

Postcards From “the Edge”: Toward Futures of Design for Sustainability Transitions

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Abstract: The design for sustainability field has evolved considerably over the past few decades. Its early beginnings were marked by addressing single issues in isolation, with a primarily technologically optimistic predisposition and a focus on incremental product innovation. Currently, “the edge” of the field strategically deals with systemic issues in the longer term, with a focus on human and ecosystem well-being. This evolution has been aligned with and partly influenced by the emergence of sustainability science, and system innovations and transitions theories, as well as scientific advancement pointing to the increasing urgency of action. This article presents an overview of the emergence of Transition Design, discusses the current status of theory and practice, and provides pointers for the theoretical and practical advancement of the field.

Key words: design for sustainability - sustainable design - sustainability - transitions - design - Transition Design.

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Introduction: The Winds That Pushed Design for Sustainability to “the Edge”

Although the history of “the environmental turn” in academic circles dates as far back as the mid-twentieth century (and is often associated with the publication of *Silent Spring* by Rachel Carson in 1962), the twenty-first century in particular has witnessed significant developments be made in both theory and practice. These developments have also

influenced the field of design for sustainability (DfS), challenging its fundamental theories, rules of thumb, tools, and methods, and have pushed it to the “edge”. The first of these developments was the emergence and development of sustainability science as a solution-oriented transdiscipline, bringing the natural and social sciences together (Kates et al., 2001; Clark & Dickson, 2003; Kates, 2011; Lang et al., 2012; Miller et al., 2014). The key implication of sustainability science has been unleashing the realization that environmental problems cannot be understood or addressed in isolation; rather, they are part of a complex whole and are tightly connected to social problems, with the two together mutually reinforcing the other. Related to this is the conceptualization of sustainability as a property of systems and not of individual system components (Clayton & Radcliffe, 1996; Faber et al., 2005), and as a “moving target” shaped by its temporal and spatial context, rather than as a static, fit-for-all, idealized endpoint (Hjorth & Bagheri, 2006). This dynamic, context-dependent conceptualization of sustainability implies that goal-based optimization approaches are not suitable for endeavors aiming at sustainability, and instead, that process-based, multi-scale, and systemic approaches guided by visions are needed (Bagheri & Hjorth, 2007). Recently, sustainability science has been defined as a science of “what could be,” and, with references to Herbert Simon’s work (Simon, 1996), a “science of design” (Miller, 2015), thereby suggesting that there are epistemological and methodological parallels in these two fields that have yet to be elaborated.

The second of these developments is the emergence and maturation of the system innovations and transitions field. System innovations are defined as transitions from one socio-technical system to another (Geels, 2005); therefore, it is common that system innovations and transitions are grouped together, and the terms are interchangeably used. Stemming from science and technology studies, particularly based on co-evolutionary theories of innovation, the beginnings of this field can be traced back to the Dutch National Inter-Ministerial Programme for Sustainable Technology Development which took place between 1993 and 2001 (Weaver et al., 2000). The two main works that set the theoretical foundations of this field were the doctoral theses and subsequent publications of Geels (2002, 2005) and Loorbach (2007, 2010). Geels, based on earlier works of several scholars (Kemp, 1994; Van den Ende & Kemp, 1999; Kemp, Rip & Schot, 2001), has further developed and refined what is known as the multi-level perspective of system innovations (MLP). It would not be an exaggeration to state that MLP is the most commonly used theoretical model and analytical tool in the field. MLP explains system innovations and transitions with references to three dynamically interactive levels: i.e., the landscape level at the top, the socio-technical regime level in the middle, and niche innovations at the bottom level of a nested hierarchy. According to the MLP, stability increases and the rate of change decreases towards the upper levels of the socio-technical system, but the depth and influence of change increases towards the lower levels. The niche innovation’s level is particularly important as this is where the novelties initially emerge from the dynamics of the socio-technical regime, later putting pressure on it.

Loorbach (2007, 2010) developed the transition management approach as a new mode of governance for sustainable development building on MLP and another well-known theoretical model, that is, the multi-phase model of transitions. The multi-phase model (Rotmans et al., 2000) presupposes that transition processes go through a pre-development

phase (no visible change, but a lot of experimentation takes place at the niche level), a take-off phase (the system starts to shift), an acceleration phase (visible structural changes occur), and a stabilization phase (a new dynamic equilibrium is reached). According to the transition management framework (Loorbach, 2010), three interrelated activities are required to achieve system innovations: 1) strategic activities to form long-term visions that will lead to changes in the culture and structure of a socio-technical system; 2) tactical activities that are directed at implementing a transition agenda within the actor-network towards the vision; and 3) operational activities that consist of experiments and learning-by-doing at the niche level. The niche level is of course especially relevant for DfS, particularly for design for social innovation which is about identifying, triggering, and facilitating these experimental opportunities (Hillgren, Seravalli, & Emilson, 2011; Manzini, 2007, 2014). Nevertheless, recent developments in design becoming active in policy development and governmental processes (Junginger, 2013; Kimbell & Bailey, 2017) suggests that it could also be productively involved in the strategic and operational activities of transition management. Recently, Gaziulusoy and Ryan (2017) have argued that transitions are creative, technical, and political design challenges that require imagining new systems, evaluating system concepts, and developing those that are promising, along with designing participatory deliberation processes to attend to the political nature of transitions. The third development is the increasing sense of urgency for action underlined by studies on the integrity of earth systems and social foundations for justice and equity. For example, the now disbanded advisory body to Australian government’s Climate Commission argued that we are in “the critical decade”; a decade in which our decisions and actions on climate change will determine the success or failure of transitions to the low-carbon future that is necessary to avoid severe implications for global society (Climate Commission, 2011). A group of scientists at the Stockholm Resilience Centre studied earth systems over several years and developed the “planetary boundaries” framework (Rockström et al., 2009; Steffen et al., 2015). This framework set out precautionary boundaries – a safe operating space – for nine critical processes of human-driven environmental change. Beyond these boundaries, we all face the possibility of abrupt, large-scale changes in the functioning of the earth’s systems and significant risks to societies and economies worldwide. According to this framework, currently two out of nine boundaries have been severely breached, posing a high risk, two of them have been breached, posing increasing risk, and two boundaries have yet to be quantified. Raworth (2012) developed the concept of social boundaries to complement the planetary boundaries framework and argued for a “safe and just operating space”, which lies between the environmental ceiling and social foundations. She demonstrated through illustrative indicators that humanity is currently falling below this social foundation on every dimension for which data are available. These and numerous other studies triggered the acknowledgment of an urgent need for a radical and transformative restructuring of the socio-technical systems that meet our needs (Ryan, 2013). These transformations cover institutional, social/cultural, organizational, as well as technological, change (Loorbach, 2010); that is, they need to take place at the societal level. Based on this contextual background, this article aims to present “the edge” of DfS theory and practice that is influenced by these developments and their implications. The next section provides a brief historical overview of the emergence of design for system innova-

tions and transitions, or Transition Design. This is followed by a detailed exploration of the current frontiers of this emerging area in theory and practice. The article is completed with “postcards from the edge”; short notes, reflections, and questions about the possible futures of this emerging field.

A Short History of “the Edge”

According to a recent account by Ceschin and Gaziulusoy (2016) on the evolution of design for sustainability (DfS) over the two decades following its inception, the field has shifted its focus from addressing single issues in the short term at the artifactual level to tackling systemic issues at the societal level with a long-term outlook. In other words, DfS has moved from a palliative position to one that is strategic, thereby enlarging its scope both in terms of timeframes and in reference to the complexity of problem and solution contexts. Ceschin and Gaziulusoy have explained their findings by referring to the theoretical developments made in the intersection of design and socio-environmental issues, as well as the established links to broader contextual developments. They have positioned design for system innovations and transitions at the socio-technical innovation level (the other levels are product innovation, product–service system innovation, and spatio-social innovation) of the evolutionary framework that they developed.

Gaziulusoy (2015) identified five criteria as being necessary for design and innovation approaches to contribute to sustainability transitions: 1) adopting a strong sustainability approach; 2) systems thinking; 3) radicalism; 4) long-term orientation; and 5) mindset change. So far, four main theoretical contributions have met these criteria to varying degrees. They are also positioned in Gaziulusoy and Ceschin’s evolutionary framework at the socio-technical innovation level. Three of these were the doctoral theses of Gaziulusoy (2010), Joore (2010), and Ceschin (2012), and the fourth was detailed in the recent contributions of Irwin (2015a) and Irwin, Tonkinwise, and Kossoff (2013, 2015). The locations of these contributions –New Zealand, The Netherlands, Italy, and the USA– are worth noting here to highlight that the emergence of this thinking has been distributed geographically.

Gaziulusoy’s (2010) work was situated at the intersection of sustainability science, system innovations and transitions theories, and design theory. She developed a theoretical framework and an operational tool for the use of design and innovation teams to align their day-to-day decisions and strategic outlooks with unfolding and upcoming sustainability transitions. The theoretical framework and operational tool have been articulated in detail in her doctoral thesis and summarized in subsequent publications (Gaziulusoy, Boyle, & McDowall, 2013; Gaziulusoy & Brezet, 2015). She developed a three-dimensional systemic framework integrating MLP (Geels, 2005) with four design innovation stages for sustainability (Brezet, 1997), and argued for extending the timeframes used for strategic decision making in businesses as a necessity for design and innovation teams to be able to respond to and participate in sustainability transitions. In Gaziulusoy’s (2010) theoretical framework, company strategy plays an intermediary role in translating diffuse, long-term, societal-level visions of sustainability into concrete decisions at the design level in the short term.

Similarly, company strategy plays an intermediary role for the design level to take part in societal-level vision making. The operational tool that Gaziulusoy (2010) developed based on this theoretical framework—a scenario method—integrated explorative and backcasting scenario approaches in order to causally link the present reality to future aspirations.

Joore (2010), on the other hand, situated his work tightly within industrial design engineering, exploring the mutual influence of new products and societal change processes. With references to MLP (Geels, 2005), he developed a multi-level design model to assist in this exploration. Joore (2010) argued that new products must make a contribution to the realization of societal-level visions, and that this influence would especially be relevant if these new products fulfill a function (in the envisioned, new, socio-technical configurations) that cannot be fulfilled in another way. Both Gaziulusoy (2010) and Joore (2010) place an emphasis on functional innovation as a means of opening up design processes for radical innovation. Joore has framed functional innovation by making references to product-service systems (PSS), whereas Gaziulusoy (2010) used a broader frame, including the societal function fulfilled by the organization.

Ceschin (2012) situated his work within the maturing research area of sustainable product-service systems (SPSS) and argued that SPSS can be considered system innovations because they require changes in user practices, organizational structures, regulatory frameworks, and culture. Based on this positioning, his project focused on exploring socio-technical experiments as strategic tools for promoting SPSS during their introduction and scaling up. He defined socio-technical experiments as a partially protected environment in which a broad network of actors can learn and explore how to incubate and improve radical innovations and how to contribute to their societal embedding. This way, Ceschin (2012) has positioned SPSS development and scaling up in the context of system innovations and transitions. Similar to Gaziulusoy (2010), Ceschin developed (2012) a tool for practicing designers.

While these three Ph.D. projects were the first large bodies of work theorizing about system innovations and transitions from the perspective of design, it was Irwin and her colleagues at Carnegie Mellon University’s School of Design who coined the term “Transition Design” within the wider design community as an emerging field of design education, research, and practice (Irwin et al., 2013, 2015; Irwin, 2015a). Transition Design, in addition to and before being influenced by system innovation and transitions theories, had its foundations in the complex systems theories and a wide array of theories of change. According to the framework proposed by Irwin (2015a), there are four mutually reinforcing elements of Transition Design: vision, theories of change, mindset/posture, and new ways of designing. This framework had begun to be developed several years before appearing explicitly in publications, and it informed the redesign of Carnegie Mellon University’s School of Design’s curriculum (Irwin, 2015b).

Current Frontiers of “the Edge”

The previous sections have provided an outline of developments in our understanding of sustainability and the dynamics of transitions that influenced the emergence of Transition

Design, and they outlined a summary of this emerging field’s brief history since 2010. But what, or where, is “the edge” at present? This section explores these questions by taking a deeper look at theory and practice.

Transitions to What?

Transitions, in the sense adopted within this emerging field, are transformations with an explicit directionality towards sustainability at the societal level. Therefore, the first exploration here is how the main theoretical contributions outlined in the previous section frame this direction. Common to all of the work cited is an emphasis on long-term and systemic orientation that is aligned with transitions as long-term processes.

Gaziulusoy (2010) discusses the conceptual groundings of sustainability in detail, favoring the strong sustainability model (irreversible hierarchies between environment, society, and economy, and limited or no substitution of environmental capital with social or economic capital) over the weak sustainability model (environment, society and economy are non-hierarchically related, substitution of capital is possible, often favoring economy over environment and society) as a baseline. She does not argue for a definitive measure or characterization of sustainability. Instead, by making references to theories of ecological economics, she points out that sustainability can only be defined through references to the nominal lifespan of what is to be sustained, and that it is not possible to assess sustainability before the end of the nominal lifespan of what is under consideration. She places an emphasis on the use of a precautionary principle with warnings about the unintended consequences of over- or under-precautionary approaches. Because of the relativity and unknowability of what is sustainable across system levels and over time, she argues in favor of searching for societal-level visions of sustainability and referencing actions at different levels of the socio-technical systems to these large-scale, long-term visions. She also highlights that sustainability cannot be a static measure, and that as the system conditions change and our relative understanding of the systems increase, the adopted vision needs to be adjusted. This dynamic framing implies that visions can only be anchors to direct and, when necessary, to readjust the direction of actions, and cannot be taken as blueprints or absolute framings of sustainable societies. In her theoretical framework, visions are emergent properties generated through direct or indirect contributions of societal system actors; they are somewhat elusive, diverse, and their scale depends on the system level from which they emerged, however, their content needs to reflect an alignment with societal-level visions.

In line with this relative and dynamic framing of sustainability and its emphasis on the different system levels from which visions may emerge, Gaziulusoy (2010) turns to concepts and calculations that are relevant to her research scope, that is production–consumption systems. She argues that as the eco-efficiency requirements that are calculated as necessary for production-consumption systems to be sustainable cannot be achieved within existing socio-technical systems, and since eco-efficiency as a measure of sustainability is insufficient for it lacks any reference to social issues, radical transformations are necessary at the societal level. Ceschin (2012), on the other hand, is less investigative of the foundations. Without engaging in a detailed conceptual exploration of sustainability, he refers instead

to some early attempts at quantifying the required reduction in consumption levels and states that resource consumption should be reduced by at least 90% in industrial contexts in order to consider a socio-technical system as sustainable. He acknowledges that these estimates are approximate; nonetheless, he argues that they validate the need for a radical transformation of our current development model. Joore (2010) is even more succinct. He cites earlier work which argued for a need to transform complex systems to achieve sustainability, and adopts this position as a starting point for his exploration of the relationship between new products and societal change processes.

Contrary to the works cited in the previous paragraph, Irwin (2015a) and Irwin et al. (2013, 2015) are not explicitly or directly concerned with production-consumption systems. Therefore, what is required for sustainability is not discussed in their work with references to concepts that are predominantly relevant for these systems, such as eco-efficiency. Instead of discussing sustainability from a resource point of view, they emphasize lifestyles. A sustainable lifestyle, according to them (with references to earlier work), is based on the principle of meeting needs through the local and regional production of hard goods and the global production and sharing of soft goods. They explicitly point out that a sustainable lifestyle is one in which communities have symbiotic relationships with their environment, and that design should acknowledge the natural world as the greater context for design practice, thus implicitly adopting the strong sustainability model as advocated by Gaziulusoy (2010).

Transitions of What?

All of the work cited here essentially argues for the necessity of societal level transformation, albeit by choosing different “functional units” and “operational contexts” on which to focus. While Gaziulusoy (2010), Joore (2010), and Ceschin (2012) predominantly situate their theoretical frameworks in the context of product development and business, with a focus on production-consumption systems, Irwin’s (2015a) and Irwin et al.’s (2013, 2015) framework focuses on lifestyles at the individual and community levels. In Gaziulusoy’s (2010) framework, there is an emphasis on companies and their design and innovation teams aligning their strategies, decisions, and actions with societal-level sustainability visions. The whole theoretical framework revolves around establishing this connection through a systemic and temporal staging, which situates societal visions in the long term, company strategy in the medium term, and product development in the short term. She provides details on how design and innovation teams can contribute to societal-level transformations, or socio-technical transitions, at the product development level.

Although the need for societal-level transformation and mutual influence between products, product-service systems, and societal change processes are acknowledged in Joore (2010) and Ceschin (2012), *how* design in product development can purposefully influence change processes at the societal level is not explained theoretically in much detail. Instead, in Joore (2010), new products are framed as potential enablers of transitions, and transitions are assumed to result in the development of new products that are reflective of the characteristics of the new or emergent socio-technical system. In Ceschin (2012), who (similar to Gaziulusoy) acknowledged different temporal frames relevant for design,

a prescription was made for designers to widen their temporal outlook and broaden their design scope to cover the design of transition paths without elaborating on how they can also take part in the generation of societal-level visions.

Irwin (2015a) and Irwin et al. (2015), however, place Transition Design at the end of a design continuum, arguing that Transition Design that deals with the generation of sustainable lifestyle visions can inform design approaches that deal with the generation of short- and medium-term solutions. Therefore, their framework resembles the framework of Gaziulusoy (2010) in the sense that it assumes a role for designers in the generation of visions at the societal level. However, the difference is that, for Gaziulusoy (2010), design and innovation teams have an indirect influence on the generation of societal-level visions mediated through company strategy, whereas, for Irwin (2015a) and Irwin et al. (2015), Transition Design is a design activity that is directly involved in the generation of visions of sustainable lifestyles. In Gaziulusoy (2010), design as a subject of transition is implicit. Similar to design indirectly influencing societal-level visions, it is assumed that societal-level visions will influence design through the mediation of company strategy, as well. Ceschin (2012) and Joore (2010) do not deal with the questions of *if* or *how* design becomes a subject of transitions. In Irwin (2015a) and Irwin et al. (2015), design is explicitly a subject of transitions. In their framework, visions of transitions, transition knowledge, designers' mindsets and posture, and new ways of designing are four elements that are assumed to continually inform and transform one another.

Transition Design: How?

Following the elaboration of how contributions to Transition Design frame the content and subject of transitions, this section explores the tools and methods of Transition Design proposed so far. In line with her conceptual framework that grants company strategy a mediating position between the wide-scale generation of societal visions and the development of products in design teams, Gaziulusoy (2010) and Gaziulusoy et al. (2013) developed a scenario method for the use of companies. This method combines tools that are familiar to companies and design teams (organizational vision development, risk assessment, stakeholder analysis, explorative [foresight] scenarios, and product concept generation) with other (new or existing) tools with which companies and design teams are unfamiliar (development of a sustainability model, societal vision development, reflecting on organizational function within society, systems analysis, and normative [back-casting] scenarios). The method aims to trigger reflection within companies on the interrelationships between environment, society, economy, and their organization, assist them to participate in the development of visions of sustainable societies and reflect on how the organization (and consequently the outputs of the design team) should change to remain relevant in those societies, and walk them through the generation of scenario network maps (List, 2005) linking the present at the organizational and product development levels with future societal visions. The resulting scenario network maps have three layers: events, products, and stakeholders, and inform company strategy and design decisions. Gaziulusoy (2010) has developed this method iteratively, working together with three case companies by following an action research methodology.

Ceschin (2012) also developed a tool, but in contrast to Gaziulusoy (2010), who targeted companies as a whole with her method, he directly targeted designers and the design process. He combined four clusters of established and new PSS design tools. These clusters involved tools for formalizing PSS concept visions (PSS offering diagram, PSS value chain map, storyboard, PSS elements, and sustainability diagram), tools for developing and formalizing transition strategies (transition path canvas, transition path storyboard, transition path table, socio-technical experiments’ design guidelines, and scaling up guidelines), tools for managing the network of actors (actor map, actors table, key issues and alternative options map, and context opportunities and barriers map), and tools for monitoring and evaluating the transition process (experiment evolution framework and scaling up evaluation framework). Ceschin (2012) has also developed, tested, and iteratively improved these sets of tools through two case study projects and a design workshop. Although Irwin (2015a) and Irwin et al. (2013, 2015) have not developed a tool or elaborated on a specific method, it is understood that they have adopted and advocate the generic method used in system innovations and transitions projects, that is the visioning and backcasting approach. They place a significant emphasis on long-term visions as propellers of short-term projects that are rooted in new, more sustainable paradigms. Even though they do not readily provide a tool or method that can be used in Transition Design projects, their main methodological contribution to Transition Design is in fact realized through design education. The new curriculum currently being implemented at Carnegie Mellon University’s School of Design (Irwin, 2015b) uses Transition Design as an overarching framework to guide design education at the bachelor, master’s, and doctoral levels. This is in line with how Transition Design in their theoretical framework is also strongly linked to the transition of design, as much as it is about the design of transitions.

Transition Design in Practice

It is heartening to observe that as a field in its infancy with a history that is more or less a decade long, Transition Design has started to attract the attention of practitioners. Any evidence that can be provided here is anecdotal and based on a few personal conversations held with practitioners mainly working in the policy-making area of service design. These practitioners, by way of being assigned to service design projects (mainly by governmental bodies), have started to sense “the edge” through the temporal, procedural, and spatial limitations imposed on them by having to work for a single client under non-disclosure mandates when the issues they are commissioned to generate solutions for require larger systemic and longer term interventions than the project briefs frame, as well as opening up processes to a larger network of relevant stakeholders than they are allowed. When these practitioners are introduced to Transition Design, they realize its transformative potential at the institutional level; nonetheless, they experience difficulties in creating opportunities for and initiating Transition Design projects within the commercial environments and bureaucracies of their clients. This anecdotal evidence may in fact be pointing to growing pains in the professional environment, and there is room to hope that soon enough early adopters will emerge, presenting their projects as examples and that a “take-off” will follow.

Although Transition Design projects are yet to come in practice, it is a promising sign that designers have started to be commissioned in transition projects for strategic roles, rather than solely to work on the creation of conventional design outputs (such as visualizations and product concepts). For example, a design-led transition 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 synthesizing knowledge from a variety of resources and expertise bases, and to develop visualized and narrated proposals for alternative, low-carbon, and resilient urban futures (Gaziulusoy & Ryan, 2017). In another project on 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, in press).

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 context of transition projects (Gaziulusoy & Ryan, 2017); but being a Transition Designer requires skills, knowledge, and professional and personality traits that are not yet widely considered “designerly traits”. Irwin (2015a) counts “mindset and posture” as one of the four core elements of a Transition Design framework. According to her, the mindset and posture required of Transition Designers cover self-reflection, inquiry into one’s own value set, a willingness to transform from within, openness, holistic worldview, community centeredness, humility, ability to lead and be led, and transdisciplinary collaboration. These new designerly traits go hand-in-hand with the 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.

Postcards From “the Edge”

The previous section provided an overview of the current status of theory and practice in the intersection of design and sustainability transitions. In this section, thoughts on how the Transition Design field could further develop will be presented. These thoughts are formulated as short notes –with a postcard synopsis– as the aim here is not to put forward well-scrutinized arguments, but instead to highlight some comments and questions that need to be considered in the near future by theorists and practitioners of Transition Design.

Postcard I - Work in Consortiums

Potential support for the diffusion of Transition Design in practice could come from the completion of some postgraduate projects undertaken in the non-commercial, protected, and educational set-up of universities. In this regard, current master’s and Ph.D. students

whose projects are building on the early work cited in the previous sections could serve as positive “Trojan horses” in the organizations they encounter throughout their studies, as well as those with whom they may work upon completion of their studies. In fact, as Transition Design projects require the generation of new knowledge through the integration of a wide array of both academic and non-academic expertise, and the creation of new policies through the involvement of large networks of stakeholders, consortiums for applied research –including academic, governmental, non-governmental, and private organizations– could be the only feasible operational model for initiating and running Transition Design projects. This brings to the fore the question of what effective mechanisms there are and should be developed further for funding and governing the work of such consortiums.

Postcard II - Advocate and Model Open Innovation Through Open Networks of Learning

There is a danger that Transition Design might become the new “design thinking”; it might be reduced to a process model and commercially exploited by “Post-it design consultancies” as yet another tool of incremental change, rather than push the boundaries of mainstream socio-ecological-technical and socio-political practices and imaginaries. Such co-option would undermine the very essence and spirit of Transition Design. This is not because Transition Design is a homogeneous or static body of theory and practice; on the contrary, evolution is an inherent characteristic of any field of knowledge, whether theoretical or practical. But, because Transition Design promotes change that has directionality towards sustainable (and just) futures achieved through the reconception of entire lifestyles (Irwin, 2015a), as well as the restructuring of entire systems of production and consumption (Ryan, 2008), any project labeled as a Transition Design project that does not include a radical rethinking of institutional and organizational models, a redesigning of socio-technical systems, or a reimagining of socio-ecological relations would result in transformative opportunities being lost. For this reason, Transition Design theory should be developed within open learning networks and any practice-relevant insights should be made immediately publicly available in a usable format. Similarly, in commercial arrangements, practitioners should readily share their Transition Design knowledge openly with their clients or in the consortiums in which they work. The practice-relevant learning generated within these arrangements on Transition Design processes should also be fed back into the body of open knowledge. Practitioners should only charge for their expertise and experience in initiating and coordinating Transition Design projects –not for the knowledge of theory and methods of Transition Design. This brings to the fore the question of how such an open network of learning and the pool of open knowledge could be organized, facilitated, and governed.

Postcard III - Do Not Lose Sight of “the Small” in a Meta-theory

Loorbach (2007) argued that transitions theory is an inclusive and flexible meta-theory that could integrate existing models and theories. This could also be considered true for Transition Design theory and the practice of Transition Design. Ceschin and Gaziulusoy

(2016), in their analysis of the historical evolution of the DfS field, presented several approaches that fall under this umbrella field as a nested hierarchy, positioning design for system innovations and transitions as the uppermost layer. Although the focus of the DfS field, in their observation, has evolved from being technology-centered and insular to being human-centered and systemic, they urged their readers to avoid drawing the conclusion that the higher levels in this hierarchy have replaced or should replace the approaches at the lower levels. Ceschin and Gaziulusoy (2016) emphasized that the approaches are complementary, rather than contrasting:

Therefore, each DfS approach should be acknowledged for its associated strengths and shortcomings, and should be utilised in conjunction with complementary approaches for any given project following a systemic analysis, because addressing sustainability challenges requires an integrated set of DfS approaches spanning various innovation levels. Approaches that fall under the Socio-technical Innovation Level demonstrate this requirement well. Design for System Innovations and Transitions focuses on transforming systems by actively encouraging development of long-term visions for completely new systems and linking these visions to activities and strategic decisions of design and innovation teams. Achieving these visions will require design and innovation teams to use a combination of the approaches in lower levels and use in development of new technologies, products and services (Level 1), new business models (Level 2), new social practices (Level 3) that can be part of the envisioned future systems. (pp. 147-148)

It would also be interesting to investigate how some emerging DfS approaches, such as design for conviviality (Lizarralde & Tyl, in press), design for resilience (Baek, Meroni, & Manzini, 2015), and design for co-habitation (Smith, Bardzell, & Bardzell, 2017) could be supported by and contribute to the theory and practice of Transition Design. Both the established DfS approaches mentioned in Ceschin and Gaziulusoy (2016) and the emerging approaches mentioned in this paragraph are “small” approaches in the sense that their focus is either systemically narrow or thematically limited. Nevertheless, the former set can assist with achieving visions at different systemic scales and the latter set can inform visions of new systems as new ways of designing.

Postcard IV - Expand Theoretical Foundations and Discuss Implications on the Practice of Such Expansion

The foundational theories that underlie the early contributions to Transition Design cover complex adaptive systems theories, sustainability science, system innovations and transitions theories, social practice theory, and environmental ethics. These are essential theories for informing the future 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 comfort zone. For example, design in general should shake off the dominance of human-centeredness in theory and practice as

it is a necessary foundation, but too anthropocentric to lead design practice into the future on its own. Transition Design should develop ways to give a voice to the voiceless, both in its epistemology and methodology, as its essential aim should cover creating *just* futures as well as sustainable ones. For this purpose, design in general, and Transition Design in particular, can learn from feminist theory, animal studies, post-humanist ethnography, political ecology, and literature on decolonizing methodology. Some of this literature has been integrated into design through the contributions of pioneering work in recent years (for example, Avila, 2017; Jönsson & Lenskjold, 2014; Schalk, Kristiansson, & Mazé, 2017; Tlostanova, 2017). Further exploring the implications of this literature in design and from it derive insights and lessons for the development of Transition Design theory and practice is urgently needed.

Postcard V - Post-Transition Design: Prepare for “What if Not?” and “What is After?”

Transition Design is implicitly a project of hope; a hope that is based on the assumption that society can achieve a major transformation toward sustainability in a timely manner and following a smooth path. Nevertheless, in the broader context of academic and public sustainability discourse, hope and despair go hand in hand. This is particularly amplified in regard to climate change. For example, on the one hand, record renewable energy deployment was observed globally in 2016 (International Energy Agency, 2017); but on the other hand, emissions reduction targets that are required to reduce the risk of severe climate change have not yet been met, and the window to limit the average increase of global temperatures to between 1.5 and 2 degrees centigrade, as compared to preindustrial levels, is rapidly closing (Rafter et al., 2017; UNEP, 2017). The observable impacts of an already changed climate include the migration of animal species to higher altitudes, shrinking glaciers, loss of sea ice, more intense heat waves, and more frequent and severe extreme weather events. This begs the question: What if transitions do not happen either timely or smoothly? Some transitions may happen faster than others, depending on contextual dynamics. In some cases, they may be induced by crises, and in some other cases there may be systemic collapses. So, there is not a single type of transition and Transition Design expands its theoretical base as well as tools meant for practice by learning from several transitions typologies proposed (Berkhout, Smith, & Stirling, 2004; de Haan & Rotmans, 2007; Smith, Stirling, & Berkhout, 2005; Geels & Schot, 2007). Another question that comes to mind is what happens after the transition, when new dynamic equilibriums start to emerge? What forms can Transition Design take and how can it contribute to post-transition contexts?

Conclusions

This article presented an overview of the influencers, history, and current theory and practice of an emerging area of design of sustainability positioned at the intersection of system innovations and transitions theories and design theory and practice, namely Transition Design. So far, there have been four main theoretical contributions to the field.

These contributions have overlaps and divergences in their foundational theories, their framing of transitions and focal system components, as well as their proposed tools and methods. At their core, they all share the view that there is an urgent need for systemic and structural changes to take place in socio-technical systems in order for society to become sustainable, and that these change processes can be formulated and approached as design projects. The contributions show that Transition Design can be relevant to different implementation contexts (including companies as well as communities), within large transition projects, and for design and innovation teams. Transition Design, following on from these early contributions, is about the transition of design as much as it is about the design of transitions. As it is an emergent field with a decade-long history, interest in Transition Design in practice is in a nascent stage. Although there are some structural impediments to the speed of its uptake, there are also hopeful signs that wider adoption may soon take place. There is ample room for this new area of design for sustainability to further develop and strengthen its theoretical base and practical relevance. Some indications provided in this article include:

- Adopting a consortium model in running Transition Design projects;
- Advocating open innovation across open networks of learning and finding a suitable governance model to enable this;
- Investigating how established and new designs for sustainability approaches could complement the theory and practice of Transition Design;
- Moving away from the legacy of human-centered design and giving a voice to the voiceless by integrating theories from feminism, animal studies, post-humanist ethnography, political ecology, and literature on decolonizing methodology; and
- Integrating transition typologies into the theory of Transition Design and reflecting on the potential roles of Transition Design in a post-transition context.

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Resumen: El campo del diseño para la sostenibilidad ha evolucionado considerablemente en las últimas décadas. Sus inicios se caracterizaron por abordar problemas individuales de forma aislada, con una predisposición principalmente optimista desde el punto de vista tecnológico y un enfoque en la innovación incremental de productos. Actualmente, “el borde” del campo se ocupa estratégicamente de problemas sistémicos a largo plazo, con un enfoque en el bienestar humano y el ecosistema. Esta evolución se ha alineado y ha sido parcialmente influenciada por la emergencia de la ciencia de la sostenibilidad y las innovaciones de sistemas y las teorías de las transiciones, así como por el avance científico que apunta a la creciente urgencia de la acción. Este artículo presenta una visión general del surgimiento del Diseño para la Transición, analiza el estado actual de la teoría y la práctica, y proporciona sugerencias para el avance teórico y práctico del campo.

Palabras clave: Diseño para la sostenibilidad - diseño sostenible - sostenibilidad - transiciones - diseño - Diseño para la Transición.

Resumo: O campo do design para a sustentabilidade evoluiu consideravelmente nas últimas décadas. Seus inícios se caracterizaram pela abordagem de problemas individuais de modo isolado, com uma predisposição principalmente optimista desde o ponto de vista tecnológico e um enfoque na inovação progressiva de produtos. Atualmente, o limite do campo ocupa-se estrategicamente de problemas sistêmicos ao longo prazo, com um enfoque no bem-estar humano e o ecossistema. Esta evolução se alinhou e foi parcialmente influenciada pela emergência da ciência da sustentabilidade e as inovações de sistemas e as teorias das transições, assim como pelo avanço científico que aponta á crescente urgência da ação. Este artigo apresenta uma visão geral do surgimento do Design para a Transição, analisa o estado atual da teoria e a prática e faz sugestões para o avanço teórico e prático do campo.

Palavras chave: Design para a sustentabilidade - design sustentável - sustentabilidade - transições - design - Design para a Transição.
