & Degrowth, 2010; Schneider et al., 2010);	
5. Alternative social, economic and technological practices as chances to transform the system	• Grassroots nowtopias as non-capitalist practices and institutions in reaction to disability of conventional institutions to secure basic human needs; nowtopian activities "exiting the economy" (D'Alisa et al., 2015b, p. 182): localized currencies (Dittmer, 2013; Hornborg, 2017), voluntary simplicity (Alexander, 2013), diverse economies (Gibson-Graham, 2008), solidarity economies (Bauhardt, 2014), Slow Cities (Mayer and Knox, 2006);	• Niche experiments providing wider regime change (Grin et al., 2010b); • Transition experiments as small-scale initiatives with a high potential to contribute to transitions; innovation projects with a societal challenge as a starting point for learning aimed at contributing to a transition (Van den Bosch and Rotmans, 2008); • Shifts towards urban farming, renewable decentralised energy systems, and social economies as examples of urban sustainability transitions (Frantzeskaki et al., 2017);
6. Need for institutional change to achieve transition	• Promoting new forms of living and producing: eco-communities, cooperatives; new government institutions, such as work-sharing or the basic and ceiling income (Kallis et al., 2015); • Change of human values and value-articulating institutions in the direction out opposite from understanding a human being as simply an economic agent (Demaria et al., 2013);	• Understanding transitions as far-reaching changes in various dimensions: technological, material, organizational, institutional, political, economic, and socio-cultural (Markard et al., 2012); • Need for simultaneous re-organization of business models, laws, technologies, user practices and cultural expectations which can be conceptualized as institutional change (Fuenfschilling, 2017);
7. Role of technology	• No single approach (Kerschner et al., 2018); • Sceptics (Ellul, 2018; Grunwald, 2018; Pueyo, 2018) and enthusiasts (Bradley, 2018; Hankammer and Kleer, 2018; Haucke, 2018);	• Applying the notion of *socio-technical systems* consisting of technology, regulations, user practices and markets, cultural meanings, infrastructure, maintenance networks and supply networks; technologies fulfil societal functions, but it depends on other elements of the system (Geels et al., 2004); • Prominent role of technologies in actors' in transition processes strategies; technology as site to organize change (Geels and Schot, 2010);
8. Role of civil society; importance of bottom-up or	• Degrowth's roots in activism; • Stressing the importance of bottom-up, participatory and democratic ways of achieving the goals of movement (Kallis et al.,	• Importance of bottom-up or grassroots approach to sustainability transitions in an urban context (Miller and Levenda, 2017; Seyfang and Haxeltine, 2012)

grassroots movements	2015) (though top-down approach prevails in literature (Cosme et al. 2017));	
9. The role of localism	• Call for relocalizing the economy (Kallis et al., 2015; Rees, 2015); • Most degrowth initiatives and practices are happening at the local level so far;	• Niches as local-scale phenomena, where "revolutionary change" occurs (Smith et al., 2010); protected spaces for social and technical innovations which can change the existing regime (Elzen et al., 2004; Grin, 2010; Smith and Raven, 2012);
10. Politicization of science	• Call for the politicization of science (Kallis et al., 2015).	• Call for the politicization of study and practice of sustainability (Miller and Levenda, 2017).

Further to the conceptual similarities between degrowth and sustainability transitions as approaches to socio-economic development presented in Table 1, it is important to showcase the linkages between the processes of degrowth and sustainability transitions. The key characteristics of transition processes, as they are understood by transitions scholars, are the following (Geels and Schot, 2010):

- Transitions are co-evolutionary processes that require changes in both development and use of technical innovations.

- Transitions are multi-actor processes that involve various social groups (business communities, scientists, different consumer or user groups, policy makers, social movements etc.).

- Transitions are understood as radical shifts from one system configuration to another. The term "radical" refers to the scope of change, not to speed.

- Transitions are long-term transformations, lasting few decades (40–50 years).

Degrowth process has much in common with the abovementioned characteristics of sustainability transitions, yet this is not always explicitly articulated. Although its proponents do not use the term "technical innovation" and envision degrowth transition rather by changing production and consumption patterns (emphasizing decreasing the level of both), changes in these patterns need to co-evolve as well.

The fact that degrowth idea and field of research developed from the social movement suggests that it is a multi-actor process. So far, scientists, various consumer, user and activist groups are involved into the discourse the most. There are attempts to move the degrowth debate from academic and activist area only to the political arena (as exemplified by the open letter to the European Parliament "Europe, It's Time To End the Growth Dependency" published in major European newspapers in association with the Post-Growth Conference in 2018. There were also attempts to find out what the role of the business is in the degrowth transition (Haucke, 2018; Johanisova et al., 2013; Khmara and Kronenberg, 2018).

Degrowth proponents often call for a radical transition to a more sustainable system. The scope of change is even more radical than in the case of other concepts of transitions to sustainability. Degrowth aspires not only to change the socio-technical systems (use cleaner and simpler production technologies), but to change the paradigm of modern global economic policy, i.e. to reject economic growth as the main policy goal of most countries, especially the developed ones.

Unlike in the case of sustainability transitions, the time frames of the changes are not explicitly articulated in the degrowth debate, yet emphasize the urgency of the changes needed to avoid social and environmental disaster. Hence, this implicitly indicates that transition must be immediate, i.e. radical in terms of speed as well.

2.4. Degrowth described with the use of sustainability transitions analytical frameworks

Similarities between degrowth and sustainability transitions allow us to apply the terminology of sustainability transitions research area for describing degrowth. For this purpose we will use the conceptual notions developed in the subfield of Transition Dynamics, namely multi-level perspective, multi-phase perspective and co-evolution, though some of them are overarching for the sustainability transitions studies in general.

One of the frameworks used most often to analyse sustainability transitions is multi-level perspective (MLP) (Geels, 2010, 2004; Geels and Schot, 2010; Markard and Truffer, 2008; Rip and Kemp, 1998). According to this framework, transitions are non-linear processes which interfere at three functional levels (degrees of structuration):

- niches – loci for radical innovation (Geels, 2004); societal subsystem which can be understood as a (local) constellation of culture (the way of thinking), practices (the way of doing) and structure (the way of organizing and functioning) (Van den Bosch and Rotmans, 2008);
- regimes – conventions, rules and norms that guide the uses of particular technologies and practices of different societal groups (Geels, 2004); the locus of established practices and associated rules that stabilize existing systems (Geels, 2011); the dominant way in which societal needs are fulfilled; dominant structure, culture and practices with the incumbent power and vested interests in a societal system (Van den Bosch and Rotmans, 2008);
- landscape – long-term, exogenous trends (Grin et al., 2010a); range of exogenous developments which influence niches and regimes (Geels et al., 2004); an external context for actors in niches and regimes which is difficult to change (Geels, 2004).

Regimes are central in this hierarchy, as transitions are defined as shifts from one regime to another, which results from the interplay of developments at all three levels (Geels, 2011). Experiments in niches are crucial for regime change, as niches are defined as protected spaces that "allow the experimentation with the co-evolution of technology, user practices, and regulatory structures" (Schot and Geels, 2008, p. 537). Such experiments, if scaled up, may provide broader incremental societal change (see Section 3). At the same time, landscape developments, though hard to change, provide external pressure for regimes (e.g. challenges of globalization, urbanization, environmental degradation etc.).

MLP may be a fruitful framework to analyse the degrowth transition. In the degrowth context, different kinds of degrowth practices or "nowtopias" (such as co-housing projects, eco-villages, agro-ecology initiatives, urban farming, consumer cooperatives, solidarity economy, community currencies, time-banks, decentralized renewable energy communities etc.), which exist outside of

formal institutions, may be considered as grassroots niche experiments.[1] Usually proponents and practitioners of such initiatives are activists as well. Being associated with a particular initiative or supporting certain lifestyles, activists unite into social movements which exert bottom-up pressure on existing unsustainable regimes. The main regime which must be changed, from the degrowth perspective, is the pursuit of economic growth.

Compared to sustainability transitions, this is a different understanding of regime, which is rather *socio-economic* than *socio-technical,* though technologies used are defined by this regime. Possibly, it can be understood as a *metaregime* between the levels of regimes and landscape. Still, we apply the term "regime", as pursuit of growth in production/consumption/profits as a goal which guides and motivates the everyday practices of producers, workers, consumers, business people and even academics (given that maintaining of economic growth and ways of providing it is one of the central topics in mainstream economics). Thus, it directly influences belief systems, innovation agendas, problem definitions, research heuristics and values. Other regimes which have to be changed from the degrowth point of view may be identified as the following: economy based on fossil fuels, centralized energy supply system, system of global production and only-profit-driven business models. The new regime which is expected to result from degrowth transition is the steady-state economy.

Niches and regimes are embedded in the broader landscape which can currently be associated with neoliberal capitalist socio-economic system, with growing population, urbanization and globalization. They result in the challenges of increasing energy demand, environmental degradation, climate change and social and environmental injustice. The landscape provides an external context and cannot be influenced in the short run, even by radical changes in regimes (Geels and Schot, 2010). This slower speed of landscape changes explains the radicality of the movement, as degrowth aspires to change not only the regimes, but the landscape as well (to reject neoliberalism; to slow down globalization trends by relocalizing the economy etc.). If landscape changes take so much time, the process of regime changes must start immediately.

Another useful conceptual notion from sustainability transitions field of research is multi-phase perspective which describes a transition in time as a sequence of four consecutive phases:

1) pre-development phase;
2) take-off phase;
3) acceleration phase;
4) stabilization phase.

In practice, these phases may not necessarily follow the set pattern, as transition processes are characterized by high levels of risk and uncertainty. As for degrowth transition (at least in the Global North), it is in its pre-development phase: the system is changing in the background (various niche experiments and social movements are appearing), but the changes are barely visible (changes remain in niches; social movements do not result in broad political change). Degrowth activists and scientists struggle to move the transition to a take-off phase (e.g. the abovementioned open letter to

[1] We use the term grassroots as these experiments are usually initiated by local communities, not governments, either central or local, i.e. they are bottom-up in nature; they are also social or socio-economic rather than technological; we will elaborate on it in Subsection 3.1.

the members of EU Parliament during the 2018 Post-Growth Conference – an attempt to shift the discussion to the political level, at least in Europe, and to make the movement more visible for broader community, so that it can pick up momentum). The acceleration phase would be the shift from the growth paradigm: political refusal from GDP growth as a primary goal of national economic policies and as indicator of well-being along with the related institutional changes related to this. So far only Bhutan has officially adopted Gross National Happiness as a political goal, and the concept of *buen vivir,* an alternative understanding of development and well-being as more community-centric, ecologically-balanced and culturally-sensitive, has influenced Bolivia and Ecuador (Gudynas, 2011; Zurick, 2006), though none of this countries refuse economic growth.. Finally, the stabilization phase for degrowth would be achieving the state of steady-state economy, when production and consumption levels remain sustainable.

Various subsystems (economic, technological, institutional, cultural, ecological) co-evolve and can reinforce each other, so that transition appears. Within the degrowth discourse, co-evolution of social and ecological subsystems and their mutual influence is the most visible. It is for this very reason that degrowth proponents are particularly wary of planetary boundaries and other ecological constraints to further growth. Co-evolution of social and ecological subsystems is also evident in degrowth discussions and analyses carried out at the local level, which underlines the need to reduce ecological footprints, live in harmony with nature, and which highlights that the degrowth transition needs to be motivated by co-design, involving both broad social representation as well as the representation of nature's interests. Co-evolution is also visible in degrowth practices, where technology (usually low), user practices and local institutions reinforce each other.

3. Degrowth practices as transition experiments – linking the phenomena

3.1. What are transition experiments and degrowth practices?

As was mentioned above, sustainability transitions research area consists of two subfields: Transition Dynamics and Transition Management (TM). The latter is at the same time a new mode of governance aimed at resolving persistent societal problems and using sustainable development as a normative framework. Distancing itself from classical management, TM acknowledges uncertainty and ignorance, which makes full control of the problems impossible. Hence, it is explorative and design-oriented rather than focused on final solutions (Rotmans and Loorbach, 2010), thus learning, searching and experimenting are crucial in TM (Rotmans and Loorbach, 2009). Eventually, TM is aimed at fostering sustainable development (Rotmans and Loorbach ibid).

In contrast, degrowth has not developed any governance perspective. The steering power of its ideas lies in bottom-up social movement and activism. Although support for top-down approach to degrowth transition prevails the degrowth literature (Cosme et al., 2017), so-far bottom-up grassroots action remains the only tool for change, hence our focus on degrowth practices which constitute a form of experimenting with degrowth concept in real life.

Transition experiments (TE) belong to the key instruments of TM (Frantzeskaki, 2011; Van den Bosch, 2010). As highlighted in the previous section, experiments are happening in niches (the lowest functional level in MLP) and play an important role in transition processes, as under certain conditions they may contribute to regime change.

According to the general definition of Sengers et al. (2016), an experiment is an inclusive, practice-based and challenge-led initiative, which is designed to promote system innovation through social

learning under conditions of uncertainty and ambiguity. Experiments are happening in niches which constitute deviations from existing regimes. The authors distinguish various terms which denote experimenting for sustainability (niche experiments, bounded socio-technical experiments (BSTE), transition experiments, sustainability experiments and grassroots experiments) with TE representing the most general category within which the other types fit.

Van Den Bosch (2010, p. 58) defined TE as "innovation projects with a societal challenge as a starting point for learning aimed at contributing to a transition." Such experiments are aimed at searching for radically new ways of fulfilling societal needs in domains such as energy, mobility or health care (Van den Bosch and Rotmans, 2008).

TE cover a broad range of innovations, implying institutional, financial, legal or socio-cultural as well as socio-technical ones.

Among different types of experimentation, grassroots experiments put strong emphasis on societal innovation and refer to "networks of activists and organizations generating bottom-up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved" (Sengers et al., 2016, p. 6). Due to the bottom-up nature of this type of experiments, niches in which they take place are institutionalized more in social economy than in market economy and take the form of cooperatives, voluntary associations, informal community groups or social enterprises (Seyfang and Smith, 2007).

Grassroots experiments are the closest to what we call "degrowth practices" or "degrowth initiatives" and which also appears in the literature as "grassroots economic practices", "non-capitalist practices" or "grassroots nowtopias" (Kallis et al., 2015, pp. 11–12). Eco-communities, digital commons, communities of back-to-landers, urban gardens, community currencies, time banks, alternative food networks etc. may be qualified as such practices. They appear in response to the crisis or to the failure of conventional institutions to meet societal needs. Kallis et al. (2015) distinguished five characteristics of such practices. The first is purpose of production: within such initiatives, goods and services are being produced for use, not for exchange. Second, voluntary participant activities play significant role in degrowth practices, substituting to some extent wage labour. The third characteristic lies in anti-utilitarianism meaning that "the circulation of goods is set in motion, at least partly by an exchange of reciprocal 'gifts'" (Kallis et al., 2015, p. 12). Fourth, such practices do not have built-in capitalist dynamics to accumulate and expand. And fifth, the relations and connections between participants play a crucial role, as these practices are community-based and result from collective action. However, these characteristics seem to be inherent to "pure" degrowth practices, and not all initiatives which appear in the literature as related to degrowth possess all of these characteristics.

In the following subsection we elaborate in more detail on the characteristics of TE, their links to degrowth practices and how TE contribute to the process of transition.

3.2. Characteristics of transition experiments and their relevance to degrowth

Van Den Bosch (2010) pointed out distinctive characteristics of TE in the categories such as (1) starting point, (2) nature of a problem, (3) objective, (4) perspective, (5) method, (6) learning, (7) actors, (8) experiment context and (9) management context. Here, we elaborate on each of these characteristics and highlight their relevance to degrowth. In Boxes 1 and 2 we apply these characteristics of TE to describe two cases from the degrowth debate – Cargonomia, a social project

in Budapest, Hungary, and Transition Towns, a network of towns working together on fighting environmental challenges and promoting community building at the local level.

As mentioned above, the (1) starting point in a TE is a societal challenge, i.e. the question of how to solve a persistent societal problem. Thus, TE are guided not by a vision of a possible final solution, but by that question, e.g. how to provide sustainable and clean energy to the community or region (Van den Bosch and Rotmans, 2008). This characteristic of TE is relevant in the degrowth context, as degrowth practices usually have the same starting point, i.e. how to meet a societal need with a strong sustainability commitment in mind. For example, the starting point of the Som Energia[2] co-operative was the population's need for clean, sustainable and affordable energy (Anguelovski, 2015; Pellicer-Sifres et al., 2018). At the same time, the starting point at Can Decreix, a centre for practical and theoretical experiments on degrowth in Cerbère, France, is meeting societal needs with "low-tech" innovations and minimum waste.

Persistent problems bring us to the second characteristics, i.e. the (2) nature of the problem. Persistent societal problems are uncertain and complex, as no final solutions are agreed on them, e.g. there is no agreed solution on the question how to fight climate change or overcome natural resource scarcity and the consequences of either solution or lack of solution is highly uncertain. This is also highly relevant in degrowth context. One of its most important goals is substituting the regime of economic growth with an alternative one of a steady-state economy, yet it is not exactly clear how this regime will look like. Bottom-up degrowth practices are a try to envision this alternative regime. However, despite possible success in small communities (grassroots niches), the possibility of upscaling degrowth practices to the level of a society (regime) remains uncertain.

The (3) objective of TE is to contribute to societal change, i.e. to transition. The same is true for degrowth practices. Even though not every initiative which may be considered as degrowth practice explicitly aims at contributing to the overall degrowth transition to a steady-state economy, they usually aim at changing other regimes, which is also crucial for such a transition. See Boxes 1 and 2 for examples.

The (4) perspective of TE is medium term or long term due to the complex nature of transition processes which may last several decades. In the case of degrowth practices it is hard to estimate the perspective, as they are not planned in a top-down manner and usually do not have time frames.

The (5) methods in TE are exploring, searching and learning. They are related to uncertainty and complexity of persistent societal problems and link to the next characteristic, i.e. (6) learning. Learning process in TE is highly important, as its aim is to contribute to a transition. As TE do not take place in laboratory conditions, but in real-life context, they enable high-quality, broad and reflexive social learning (Van den Bosch and Rotmans, 2008). Broad learning means that actors in experiments learn about different dimensions of a problem (institutional, socio-cultural, technological etc.). Reflexive or 2nd order learning means thinking out of the box, i.e. actors undermine the basic assumptions about the problems, as persistent problems cannot be solved within the dominant way of thinking. Eventually, social learning means participatory learning process in which various actors interact and develop different perspectives on reality (Van den

[2] Although we have no evidence that this initiative was fueled by the degrowth concept, we refer to Som Energia as an example of degrowth initiative based on the fact that this is a bottom-up initiative, the form of its organization is a co-operative "consisting of groups of highly-motivated activists and politically conscious people" (Pellicer-Sifres et al., 2018, p. 104). It also appears in the degrowth literature as a relevant initiative (Johanisova et al., 2015; Kunze and Becker, 2015).

Bosch and Rotmans ibid). Exploring, searching and learning are highly relevant in the degrowth context, especially learning. Degrowth practices also involve broad and reflexive social learning with most emphasis on its reflexive character. As degrowth practices translate into alternative ways of fulfilling societal functions, organizing production and consumption, they imply reflexive learning. And it is definitely social, as importance of social inclusiveness, contacts and conviviality is underlined within the degrowth discourse, and knowledge producing interactions usually take place between all participants of an initiative. For example, in the already mentioned case of Som Energia both first-order and second-order learning takes place, as participants of the cooperative learn about capabilities and skills regarding communication, working in groups, IT or creating influence and building a social network while at the same time reflect on possibilities of consumption as a tool of social change, power relations and decision making in energy sector (Pellicer-Sifres et al., 2018). This learning is also broad (participants reflect on various aspects of energy consumption – institutional, technological, economic, socio-cultural) and social, as it happens via working in co-operative as well as via interacting with external actors.

Actors (7) in TE are multiple as experiments are happening across society with multiple participants involved, and not only specialized staff. In the case of degrowth this diversity of actors is hard to assess. So far most of degrowth practices are niche initiatives which are often marginal, hence it is difficult to talk about multiplicity of actors in the same way for TE.

TE take place in real-life societal context (8) and not in a controlled one, as transitions are open-ended orientation for change. The same is true for degrowth practices.

Finally, the (9) management context of TE is Transition Management which is focused on sustainability transitions goals. As mentioned previously, degrowth has not developed any governance perspective, thus it is hard to talk about management in this context. Every initiative is being managed in the most suitable way for participants (usually participative and horizontal). This is what sustainability transitions field of research may provide degrowth with.

3.3. Mechanisms contributing to transitions

In order for TE to be successful, it is important to understand through which mechanisms they can contribute to a transition. Sustainability transitions field of research has developed theoretical insights into this question.

Van Den Bosch and Rotmans (2008) identified three mechanisms through which TE may contribute to transitions: deepening, broadening and scaling up. Deepening builds upon the importance of social learning and upon experimenting in niches as protected spaces which deviate from the regime and provide specific context for experimenting with sustainable practices. Deepening means that actors learn about a TE as much as possible within a specific context. Interactive process of social learning builds first-order and second-order knowledge. And the fact that experiments happen in niches allows to learn how local culture, practice and structure are changing. The outcome of deepening is a new local constellation which fulfils a societal need in a fundamentally different way.

The learning process in TE is characterized as contextual, as what can be learned is limited to specific real-life context and the scale of an experiment. Hence, repeating an experiment in a variety of contexts is of high importance. Repeating an experiment is part of the mechanism of broadening along with linking the experiment to other functions or domains. This also involves adapting an

experiment to new contexts. Broadening implies "an invasion of other niches" (Van den Bosch, 2010, p. 67) and generates new niche-clusters which may further contribute to a regime shift.

Broadening is an important intermediary mechanism between deepening and scaling-up. Van Den Bosch and Rotmans (2008) define scaling-up as the process through which a new constellation of culture, structure and practice scales-up and gradually becomes the part of mainstream practices, fundamentally changing the way in which the societal function is fulfilled.

These mechanisms link to routes of innovation diffusion applied in strategic niche management, namely replication, scaling up and translation (Seyfang and Haxeltine, 2012). Despite the same name, scaling up as innovation diffusion route is different from scaling up in the context of TE and means scaling up in size (e.g. increasing the number of participants in the case of a grassroots innovation). Replication links to the mechanism of broadening and means replicating the model of a particular initiative in different contexts. Translation links to the mechanism of scaling up, as it means a diffusion of niche innovative practices to a wider society, i.e. to the level of regime.

All three mechanisms relate to MLP. Mechanism of scaling-up explains how regime change appears. However, this is a difficult process, as deviant practices of niches do not necessarily work in the dominant context of a regime. This is caused by the dichotomy between niches and regimes, different "rules of the game". Niches function as "protective spaces" for experimenting (Smith and Raven, 2012) and adaptation to their specific context is difficult. However, Van Den Bosch (2010, p. 69) argued that "in practice the step from niche to regime is not a single step but the result of a process of many intermediate steps," that is why broadening is an important intermediary mechanism, as repeating the experiment in different contexts or applying it to different domains increases the stability of the niche and may facilitate the institutionalization of at least some niche practices, so that niche-regime may appear or the incumbent regime may change.

In the degrowth discourse, Transition Towns are the most successful illustrative example for these mechanisms (see Box 2). Visioning and managing degrowth initiatives with these mechanisms in mind would help them to move beyond the protected spaces of niches and contribute to tangible regime changes.

Another illustrative example related to degrowth may be urban gardens. Although they were spreading during the Great Depression and World War I and II (Anguelovski, 2015), today they still increase food security, especially in the Global South. They are mostly initiated from bottom-up "in people's desire to reconnect with food, nature and community" (Firth et al., 2011, p. 555) and thus facilitate interactions between people, shared responsibility for common space, inclusiveness, stress recovery, relaxation, conviviality etc. and address inequalities in food provision (Anguelovski, 2015), which is highly relevant to degrowth. Nowadays, urban gardens spread around the globe, meaning that mechanisms of deepening and broadening take place. Governments', NGOs' and farmer groups' support for urban gardens in the Global South (Anguelovski, 2015) evidences for scaling up possibilities for such initiatives and integrating them in the global food regime.

Boxes

Box 1. Cargonomia

Description: degrowth-inspired initiative operating as an organic food distribution point, a cargo bike centre, and an open space for community and educational activities related to degrowth, sustainability, well-being etc. (Csoma and Lazányi, 2019). Cargonomia formalizes previously

existing cooperation between three socially and environmentally conscious enterprises: Cyclonomia Do it Yourself Bicycle Social Cooperative; Zsamboki Biokert, an organic vegetable farm and a sustainable agriculture community education centre; and Kantaa, a self-organized bike messenger and delivery company.

Relation to degrowth principles: degrowth as a source of inspiration; use and promotion of low-carbon and sustainable ways of transport; promoting local economy – distribution of local organic food products and propagation of conscious and sustainable consumption, creation of local, decent jobs connecting rural and urban areas by partnering with local, small scale business; strengthening sense of community and conviviality by providing open space for meetings, workshops, discussions and other events; promoting sustainable lifestyles, care and unpaid activities; promoting principles of a "gift economy" and a "reciprocity economy".

(1) Starting point: societal challenge related to unsustainable transport use in Budapest; transport system dominated by private cars and food system dominated by global industrial agriculture products offered through large scale retailers; unsustainable consumption patterns.

(2) Nature of the problem: problems addressed in the project are persistent because:

- city development strategies have exaggerated focus on motorized transport and it is more prioritized in existing infrastructure;

- road transportation remains the most significant in Hungary,

- around 75% of grocery shopping is done in supermarkets,

- people's habits regarding sustainable transportation and consumption are hard to change.

These problems are complex, as many actors are involved, and uncertain.

(3) Objective: contribute to degrowth transition, i.e. contributing to several regime shifts (growth-based economy, fossil-fuel-based economy, global food production and consumption and only-profit-driven business models) by changing local practice and culture. Showcasing alternative solutions.

(4) Perspective: 2015- no upper time frame (long-term).

(5) Methods: *exploring* alternative ways of transportation, food production and delivery, cooperation, producer–consumer interactions; *searching* for new alternatives, new possibilities and new partners; *learning* (first-order and second-order, see below).

(6) Learning: *broad* – learning about institutional dimension by searching for grants and public support; learning about socio-cultural dimension by communicating with consumers, participants of workshops and various events; learning about technical dimension by facing possibilities and challenges of organic and community supported agriculture, using and producing cargo-bikes; *reflexive* – the learning process in the initiative produces new social and cultural values, promotes social cohesion and showcases "something different from capitalism" (Gombos and Párdi, 2016); *social* – participants of the initiative, as well as, consumers and event participants learn new perspectives and values (other than capitalistic ones).

(7) Actors: mainly civil society actors: cooperative workers (including those from Cyclonomia, Zsamboki Biokert and Kantaa, consumers, event participants.

(8) Context: real-life; context of a postsocialist capital city.

(9) Management context: grassroots initiative; no typical management context so far.

Mechanisms of contributing to transitions: this experiment is in the stage of *deepening* (different types of learning take place; participants try to learn as much as possible about the experiment in the specific context of Budapest). However, there is no evidence about Cargonomia being *replicated* in the same way elsewhere, even though there are similar projects on the topics of mobility, care and inclusiveness (e.g. see http://www.newcityzens.com). It is important to *broaden* the experiment in other contexts to verify its viability and create a niche-cluster for potential regime-shifts. Although it is debatable if Cargonomia aims at *scaling up* due to its ideological principles (emphasizing unpaid care work), the scaling up possibilities for such an experiment lie in the formalization of its activities by starting a co-operative or social enterprise and thus increasing the potential of penetrating into the mainstream regime.

Box 2. Transition Towns (TT; Transition Network)

Description: an international network of grassroots initiatives supporting local economies, fighting Peak Oil and climate change, building resilient communities and promoting inclusivity and social justice. These initiatives usually involve active citizens developing projects across various domains (food, energy, finance, transport). The movement started in 2005 and has now reached more than 50 countries (https://transitionnetwork.org).

Relation to degrowth principles: although there is no explicit evidence that TT movement was directly fuelled by degrowth ideas, it is often associated with it (Trainer 2010, 2012, Demaria *et al.* 2013, Escobar 2015, Johanisova *et al.* 2015, Kunze and Becker 2015, Longhurst *et al.* 2016, Gibbs and O'Neill 2017). The TT movement's principles are closely related to those of degrowth: respecting resource limits by promoting local economy (community self-sufficiency and resilience), enhancing community spirit, social justice, inclusiveness and conviviality, promoting voluntary simplicity. One of the first TT, Totnes in the UK, may serve as an illustrative example, with its high permaculture activity, local organic food producers, small and ethical business presence, alternative housing arrangements etc. (Longhurst, 2015).

(1) Starting point: enhancing local economy, community resilience and self-sufficiency to avert or reduce potential negative effects of Peak Oil, climate change and economic instability.

(2) Nature of the problem: the problems addressed in the project have global level; they are persistent as global economy is still based on fossil fuels which results in climate change and environmental damage; they are complex, as different national and global actors are involved, and highly uncertain.

(3) Objective: to adapt to decarbonized and post-fossil-fuels economy; according to Seyfang and Haxeltine (2012, p. 385), TT movement "does not intend to trigger a transition, but instead responds to landscape pressures at a microlevel and seeks to grow a niche of new infrastructure and practices to replace the incumbent regime when it fails to function;" still, it is fair to say that this

experiment's objective is to contribute to a transition to sustainability; regimes which are to be replaced: fossil-fuels-based economy, global production and consumption, current energy regime (centralized and fossil-fuels-based).

(4) Perspective: 2005- no upper time frame (long-term).

(5) Methods: *exploring* the life with significantly less energy consumption, the opportunities of resilience and collective action; *searching* for the tools to make the economy local, build resilience and ensure high quality of life with less energy consumption; *learning* (first-order and second-order, see below).

(6) Learning: *broad* – learning is built into the process of becoming a TT, it covers practical matters (learning various technical skills which were common in the past but have been lost with the rise of consumer society, organizational skills, e.g. how to set up and facilitate a steering group, run participative workshops etc.), institutional matters (e.g. how to cooperate with local government), and ideological issues (the movement's perspective on climate change, Peak Oil, resilience, visions of social change etc.); *reflexive* – this type of learning is the most prominent in the movement's activities, as it addresses the system transformation of modern industrialized consumer society and encourages its participants to question current frames of reference, e.g. that it will always be possible to sustain our current level of energy consumption; *social* – not only active participants of the initiative take part in the learning process, but also people from "out there" (through awareness raising events, public talks, screening movies etc.) (Hopkins, 2008; Seyfang and Haxeltine, 2012).

(7) Actors: actors are multiple in the context of the niche (activists with different backgrounds, local economy actors, local government in some cases), but there is lack of networking with regime actors, e.g. business (Seyfang and Haxeltine, 2012).

(8) Context: real-life; from the context of mostly Anglo-Saxon countries in the beginning, the initiative has spread around the globe.

(9) Management context: grassroots initiative; however, principles of transition concept and tips for starting a transition may be considered as a base for an embryonic management approach.

Mechanisms of contributing to transitions: mechanisms of *deepening* and *broadening* are evident in the case of TT. Literature about Kinsale and Totnes, two prototypes of the initiative, written by the movement's founder Rob Hopkins, as well as by other authors (Connors and McDonald, 2011; Hopkins, 2008, 2010; Longhurst, 2015), and a documentary (Koons, 2011) evidences the deepening knowledge about the original initiative. Perhaps this is one of the reasons for the movement's success in *replicating* its model. According to the movement's website, there are currently 963 TT initiatives around the globe covering a variety of geographical areas – small and large towns or cities, villages, islands, rural areas and forests. However, the movement is still most popular in few Anglo-Saxon countries (UK, USA, Australia) and it is important to widen it further. Some of the key messages of the movement are articulated by mainstream actors in some countries (e.g. reskilling, localizing food production and thrift in the UK) or have been reinforced by economic crisis (Seyfang and Haxeltine, 2012), so the experiment has *scaling up* potential, although the cultural shift has not been large so far.

4. Discussion and conclusions

The aim of this paper was to study how sustainability transitions analytical framework can help to make degrowth more specific and operational. For this purpose we identified similarities between sustainability transitions and degrowth (both as research areas and processes) and used some of the sustainability transitions analytical frameworks to describe degrowth.

Our paper contributes to the existing literature dealing with both degrowth and sustainability transitions and furthers the analysis of the links between them. For example, in one of the most relevant paper connected to this topic, Gibbs and O'Neill (2017) focused on geographical perspective of green economy and investigated the role of regions as its drivers, drawing on different regional futures – from "clean-tech economy" to those related to degrowth. Gibbs and O'Neill (2017) applied the analytical framework of MLP as a "useful perspective" to look at such approaches. Although their study used an analytical framework from sustainability transitions field of research for analysing degrowth ideas, we explored these linkages more comprehensively and with a broader objective. We provided explicit analysis of the linkages between the two areas, explained key terms and conceptual notions, and applied other conceptual notions from sustainability transitions field of research as well. This is what also differs our approach from that of Vandeventer et al. (2019), along with the conceptualization of degrowth as a form of sustainability transition rather than a niche.

However, applying sustainability transition analytical frameworks to approaches "from the opposite parts of the spectrum" by Gibbs and O'Neill (2017) evidences that indeed there are different forms of sustainability transitions with different degrees of "radicality" and analytical frameworks from sustainability transitions field of research "have proved helpful in understanding the opportunities and constraints that a shift to green economy may encounter" (Gibbs and O'Neill, 2017, p. 165).

Sustainability transitions and degrowth ideas are indeed closely related. This is evidenced by a number of similar visions and approaches to socio-economic development (Table 1), case studies used in boxes and other illustrative examples.

Sustainability transitions analytical frameworks and conceptual notions proved to be helpful interpretative lenses for looking at degrowth and can help structure its main postulates in a systemic way. Functional levels of the societal system, as well as probable phases of degrowth transition have been identified. Degrowth requests quite a specific case of sustainability transitions, it is the most far-reaching and radical. So far, niches in degrowth have mostly taken the forms of grassroots and social as they have usually been created in a bottom-up way, with emphasis placed on societal, rather than on technological change, although niche actors experiment with using alternative (usually simpler) technologies. The main regime which has to be changed is economy based on economic growth. This is a slightly different understanding of regime, as itis socio-economic rather than socio-technical. Other unsustainable regimes of both socio-technical and socio-economic nature also have been identified. By regime shifts, degrowth aspires to change landscape as well, i.e. to reject neoliberalism; to slow down globalization trends by relocalizing the economy etc.

One of the most fruitful sustainability transitions concepts applied to degrowth is TE. In this article, we suggest that degrowth initiatives may be understood as grassroots TE by identifying characteristics of TE in two case studies of degrowth practices and by providing other illustrative examples from degrowth context. However, there is high possibility that many of degrowth practices, as in case of a lot of grassroots innovations, will remain on the level of niches, with little potential to contribute to regime shift. Here is the point where sustainability transitions studies may

have space to contribute. Applying the same mechanisms through which TE contribute to transitions may help degrowth practices to gradually break through the protected level of a niche. This would imply the application of TM (along with its other instruments, such as strategic planning and visions, actors selection etc.) to steer a transition process, and entail involvement of local governments and other main stakeholders which resonates with the proposals for top-down action from most degrowth scholars (Cosme et al., 2017) and overall civic initiatives' need in improving "their organizational and cooperation culture", and acquiring "more management and planning skills" (Gombos and Párdi, 2016, p. 47). Of course, TM would have to be adapted and to some extent altered to meet the degrowth initiatives' specificity, mainly governing small-scale social innovations. This rises many questions: to what spatial scale TM should be applied for contributing to a degrowth transition – to the level of a neighborhood, city, region or the whole country? Or maybe to a specific societal problem? How to visualize the implementation of a degrowth transition at the level bigger than one neighborhood? How to measure it? All these topics open an inspiring avenue for further research on degrowth operationalization and the applicability of TM for making it possible, and our research offers a preliminary step in that direction.

What can be stated at this level of research is that TM teams should consist not only of community of "experts", but account for the voice and agency of workers, activists and other civil society actors. This would respond to the criticism that TM has received for being technocratic and legitimizing the knowledge being created by small groups of elite experts (Lawhon and Murphy, 2012), and resonate with calls for re-thinking how knowledge is produced and used in society (Abson et al., 2017). This would also show how sustainability transitions area of knowledge can benefit from insights from degrowth.

The process of knowledge producing and using relates to the concept of mindset or paradigm out of which the socio-technical or socio-economic systems arise. Mindsets and paradigms constitute an important leverage point for bringing significant changes in the system (Meadows, 1999). Applying sustainability transitions notions and frameworks, and thus systems thinking, to degrowth positions the growth-based economic system as the regime which should be replaced and articulates once again that unlimited growth is a goal which must be abandoned.

Sustainability transitions field of research may also benefit from linking to degrowth in other ways. It is still an evolving area of research, hence it can benefit from using new case studies, especially those related to social innovations, to develop its theoretical framework further (in particular it relates to TM). This paper resonates with the overall call for "rigorous analysis and critiques of capitalism" and engagement with discussions on post-growth futures (Feola, 2019).

Both research areas need to pay more attention to geographical and cultural contexts in their analyses. Discourse about differences between Global North and South and the relevance of promoting degrowth ideas in the latter is present in the degrowth debate, especially in the context of justice (D'Alisa et al., 2015b; Demaria et al., 2013; Foster, 2011; Martinez-Alier et al., 2010). At the same time, sustainability transitions received critiques for being geographically naïve, lacking "sensitivity to the socio-spatial struggles that can lead to a scaling up of a niche or regime beyond its predefined (typically national) boundaries or that can unevenly distribute a more/less sustainable regime within a nation or region, or at the global scale" and limiting case study context to developed Western countries mainly, the Netherlands in particular (Lawhon and Murphy, 2012, p. 362). In response to such criticism, special issues appeared (Truffer et al., 2015) and geography of sustainability transitions became one of the themes of the field's research agenda, with attention to

developing countries' contexts as well (Wieczorek, 2018). Still, this avenue is developing and both degrowth and sustainability transitions could be mutually inspiring within it, with sustainability transitions paying attention to formal institutions' development and degrowth bringing in the voice of indigenous communities, articulating social innovation etc. However, both fields of research concentrate on the polar sides of Global North and South largely disregarding the context of postsocialist countries, which are in the middle position. This could be another fruitful area of research and give the notion of transition a new connotation, as so far it is used mostly in the meaning of transition from the planned economic model to one based on the market (Kronenberg et al., 2017).

Finally, the fact that both case studies of degrowth practices used in this article take place in cities links degrowth with the emerging field of urban sustainability transitions. Cities are recognized to have high potential to contribute into global sustainability transition, as solutions to sustainability challenges found and operationalized in cities may be scaled up globally (Elmqvist et al., 2018) and new initiatives and interventions to counteract unsustainable behaviour and practices have often originated in cities (Frantzeskaki et al., 2017; Fratini et al., 2019). Hence, cities may serve as niches for experimenting with sustainability transitions. Relating to this, investigating what degrowth would mean on the level of city is of high importance.

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