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Between Deep Roots and a Broad Crown

Reflections on the Development of Sustainability Transitions as a Research Field

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28.1 Introduction

Chapters 1–27 in this edited volume have introduced a wide range of concepts and themes that have been developed within sustainability transitions research (STR) and that have shaped the field over the course of more than three decades. This chapter focuses on the trajectory of STR as a research field. The writing of this Handbook provides a unique opportunity to pause and reflect on the field's origins, progress, past and present tensions and future aspirations. This chapter serves as an observatory for such introspection, consolidating and synthesising how STR is perceived by its contributors. Our aim here is not to conclusively define the past, present and future of STR but rather to open a dialogue about how this vibrant research field is perceived by its contributors and where it could – and should – be heading.

The development of research fields has frequently been described in terms of distinct phases and stages of disciplinary development (Geels, 2022; Hirsch & Levin, 1999; Shneider, 2009). Drawing on these understandings, we neither perceive nor present the development of STR as a linear march through time. Instead, we see it as layers of activity that collectively contribute to the establishment of a common research focus. At its core, STR focuses on understanding and analysing complex, dynamic, long-term and fundamental processes of change in subsystems of society, most often described as socio-technical systems. This shared interest in meso-level societal change processes, beyond individual decisions but short of fundamental transformations of whole societies, and their potential reorientation towards broadly understood sustainability, is at the core of the field. If STR were a tree, the common focus on these change processes would be its trunk, fed by a constantly evolving root system drawn from a wide range of scientific disciplines and research fields. Like the trunk of a tree branches out, STR consists of widely, but not uniformly, shared language, concepts and research approaches, which are

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discussed in *Part I* of this book: *Understandings of sustainability transitions*. Over the past decades, this tree has grown a broad crown, but remains connected to other social science fields.

As contributors to the field and active members of the STR-related communities sustainability transitions research network (STRN) and the network for early-career researchers on sustainability transitions (NEST), we, the authors of this chapter, are not neutral observers, but actively seek to contribute to the development of STR. The observations and reflections presented in this chapter are based on perspectives brought forward by the community. They are thus, to stay with the metaphor, the views of forest dwellers and are meant to be read as an invitation and inspiration for a wider discussion. The remainder of this chapter is organised in four sections. We begin with a brief description of our *Approach* to gathering insights and reflections on STR as a research field. We then discuss the *Past and Present of STR* as well as its *Challenges Ahead* derived from these insights and reflections, and conclude with *Concluding Remarks* in which we present points for further discussion.

28.2 Approach

The observations on the development of STR that we present in this chapter are based on an integration and triangulation of the results of a survey of respondents from the research field, as well as on recurring critiques and reflections on the development of the field. The survey (consisting of seven questions about the respondent's background and three open-ended questions about the current and future perspectives of STR) was distributed among STRN and NEST members as key communities within STR. This was done via the respective mailing lists, the authors' Twitter accounts and the NEST conference acceptance email in March 2023. This resulted in 208 responses, of which 184 were complete. Of particular interest for this chapter were the three questions on the current state and future developments of STR. The responses were coded inductively, looking for recurring arguments and patterns. This coding was an interactive process with all authors to increase the validity of the findings. In addition, the key findings of the survey were linked to arguments found in the literature discussing and critiquing developments in and within the field, in order to arrive at the observations present in Section 28.3.

28.3 Past and Present of Sustainability Transitions Research

28.3.1 Origins and Core Focus

The mid- and late-1990s mark the beginning of STR. This marked the emergence of various analytical frameworks designed to grapple with the complexities of socio-technical change. These frameworks drew on a range of disciplinary

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perspectives, spanning evolutionary economics, science and technology studies and innovation studies (Geels, 2022). By 2012, Markard et al. (2012) identified four seminal approaches at the heart of transition research: technological innovation systems (Bergek et al., 2008; Hekkert et al., 2007, see also Chapter 4), strategic niche management (Kemp et al., 1998, see also Chapter 5), transition management (Loorbach, 2007; Rotmans et al., 2001, see also Chapter 3) and the multi-level perspective on socio-technical transitions (Geels, 2002, 2011; Smith et al., 2010, see also Chapter 2). These approaches not only served as conceptual frameworks but also delineated the boundaries of the research field and promoted a shared systemic perspective on socio-technical change (Markard et al., 2012). This has also influenced the lenses we wear when defining and framing a problem. As discussed in Chapters 25 and 27 of this Handbook, it influences which worlds are brought into focus, and which are not. The assumptions and insights from these strands of research often overlap or complement each other, and they share an interest in providing middle-range theories for understanding change (Geels, 2007, 2018).

These four frameworks have provided STR with a shared language of socio-technical niches, regimes and landscapes. Each framework contributes unique insights, which intertwine and reinforce each other, creating a shared focus, networked knowledge and a distinguishable body of theory. Most notably, it is the language of the Multi-level perspective (MLP) which has over time come to permeate the entire field. More specifically, processes of regime formation, generally driven by social and technological innovations coming from the niche and influenced by landscape dynamics, became the dominant focus of STR in the field's formative years. More recently, this focus has been broadened to include converse processes of regime destabilisation, the deliberate decline of incumbent system configurations, multi-regime interactions and the governance of transition processes (Kanger et al., 2020; Rinscheid et al., 2021; Turnheim & Geels, 2012, see also Chapter 10).

However, this was only the beginning of the development of STR. Although by no means a complete shift, the focus of the field has moved from *socio-technical* to *sustainability* transitions (Cherp et al., 2018). Researchers' attention to sustainability transitions involves a focus not merely on regime change, but is defined as a 'radical transformation towards a sustainable society, as a response to a number of persistent problems confronting contemporary modern societies' (Grin et al., 2010). This focus on sustainability implies strong normative assumptions: that systems must change in response to major societal challenges (Markard et al., 2012), and that the preferred direction of change can be known. It is this combination of addressing societal and sustainability challenges from a socio-technical systems perspective that binds STR scholars together. At the same time, it is crucial to acknowledge the diversity of perspectives within STR (e.g. Swilling, 2020) in its development.

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28.3.2 Achievements and Current Developments

STR has grown from its origins as a small field within a few Western European universities to an international research field using a common research language. Over the years, the metaphorical tree of STR has grown, and we can observe a network of branches extending in various directions. These branches encompass a wide range of methodological approaches, including qualitative, quantitative and mixed methods and tools, theoretical concepts and thematic foci. While some of them have been significantly developed, such as the focus on energy and mobility, others are still in their nascent stages and offer room for further exploration, such as water and outer space. In addition, engagement with policy and practice has won increasing attention over the years. Overall, we observe two main streams within STR scholarship, which also become very apparent in the responses to our survey. In one stream, researchers address transitions as a research unit, first from a historical perspective (Markard et al., 2012), later with more focus on ongoing transition processes (e.g. Hoffman & Loeber, 2016; Voß et al., 2009). In the other stream, researchers conduct more normatively driven research aiming to steer and facilitate transition processes-in-the-making (Farla et al., 2012), including an additional element of action and urgency (Kemp & van Lente, 2011; NESTwebinar#9 by Bruno Turnheim (Youtube)).

This openness to a variety of research approaches, both problem-oriented and solution-oriented, seems to make STR an attractive field for many scholars. While this was evident in the survey results, it is also reflected in the growth of STRN and NEST as research communities. From a field that was shaped by the valuable contributions of a few leading individuals, STR has developed into a vibrant community open to the engagement of both early-career and established scholars to shape these communities from within. The growing number of scholars involved in the activities of the communities has also led to a process of formal institutionalisation, for example with the recent development of an STRN secretariat at Utrecht University. Reciprocally, STR is also being consolidated into a fixed picture, for example with the publication of the STR research agenda (Köhler et al., 2019), the establishment of Environmental Innovation and Societal Transitions as a respected journal, as well as the compilation of the handbook of which this chapter is part.

28.3.3 Main Critiques and Avenues for Development

Despite its achievements, STR is not without its challenges. Survey responses highlight the need to expand the empirical scope of the field into under-researched sectors (e.g. finance or digitalisation, see van den Bergh et al., 2021) and geographies. Furthermore, there are calls to diversify the field by including voices that help to overcome the dominance of traditional perspectives, and to set another

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step by decolonising sustainability transitions (e.g. Arora & Stirling, 2023; Ghosh et al., 2021) Additionally, STR should further mature in its inter- and transdisciplinary approaches (Loorbach et al., 2017) and develop a long-term perspective on successful and failed transition processes (e.g. Sengers et al., 2019), instead of perpetuating certain narratives with their material consequences. As the study of power and politics is central to STR (e.g. Avelino, 2017), it is also important to acknowledge the taken-for-granted assumptions that feed back into what is studied by transition scholars (Raj et al., 2022).

Two main critiques of STR have remained persistent over time. While these critiques have been raised and discussed repeatedly, it is important to emphasise that they have resurfaced in the survey and therefore require continued attention.

First, STR is understood as a field that focuses on 'mere description' (Gerring, 2012) and too much incremental and partly repetitive research. Related to this is the finding that articles published in Environmental Innovation and Societal Transition are dominated by single case studies and a single theoretical framework for each of these studies, with too few attempts to build a cumulative knowledge base (dialogue session IST2023; Newig & Rose, 2020). There is a general desire for STR to move from describing change processes to providing causal explanations (see Sorrell, 2018; Svensson & Nikoleris, 2018) and the ability to predict transitions. In recent years, much work has been done in this direction, for example related to social innovation (e.g. Pel et al., 2020), a focus on actors and behaviour (e.g. Upham et al., 2020) and a focus on modelling (for an overview, see Hirt et al., 2020).

Second, criticism has been voiced under the umbrella of an 'innovation bias' of the field (Hebinck et al., 2022; van Oers et al., 2021). STR is being accused of – still – placing a strong emphasis on technological innovations and making assumptions about the need for economic growth (e.g. Feola, 2019). This persistence is attributed to a lack of discussion of epistemological and ontological differences within the field, limited self-criticism and reflexivity about research practices and findings, as well as an uncritical engagement with the 'sustainability' and 'transition' as buzzwords. Additionally, it is perceived as problematic that STR incorporates concepts from other research fields – but does not necessarily include the scholars coming from these fields – while lacking engagement with the debates that have already been conducted or are ongoing around these concepts. As a result, there is too little integration of frameworks and insights on sustainability and/or transitions from other fields and limited discussion of STR findings with other communities.

28.4 Challenges Ahead

Beyond these established critiques of STR, we outline several key challenges on the horizon, each of which has implications for the field's development and impact.

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28.4.1 Cohesion versus Fragmentation

One pressing challenge facing STR is the tension between cohesion and fragmentation. While certain branches of the field, such as research focused on energy transitions, continue to thrive and attract considerable scholarly attention, there is a growing concern about the potential fragmentation of STR. The rapid expansion of STR literature (see contribution Markard & Truffer in the 35th STRN Newsletter, pp. 10–12) has increased the risk that each specialised branch may develop into its distinct research field, potentially weakening the links between empirical findings and conceptual advances across different branches. This fragmentation may exacerbate the issue of insufficient cumulation of evidence that we highlighted earlier in this chapter. At the same time, the long-standing tension between the use of transitions and transformations (see Hölscher et al., 2018) also provides food for thought about how the research field develops and how it relates to its different branches.

In addition, the diverse academic backgrounds of STR scholars, rooted in different disciplines, may contribute to this fragmentation. Academic affiliations with different disciplines are often necessary for career advancement, which can further isolate research strands within STR. To address this challenge, it is imperative that the academic communities of STRN and NEST, as well as core transition studies journals, to actively counteract these centrifugal forces. Fostering collaboration, interdisciplinary dialogue and the sharing of insights and methodologies between different branches is essential to promote the cohesiveness of the field.

28.4.2 Giving Back to the Academic Environment

To return to the tree metaphor, the growth and development of STR has been dependent on the rich academic environment from which it has drawn nourishment. Yet, as this field has flourished, it is important that it reciprocates and contributes back to the broader academic ecosystem. In the metaphorical context of the tree, STR has absorbed nutrients from fertile soil but has not yet sufficiently returned these efforts to other research communities, leading to a certain degree of isolation.

Less metaphorically, STR continues to draw on findings and concepts from established disciplines such as sociology, political science or science and technology studies, and increasingly also from management studies and psychology (e.g. Bögel & Upham, 2018; Kump, 2023), linking them to key STR concepts. However, the reverse flow of insights and conceptual developments from STR to these contributing disciplines is less pronounced. Understanding the dynamics of knowledge exchange – identifying where knowledge is imported from and where STR concepts and results can be integrated into other disciplines – is crucial. This is particularly important for early-career researchers, who often have to

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navigate the need to build academic standing in more traditional disciplines and research fields beyond their engagement with STR. It is a delicate balance between established disciplines with their own logics and STR, to not only develop the conversation within the research field but also to reach out to those beyond, and to further develop the theorising within STR. To ensure a healthy reciprocal relationship with other disciplines, the field should actively investigate the factors that currently inhibit the dissemination of findings and conceptual developments from STR, and work to alleviate these obstacles.

28.4.3 Political and Social Responsibility

Another challenge relates to the social and political responsibility of the field. As the issue of sustainability transitions grows in importance, the relevance and impact of STR will increase and its core concepts and approaches may become mainstreamed in education, funding calls and policymaking. These developments increase the agency of STR scholars to potentially drive certain societal changes. This position comes with societal responsibilities as well as (research) ethical issues that the field needs to reflect upon and respond to. In light of this, it is essential for STR to contemplate its potentials and limitations, particularly in supporting practitioners and policymakers. As STR scholars are increasingly sought after for advisory roles, and as more researchers trained in transition studies enter careers in policy advice, it is crucial to identify best practices and learnings (see e.g. European Environment Agency, 2019). Reflections on how STR can effectively contribute to policy and societal progress should be a part of the ongoing discourse in the field.

These three challenges represent an opportunity for the growth and maturation of the field. Balancing specialisation with cohesion, fostering reciprocal knowledge exchange, for instance through inter- and transdisciplinary processes of knowledge production, and thus, embracing responsibility for influencing societal change are key aspects of STR's evolving journey.

28.5 Concluding Remarks

In this chapter, we have taken stock of the field's past and present, considering how it has developed and how contributors perceive its current state. In addition, we have considered critiques of and challenges to STR that we believe are important for understanding its future trajectory and that mark key areas where STR scholars need to focus their efforts in order for the field to maintain its relevance and lustre. Returning to the image of the tree, transitions research is far from being static, but a living entity. The metaphor serves as a reminder that the field does not

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grow out of nowhere but is the result of the collective efforts of individual scholars and from the health of its roots grounded in a broad range of academic disciplines.

From these reflections, several key insights emerge. First, particularly in the light of the consolidation of transitions research, there is a clear desire to avoid isolation and to exchange with neighbouring research fields, their methods and theories, in order to sustain the success of STR. While there is no consensus on the exact nature of this exchange or the priorities placed on different inputs, the STRN research agenda (Köhler et al., 2019) and the survey results presented here provide some guidance.

Second, STR forms a robust community, united by a common language, which can be considered one of the major achievements of the research field. While this common language facilitates interaction across the diverse disciplinary backgrounds of scholars within STR, it also carries the risk of rigidity and exclusivity, as it potentially alienates newcomers and impedes the exchange of knowledge with other research fields. Moreover, language evolves in tandem with societal change, necessitating adaptation. Thirdly, the growth of a tree, like the development of a research field, is gradual, whereas the academic and societal environment can change rapidly. Finding the right balance between embracing new developments and staying rooted is an ongoing challenge, particularly in a field born out of an ambition to contribute middle-range theory on societal change while remaining in dialogue with practice (Köhler et al., 2019). This requires critical reflection on the role of technological innovation, which does not yet deliver on its promises towards systemic shifts towards sustainability (Koretsky et al., 2022) and prevailing economic assumptions (Feola, 2019).

Finally, while STR has made significant contributions to the understanding of socio-technical change, it also faces important areas for improvement and critical reflection. These areas include addressing diversity and inclusivity, integrating insights from other fields and fostering greater (self-)reflexivity about the field's assumptions and structures and how these influence our problem framing, research questions, research processes and (policy) recommendations. By addressing these weaknesses, STR can better fulfil its aspirations and increase its impact and relevance in driving sustainability transitions towards a more sustainable future.

As early-career researchers aspiring to contribute to the field, we recognise the responsibility to take these insights forward. The development of STR is an ongoing process, and we urge scholars, especially early-career researchers, to continue the discourse. The institutionalisation process of STRN offers a valuable space for reflection within the network's activities. We firmly believe that such reflection is essential to enhance the academic quality of transitions research and extend its potential impact beyond the confines of the academy. All in all, STR is a thriving field that constantly evolves. We are convinced of its capacity to bring long-term processes of change to life.

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