Convergences: Design for Sustainability Transitions and Degrowth

A. Idil Gaziulusoy* and Eeva Houtbeckers

*Corresponding author: idil.gaziulusoy@aalto.fi

NODUS Sustainable Design Research Group
Department of Design
Aalto University
Helsinki, Finland

Abstract

Design for sustainability transitions is an emerging area of research and practice which integrates and expands theories of sustainability science, design and transition management. Recently sustainability transitions have been framed as design challenges with three main dimensions: creative, technical and political (Gaziulusoy & Ryan, 2017). With references to the multi-level perspective of system innovations, design for sustainability transitions investigates the niche socio-cultural practices and technologies to develop and analyse design scenarios for alternative futures using participatory approaches. Degrowth as a civic movement that challenges the continuous economic growth as a policy making goal, converges design for sustainability transitions in its holistic understanding of a need for systemic change. Yet, recent discussions in degrowth have called for a deeper understanding of actors that would carry out such transitions. This includes taking into consideration questions of power, gender, class, ethnicity and inter-species interactions, which are at times overlooked in analyses. It is our position that there is a need for expansion, diversification and deepening of theoretical groundings of design for sustainability transitions as well. In this article we provide a short history of this research and practice area, frame a theoretical perspective on degrowth integrating the implications of current relevant questions, integrate this theoretical perspective with design for sustainability transitions theories, and discuss implications for design and policy practice as well as degrowth research.

Keywords: degrowth, design, transitions, sustainability

Thought expands but paralyses, action animates but narrows.
-Johann Wolfgang von Goethe

Introduction

The biophysical and socio-technical trends indicate that we as humanity are approaching towards tipping points which, unless confronted generatively, imaginatively and urgently, impose increasing risks over sustainment of conditions that support human life and countless other species on Earth (Dearing et al., 2014; Rockström et al., 2009; Steffen et al., 2012). Over the past couple of decades there has been an increasing acknowledgement, first within the research community followed by governments and businesses, that there is a need for structural, and in some cases radical, changes in systems that support human society (Loorbach, 2010). These structural changes are often referred to as sustainability transitions. Nevertheless, the interpretations of this acknowledgement in policy-making failed to recognise that the essence of such systemic changes is politico-economic and particularly within Europe a technologically optimistic and deterministic position prevailed in line with the neoliberal strategic agenda of the European Commission. Certain discussions that have been lively and in some cases "heated" within the diverse community dealing with sustainability research on qualities of the political-economic system that is appropriate for dealing with the socio-technical-ecological complex of sustainability problems had not found much of an audience outside of the academic institution with the exception of a couple of local governments (e.g. Barcelona, Bologna initiatives). One such body of discussion relates to the perceived need for degrowth.

Degrowth (DG) movement engages various actors, such as citizens, activists, academics, and decision-makers (Demaria et al., 2013). Degrowth thinking challenges the omnipotence of continuous exponential economic growth on the basis that the limits of our planet have already been exceeded. We cannot escape the fact that energy cannot be recycled, which again affects the understanding of the limits to growth based on more use of materials and energy (Martínez-Alier, 2012). Latouche (2009) argues that many may agree with these notions, but few consider it possible to detach from the vicious cycle of economic growth. Instead, growth has become a paradigm that needs to be sustained, because it is the unquestioned basis for social security, labour markets, policy-making, citizenship, and corporate activities. Thus, degrowth debates do not only concern decreasing material throughput but a need for holistic paradigm change (Paulson, 2017). For example, it is shown that well-being in the industrialised global North does not follow from continuous economic growth (see for example Latouche, 2009). Instead, people suffer from growth-based lifestyles, as manifested in increasing obesity, depression, and burn-out.

Transitions to sustainability has recently been framed as design challenges with creative, technical and political dimensions rather than being problems that can be addressed solely through development and deployment of technology (Gaziulusoy & Ryan, 2017). Design for sustainability transitions (DFST) is now recognised as the emergent edge of design for sustainability field (Ceschin & Gaziulusoy, 2016) although the origins of this new area goes as far back as late 1990s (Gaziulusoy & Erdoğan Öztekin, 2018). As an emerging area, there is not yet a unified and empirically validated theoretical foundation however the contributions so far integrated insights from sustainability science, system innovations and transitions theories, social practice theory, futures studies, complex systems theories, product-service systems, social innovation, value-based design, and user innovation (e.g. Cipolla & Peruccio,

2008; Dewberry & Johnson (2010); Gaziulusoy (2010); Gaziulusoy & Brezet (2015); Kossoff (2011); Kossoff, Tonkinwise & Irwin (2015); Ceschin (2012); Ryan (2013); Heiskanen et al. (2014); Mok & Hyysalo (2018)). The common position adopted in these contributions is an emphasis on normativity; that to achieve sustainability the society should not rely on projections of the present and that there is a need to create visions for alternative futures to shift the projected trajectory of the present (which is unsustainable) towards those that are aiming at the visions.

This paper is a collaboration between a social scientist and a design researcher whose research focus include degrowth and design for sustainability transitions respectively. It explores the broad question of "How to advance the needed systemic sustainability transitions?" by reflecting on the intersection of DFST and DG, trying to identify potential contributions each research and practice area can make to the other. We aim to address (1) what design for sustainability transitions theory and practice can learn from degrowth theories and movement and (2) how degrowth movement can utilise design for sustainability transitions.

Design for Sustainability Transitions Theory and Practice

Origins and map of the research space

This section is based on a recent article by Gaziulusoy and Erdogan Oztekin (2018). The origins of design for sustainability transitions goes as far back to late 1990s when at the time ongoing research into development of sustainable technologies in the Netherlands influenced thinking of ecodesign scholars. Brezet (1997) identified four types of *ecodesign innovations* with increasing potential of environmental improvements*:* product improvement, product redesign, function innovation and system innovation. He explained system innovations as changes that are required in infrastructure and organisations as a result of new products and services. The early endeavours of situating *the social* and *everyday life* in design dealing with radical system changes can be observed in the work of Young et al. (2001). It was not until a decade later the first PhDs integrating theories of system innovations and transitions with design were completed (Gaziulusoy, 2010; Joore 2010; Ceschin, 2012), nevertheless, a conference held in 2008 provides evidence that sustainability transitions related thinking in design across the board was well underway before the first PhDs in the area were completed (Cipolla & Peruccio, 2008). Late 2000s and early 2010s have seen a significant influence of system innovations and transitions theories (Geels, 2005; Loorbach, 2007; 2010) in design for sustainability work. These theories provided *some foundations* on how socio-technical transformations happen and how they can be steered so that design researchers could start to establish links between design theory and practice and sustainability transitions. The three PhDs mentioned above, although fundamentally based on system innovations and transitions theories, generated a set of theoretical (and operational) frameworks with similarities but also differences. Kossoff (2011), on the other hand, situated his work in philosophy, social ecology, and everyday life discourse without any reference to system innovations and transitions theories. Building on ideas of Kossoff (2011), Irwin (2015a) published an article presenting a transition design framework for design education, research and practice. This article has coined the term transition design and popularised it within the broader community of design academics and practitioners. She situated transition design as an emerging area at the end of a design continuum, following service design and design for social innovation, thereby, making links between transition design and other new areas of design for sustainability. In 2012, Carnegie Mellon University, School of Design have started to implement

curriculum formulated using transition design as an umbrella framework across all levels of design education (Irwin, 2015c). In 2015, the first journal Special Issue on transition design was published (Kossoff, Irwin & Willis, 2015). The other key work in the development of this emerging field include an exploratory study on the roles of design in transition processes (Gaziulusoy & Ryan, 2017), explicit use of particular design approaches in transition projects (Mok & Hyysalo, 2018; Mok & Gaziulusoy, 2018), and investigations of evidences of user involvement in the design and diffusion of new technologies in transition projects (Heiskanen et al., 2014; Hyysalo et al., 2017).

Theoretical underpinnings

The works cited above have some overlapping and some different theoretical underpinnings. Gaziulusoy's (2010) work (see also subsequent publications, Gaziulusoy, Boyle & McDowall, 2013; Gaziulusoy & Brezet, 2015) is significantly influenced by the ideas of sustainability science, particularly by complex adaptive systems theories. Joore's work (2010) (also Joore & Brezet (2015)) is situated in industrial design, systems engineering, sustainable product development, system innovations and socio-technical transitions theories. Ceschin (2012) (also Ceschin 2014a; 2014b) based his work on product-service systems, strategic design, system innovations and transitions theories, and strategic niche management. The theoretical underpinnings of Kossoff (2011) (and subsequently Kossoff, Tonkinwise & Irwin, 2015; Irwin 2015a; Irwin 2015b; Irwin, Tonkinwise & Kossoff, 2015) are stretched across chaos and complexity theory, Goethean science, holism, needs theory, everyday life discourse, indigenous knowledge, post-normal science, social psychology, social practice theory, alternative economies, and, socio-technical system innovations and transitions theories. All of this work, despite similarities and differences in theoretical underpinnings and systemic scopes, put an emphasis on linking design action in the short-term with visions of desirable and sustainable futures in the long-term, therefore demonstrating a preference for normative outcomes.

Although there is an emphasis on normativity of outcomes of design for sustainability transitions in all this work, there are also differences in the characteristics of the normative outcomes argued for. For example, according to Gaziulusoy (2010) sustainability is not an absolute property; it can only be established relative to the nominal lifespan of the system to be sustained. Whether the subject system has reached its nominal lifespan can only be assessed ex post facto. Therefore, sustainability cannot be measured (at least in absolute terms) but sustainable systems can be envisioned and enacted upon across relevant system levels and timeframes. Joore (2010) on the other hand, does not take up a mission for developing an elaborate frame for sustainability. Instead, he simply adopts a definition from an earlier work by Tukker and Tischner (2006); that is causing minimum negative environmental impact while maximizing social well-being and maximizing economic added value. Ceschin (2012), although minimal, provide some discussion touching on some overarching themes in sustainability discourse such as growth, equity and limits. He argues that sustainability can only be achieved by drastically reducing consumption of environmental resources, at least by 90%, compared to the average consumption by mature industrialised contexts, and by equally distributing them. Kossoff (2011) argues that sustainability requires not only ecological, social, economic, but also cultural, political, existential problems to be addressed so that *everyday life* becomes sustainable *again* across its all *domains*. He is against quantitative framings of sustainability and advocates qualitative understandings that incorporate non-utilitarian, in addition to utilitarian, human activities. The subsequent discussions and framings in Kossoff, Tonkinwise & Irwin (2015), Irwin (2015a), Irwin

(2015b), Irwin, Tonkinwise & Kossoff (2015) do not discuss in detail theories that inform framings of sustainability but reflect the ideas elaborated in Kossoff (2011). The position adopted in these works can be summarised as sustainability being a place-based property of globally networked communities, informed by evolving visions which propose whole lifestyles and diffuses in everyday practices.

Design for Sustainability Transitions in Practice

As an emerging area, design for sustainability transitions has very recently started to penetrate into design practice. It is a promising sign that designers have started to be commissioned in transitions projects for strategic roles than solely for working on the creation of conventional design outputs (such as visualisations and product concepts). For example, a design-led transitions project in Australia commissioned a total of sixteen professional designers with backgrounds in architecture, urban design, industrial design, service design and interaction design to facilitate visioning processes in participatory stakeholder workshops, to assist the project researchers in synthesising knowledge from a variety of resources and expertise bases and to develop visualised and narrated proposals for alternative, low-carbon, resilient urban futures (Gaziulusoy & Ryan, 2017). In another project about energy transitions in Finland, value sensitive design research and implementation was used to deal with the socio-technical complexity associated with placing solar panels on the roof of a heritage building (Mok & Hyysalo, 2018).

Of course, playing roles as designers in transitions projects and being transition designers, although interrelated, come with nuances. Designers are already equipped with skills and knowledge that are invaluable within the contexts of transition projects (Gaziulusoy & Ryan, 2017). But being a transition designer require skills, knowledge as well as professional and personality traits that are not yet considered widely as "designerly traits". Irwin (2015a) counts "mindset and posture" as one of the four core elements of transition design framework. According to her, the mindset and posture required from transition designers cover self-reflection, inquiry into one's own value set, a willingness to transform from within, openness, holistic worldview, community centredness, humility, ability to lead and being lead, and transdisciplinary collaboration. These new designerly traits go hand-in-hand with new attitudes, skills and knowledge that are necessary for designers. Ceschin (2012) mentions a few of these including broadening design scope, accommodating short-, medium- and long-term perspectives in projects, building up and working within broader networks of stakeholders, adopting an experimental and learning-based design attitude and knowledge of how socio-technical system changes happen.

What is next?

The foundational theories that underlie early contributions in design for transitions cover complex adaptive systems theories, sustainability science, system innovations and transitions theories, social practice theory and environmental ethics. These are essential theories for informing futures of design practice that can play a role in sustainability transitions. Nevertheless, this emerging field can and should also learn from other theories that are currently informing design and penetrating its zone of comfort. For example, design in general should shake the dominance of human-centredness in theory and practice as it is a necessary foundation but too anthropocentric to lead design practice into the future on its own. Design for sustainability transitions should develop ways to give voice to voiceless both in its epistemology and methodology as the essential aim should cover creating *just* futures as

well as sustainable ones. For this purpose, design in general and transition design specifically can learn from feminist theory, animal studies, post-humanist ethnography, political ecology and literature on decolonising methodology. Some of these literatures have been integrated into design though contributions of pioneering work in the recent years (for example, Avila, 2017; Jönsson & Lenskjold, 2014; Schalk, Kristiansson & Mazé, 2017; Tlostanova, 2017). There is urgency to further explore implications of these literatures in design and derive insights and lessons for development of transition design theory and practice.

Degrowth Theory and Practice

There are excellent overviews of degrowth thinking (see for example Asara, Otero, Demaria, & Corbera, 2015; D'Alisa, Demaria, & Kallis, 2014; Demaria, Schneider, Sekulova, & Martinez-Alier, 2013; Jackson, 2009; Latouche, 2009; Weiss & Cattaneo, 2017). They discuss main ideas, the diversity and depth of the discussions, and the criticism from various positions. According to Paulson (2017, p. 426), 'debates about what degrowth is, is not, or ought to be entail extraordinary theoretical and normative complexity'. Recent critical and emerging discussions in degrowth have called for a deeper understanding of how degrowth could be achieved. This includes taking into consideration questions of power, gender, class, ethnicity, inter-species interactions, different geographical locations, which are at times overlooked in analyses. Since degrowth has many interesting debates impossible to summarise in a short paper, here we chose the discussions that aim to advance the debates and draw from ongoing discussions overlapping degrowth community and debates.

North-South relations and de-colonialism

Some argue that degrowth should first take place in the global North, where the ecological footprint of people is much higher compared to the global South, although this view has been also challenged by calling for a more equal distribution of wealth, a world-system view, and post-development discourse (Escobar, 2015; Gerber & Raina, 2018). Connecting the criticism of development with degrowth is still emerging (Beling et al., 2018; Bendix, 2017; Escobar, 2015), although authors, such as Latouche (2009), have shown how shared cultural understandings of development are harmful and result in colonialism. Degrowth debates, according to Belig et al. (2018), are part of 'discourses of transition' (Escobar, 2015), which have 'global aspirations' to 'bend the developmental trajectories worldwide' (Beling et al., 2018, p. 306).

There are different traditions in different parts of the world. For instance, degrowth movement is located in Europe, while Buen Vivir is understood to be developed in Latin America (Beling et al., 2018). While the latter focuses on the criticism of development, Bendix (2017) found that the German degrowth movement (Postwachstum) hosts different perspectives, from which ecofeminist and anti-capitalist movements address North-South 'interdependencies'.

The 'meshwork', i.e. loose networks of degrowth invites collaboration between regions with various local initiatives (Escobar, 2015; Harcourt, 2014). Authors invite actors to come together and learn from one another in order to advance the criticism of development and create ways of being in and for degrowth societies (Beling et al., 2018; Escobar, 2015; Harcourt, 2014).

Democracy, activism and local initiatives

Some debates touch upon democracies and democratic decision-making (Deriu, 2012). According to Demaria et al. (2013, p. 199), 'degrowth is a response to the lack of democratic debates on economic development, growth, technological innovation and advancement'. There are different approaches toward how solutions for degrowth are or should be developed beyond existing institutions. The actions related to degrowth vary from oppositional activism and building alternatives to reformism, in which the aim is to work with existing institutions (Demaria et al., 2013). Many emphasise the importance of community-based initiatives (Sekulova, Anguelovski, Argüelles, & Conill, 2017), while it is recognised that action is needed on all levels, namely local, national and global (Demaria et al., 2013).

Based on a survey conducted among degrowth activists, Eversberg and Schmelzer (2018) concluded that the respondents represented five clusters, namely (1) sufficiency-oriented critics of civilisation, (2) immanent reformers, (3) voluntarist-pacifist idealists, (4) the modernist-rationalist Left, and (5) the alternative practical Left. Finally, despite different foci, degrowth thinking is developed in collaboration and learning between activists and academics (Demaria et al., 2013).

Gender dimension, feminist economics, and ecofeminism

According to Prieto and Domínguez-Serrano (2017, p. 223), 'women's greater responsibility in human and environmental care or the greater impact that ecological damage has on them, due to the gendered division of labour, are issues that have not been fully discussed by the degrowth movement'. This is reflected in the degrowth writings by a focus on the needed changes of production systems, 'but not the reproduction system' (Prieto & Domínguez-Serrano, 2017, p. 229). In addition, most (highly cited) degrowth scholars are men. Consequently, authors call for including ecofeminist analyses and feminist economics to degrowth thinking (Barca, 2017; Harcourt, 2014; Prieto & Domínguez-Serrano, 2017; Martínez-Alier, 2012).

Employment, labour and work

While degrowth is recognised as a social movement, it is rarely connected with labour movements or labour unions (Barca, 2017). In the face of contemporary developments, paid labour has started to erode as a source of livelihood, while at the same time the ecological impoverishments are alarming. These developments call for new understandings of employment, work, and labour. One of the dilemmas emerges from how to maintain a sufficient livelihood for people during and after the transition to a post-fossil fuel society (Barca, 2017).

Non-human animals and interspecies solidarity

In addition to gendered division of human labour, also animals work (Coulter, 2017). Moreover, animal rights in a human-centric world is an on-going discussion. Implicitly, some include making connections between the maltreatment of animals and the paradigm of continuous economic growth (Hamilton & McCabe, 2016). Many calculations about the ecological impacts of humans assume that 'humans have the right the use most of the planet' (Martínez-Alier, 2012, p. 63). Consequently, including non-human animals in the democratic negotiations about economy is a probable future issue also for the degrowth movement (Deriu, 2012). For example, Bogadóttir and Skarðhamar Olsen (2017) discuss Faroese pilot whaling. They link the practice to the discussions of degrowth by framing it as a local non-growth-oriented means of food production.

Discussion and Closure

In this section we address our research questions: (1) What can design for sustainability transitions theory and practice learn from degrowth theories and movement? (2) How can degrowth movement utilise design for sustainability transitions? This paper is a collaboration between a social scientist and a design researcher whose research focus include degrowth and design for sustainability transitions respectively. Thus, in the spirit of appreciative inquiry, we highlight strengths that we see in each other's field.

The strength of DFST lies in the focus on solutions. Since degrowth movement includes an array of various perspectives, there is a wide spectrum of activities that are considered to result in sustainable degrowth. While such a diversity is fruitful for democratic discussions, some processes would benefit from convergence that results from DFST. Moreover, the power of hope present in DFST should not be bypassed. While hope may be interpreted as naivety, it also represents an ability to face troubling issues and still be able to function (Macy & Johnstone, 2012). DFST approaches seem to encompass such hopeful stance, in which troubling and wicked issues are pragmatically addressed one step at a time.

Thus, DFST can contribute into DG research and practice by a number of ways. First, DFST hosts theories on how to achieve transitions, which could be applied to achieving sustainable degrowth. Second, DFST includes practical tools to embed long-term thinking in degrowth movement, which could in turn assist with developing pathways, thus to demonstrate that degrowth is not necessarily fully utopian. Third, DFST creates spaces for hopeful speculation and deliberate creation of pathways as well as knowledge on where do these pathways come from. While there exist the dilemma of keeping futures open while taking action towards creating alternative futures, action for engaging different actors is a strength in DFST. In general, the tendency of DFST to work with the establishment to create "institutional innovation" has value, although some bottom-up actors may not see value in this.

The strength of DG is evident in the accommodation of multiple perspectives in building of theory and practice and therefore paying close attention to discussions on topics that are highly relevant to "creating better futures" (which is what DFST is essentially aiming for) for all, including the "suppressed" and the "voiceless". While these discussions are prevalent in the broader design theory, they have not yet been integrated into DFST thinking in such depth and richness. These discussions have not penetrated into DFST mainly because transitions theories that informed earlier theory development in DFST have been agnostic about growth and the transitions practice followed a mainstream European neoliberal agenda, at least have not fundamentally challenged it. The current theory of DFST puts emphasis on intervening into political-economy as the core leverage point for creating sustainability transformations, thus DFST can benefit from DG discourse to expand and strengthen its theoretical core. In addition, as one main foundation of DFST practice is creation of imaginaries that are radically different than the projection of present, the diverse discussions in DG can feed into these imaginaries immensely as assist them diverge from "business-as-usual" proposals.

This paper has started a discussion on the interface between DG and DFST. We have collaboratively explored how DFST and DG contribute into each other. It seems that, on one hand the strengths of DG

and DFST are complementary but on the other hand they are also paradoxical: What makes DG strong from the perspective of DFST is its divergence and expanding theoretical positions on degrowth whereas what makes DFST strong from the perspective of DG is its aim for convergence, for creating actionable insights and making interventions in systems. This creates an unresolved dilemma; the dilemma of how to carry on critical discussions while at the same time articulating imaginaries and pathways for alternative futures. This resonates with the quote from Goethe we cited at the beginning of our article and perhaps constitutes an "edge" for theory and practice of sustainability transitions that can be deliberated together by scholars from both fields.

References

Asara, V., Otero, I., Demaria, F., & Corbera, E. (2015). Socially sustainable degrowth as a social–ecological transformation: repoliticizing sustainability. *Sustainability Science*, *10*(3), 375–384.

Avila, M. (2017). *Ecologizing, Decolonizing: An Artefactual Perspective*. Paper presented at the NORDES 2017: Design + Power, Oslo.

Barca, S. (2017). The Labor(s) of Degrowth. *Capitalism Nature Socialism*, 1–10. https://doi.org/10.1080/10455752.2017.1373300

Beling, A. E., Vanhulst, J., Demaria, F., Rabi, V., Carballo, A. E., & Pelenc, J. (2018). Discursive Synergies for a 'Great Transformation' Towards Sustainability: Pragmatic Contributions to a Necessary Dialogue Between Human Development, Degrowth, and Buen Vivir. *Ecological Economics*, *144*, 304–313. https://doi.org/10.1016/j.ecolecon.2017.08.025

Bendix, D. (2017). Reflecting the Post-Development gaze: the degrowth debate in Germany. *Third World Quarterly*, *38*(12), 2617–2633. https://doi.org/10.1080/01436597.2017.1314761

Bogadóttir, R., & Skarðhamar Olsen, E. (2017). Making degrowth locally meaningful: the case of the Faroese grindadráp. *Journal of Political Ecology*, *24*, 504–518.

Coulter, K. (2017). *Animals, work, and the promise of interspecies solidarity*. Palgrave Macmillan.

Brezet, H. (1997). Dynamics in ecodesign practice. *Industry and Environment, 20*(1-2), 21-24.

Ceschin, F. (2012). *The introduction and scaling up of sustainable Product-Service Systems: A new role for strategic design for sustainability.* (PhD), Politecnico di Milano, Milan, Italy.

Ceschin, F., & Gaziulusoy, I. (2016). Evolution of design for sustainability: From product design to design for system innovations and transitions. *Design Studies, 47*, 118-163. doi:http://dx.doi.org/10.1016/j.destud.2016.09.002

Cipolla, C., & Peruccio, P. P. (Eds.) (2008). Proceedings of the Changing the Change: Design Visions, Proposals and Tools, An international conference on the role and potential of design research in the transition towards sustainability, Turin, Italy.

D'Alisa, G., Demaria, F., & Kallis, G. (2014). *Degrowth: A vocabulary for a new era*. Routledge.

Demaria, F., Schneider, F., Sekulova, F., & Martinez-Alier, J. (2013). What is degrowth? From an activist slogan to a social movement. *Environmental Values*, *22*(2), 191–215.

Dearing, J. A., Wang, R., Zhang, K., Dyke, J. G., Haberl, H., Hossain, M. S., . . . Poppy, G. M. (2014). Safe and just operating spaces for regional social-ecological systems. *Global Environmental Change, 28*(Supplement C), 227-238. doi:https://doi.org/10.1016/j.gloenvcha.2014.06.012

Deriu, M. (2012). Democracies with a future: Degrowth and the democratic tradition. *Futures*, *44*(6), 553–561. https://doi.org/10.1016/j.futures.2012.03.016

Dewberry, E., & Johnson, J. (2010). *Design interventions, prediction and science in the sustainable transition of large, complex systems*. Paper presented at the The 2nd International Conference on Design Engineering and Science (ICDES2010), 17-19 November, Tokyo. Keynote Lecture.

Escobar, A. (2015). Degrowth, postdevelopment, and transitions: a preliminary conversation. *Sustainability Science*, *10*(3), 451–462. https://doi.org/10.1007/s11625-015-0297-5

Eversberg, D., & Schmelzer, M. (2018). The degrowth spectrum: convergence and divergence within a diverse and conflictual alliance. *Environmental Values*, *27*(3), 245–267.

Gaziulusoy, A. I. (2010). *System Innovation for Sustainability: A Scenario Method and a Workshop Process for Product Development Teams.* (Ph.D.), University of Auckland, Auckland.

Gaziulusoy, A. I., Boyle, C., & McDowall, R. (2013). System innovation for sustainability: a systemic double-flow scenario method for companies. *Journal of Cleaner Production, 45*(0), 104-116. doi: https://doi.org/10.1016/j.jclepro.2012.05.013

Gaziulusoy, A. I., & Brezet, H. (2015). Design for System Innovations and Transitions: A Conceptual Framework Integrating Insights from Sustainability Science and Theories of System Innovations and Transitions. *Journal of Cleaner Production, 108*, 558-568. doi:http://dx.doi.org/10.1016/j.jclepro.2015.06.066

Gaziulusoy, A. İ., & Erdoğan Öztekin, E. (2018). *Design as a Catalyst for Sustainability Transitions.* Paper presented at the Design Research Society Conference 2018, Limerick, Ireland.

Gaziulusoy, A. İ., & Ryan, C. (2017). Roles of design in sustainability transitions projects: A case study of Visions and Pathways 2040 project from Australia. *Journal of Cleaner Production, 162*, 1297-1307. doi:https://doi.org/10.1016/j.jclepro.2017.06.122

Geels, F. W. (2005). *Technological transitions and system innovations: a co-evolutionary and socio-technical analysis*. Cheltenham, UK ; Northampton, Mass.: Edward Elgar.

Gerber, J.-F., & Raina, R. S. (2018). Post-Growth in the Global South? Some Reflections from India and Bhutan. *Ecological Economics*. https://doi.org/10.1016/j.ecolecon.2018.02.020

Hamilton, L., & McCabe, D. (2016). 'It's just a job': Understanding emotion work, de-animalization and the compartmentalization of organized animal slaughter. *Organization*, *23*(3), 330–350. https://doi.org/10.1177/1350508416629448

Harcourt, W. (2014). A feminist response to Stephen Marglin's *Premises for a New Economy*. *The Economic and Labour Relations Review*, *25*(4), 603–611.

Heiskanen, E., Hyysalo, S., Jalas, M., Juntunen, J. K., & Lovio, R. (2014). User involvement and radical innovation: The case of heat pumps in Finland. In S. Juninger & P. Christensen (Eds.), *Highways and Byways of Radical Innovation: The perspective of design*. Kolding: Kolding Design School.

Hyysalo, S., Johnson, M., & Juntunen, J. K. (2017). The diffusion of consumer innovation in sustainable energy technologies. *Journal of Cleaner Production, 162*(Supplement), S70-S82. doi:https://doi.org/10.1016/j.jclepro.2016.09.045

Irwin, T. (2015a). Transition Design: A Proposal for a New Area of Design Practice, Study, and Research. *Design and Culture, 7*(2), 229-246. doi:10.1080/17547075.2015.1051829

Irwin, T. (2015b). *Transition Design: A new area of design research, practice and study that proposes design-led societal transition toward more sustainable futures*. Monograph. School of Design, Carnegie Mellon University, Pittsburg, USA.

Irwin, T. (2015c). Redesigning a Design Program: How Carnegie Mellon University is Developing a Design Curricula for the 21st Century. *Solutions, January-February 2015*, 91-100.

Irwin, T., Tonkinwise, C., & Kossoff, G. (2015). *Transition Design: An Educational Framework for Advancing the Study and Design of Sustainable Transitions*. Paper presented at the International Sustainability Transitions (IST 2015) Conference, Brighton, UK.

Jackson, T. (2009). *Prosperity without growth: Economics for a finite planet*. London: Earthscan.

Joore, P. (2010). *New to Improve, The Mutual Influence between New Products and Societal Change Processes.* (PhD PhD), Technical University of Delft, Delft.

Jönsson, L., & Lenskjold, T. U. (2014). A Foray Into Not-Quite Companion Species: Design Experiments With Urban-Animals as Significant Others. *Artifact, 3*(2), 1-7.

Kossoff, G. (2011). *Holism and the Reconstitution of Everyday Life: a Framework for Transition to a Sustainable Society.* (PhD), University of Dundee, Scotland.

Kossoff, G., Irwin, T., & Willis, A.-M. (2015). Transition Design. *Design Philosophy Papers, 13*(1), 1-2. doi:10.1080/14487136.2015.1085681

Kossoff, G., Tonkinwise, C., & Irwin, T. (2015). *Transition Design: The Importance of Everyday Life and Lifestyles as a Leverage Point for Sustainability Transitions*. Paper presented at the 6th International Sustainability Transitions Conference, August, 2015, University of Sussex, UK.

Latouche, S. (2009). *Farewell to Growth*. Cambridge: Polity Press.

Martínez-Alier, J. (2012). Environmental Justice and Economic Degrowth: An Alliance between Two Movements. *Capitalism Nature Socialism*, *23*(1), 51–73. https://doi.org/10.1080/10455752.2011.648839

Loorbach, D. (2007). *Transition Management: New Mode of Governance for Sustainable Development.* (PhD), Erasmus University Rotterdam, Utrecht, Netherlands.

Loorbach, D. (2010). Transition management for sustainable development: A prescriptive, complexity-based governance framework. *Governance, 23*(1), 161-183.

Mok, L., & Gaziulusoy, İ. (2018). Designing for sustainability transitions of aquaculture in Finland. *Journal of Cleaner Production, 194*, 127-137. doi:https://doi.org/10.1016/j.jclepro.2018.05.013

Mok, L., & Hyysalo, S. (2018). Designing for energy transition through Value Sensitive Design. *Design Studies, 54*, 162-183. doi:https://doi.org/10.1016/j.destud.2017.09.006

Paulson, S. (2017). Degrowth: culture, power and change. *Journal of Political Ecology*, *24*, 425–448.

Prieto, L. P., & Domínguez-Serrano, M. (2017). An Ecofeminist Analysis of Degrowth: The Spanish Case. *Feministische Studien*, *35*(2). https://doi.org/10.1515/fs-2017-0027

Rockström, J., Steffen, W., Noone, K., Persson, A., Chapin, F. S., Lambin, E. F., . . . Foley, J. A. (2009). A safe operating space for humanity. *Nature, 461*(7263), 472-475.

Ryan, C. (2013). Critical Agendas: Designing for Sustainability from Products and Systems. In S. Walker & J. Giard (Eds.), *The Handbook of Design for Sustainability*. London, New York: Bloomsbury.

Schalk, M., Kristiansson, T., & Mazé, R. (2017). *Feminist futures of spatial practice: materialism, activism, dialogues, pedagogies, projections*. Braunach: Spurbuchverlag.

Sekulova, F., Anguelovski, I., Argüelles, L., & Conill, J. (2017). A 'fertile soil' for sustainability-related community initiatives: A new analytical framework. *Environment and Planning A*, *49*(10), 2362–2382. https://doi.org/10.1177/0308518X17722167

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., . . . Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science, 347*(6223).

Tlostanova, M. (2017). On decolonizing design. *Design Philosophy Papers, 15*(1), 51-61. doi:10.1080/14487136.2017.1301017

Tukker, A., & Tischner, U. (Eds.). (2006). *New business for old Europe: product-service development, competitiveness and sustainability*. Sheffield: Greenleaf.

Weiss, M., & Cattaneo, C. (2017). Degrowth – Taking Stock and Reviewing an Emerging Academic Paradigm. *Ecological Economics, 137*, 220-230. doi:https://doi.org/10.1016/j.ecolecon.2017.01.014

Young, D. C. W., Quist, J., Toth, D. K., Anderson, D. K., & Green, P. K. (2001). Exploring sustainable futures through 'Design Orienting Scenarios' – The case of shopping, cooking and eating. *The Journal of Sustainable Product Design, 1*(2), 117-129.