Lost in transition? Disentangling agency, activities and actor roles

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Abstract

The aim of this paper is to disentangle agency, activities and actor roles and to link them with the phases of a transition over time. We define agency in this context as the capability that arises from the combination of individual interests and resources. Activities are understood as agency put into practice, while roles are characterized as a set of recognizable activities by an actor. For the development of transitions over time and through different stages the paper builds on the five prototypical phases as described in the Dialectic Issue Lifecycle Model: (1) problem emergence and regime neglect; (2) rising public concerns and defensive regime responses; (3) political debate/controversies and defensive hedging; (4) formation and implementation of substantive policy and industry diversification; (5) stabilization of the new regime and strategic reorientation. Using these definitions and this dynamic conception of transitions as a foundation, we are able to conceptualize (1) how different roles influence the progress of a transition (2) how roles and their relevance change dynamically over the course of the transition and (3) how a variety of actors can take on certain roles in transition processes. The paper outlines the critical activities for each phase and their impact on the transition process, i.e. how those activities either move the transition forward or hinder its progression. We link these activities with actor roles and role constellations. Our dynamic concept provides researchers with a conceptual foundation to empirically identify different roles, activities, and their impact on a transition process. Thereby it gives a framework to an actor centered research approach. It further allows for tailoring of policy measures more specifically to the current status of a transition as well as identifying the state of progress of an ongoing transition based on the current activities.

Key words: Roles, Actors, Socio-technical Transitions, Transition Dynamics

Highlights:

- Agency, activities, and actor roles receive increasing attention in transition research
- Their dynamics across the transition process make them hard to grasp
- We disentangle roles from individual and collective actors
- We provide a framework that links actor roles with different phases of transitions

1 Introduction

The issue of actors and agency in socio-technical transition is one that has received some attention (Geels 2020; Fischer and Newig 2016), but has also been identified as an area that is under-researched and under-conceptualized (Wittmayer et al. 2017; Bögel and Upham 2018; Upham et al. 2019; de Haan and Rotmans 2018). This variety in perception regarding the state of knowledge is most likely due to the high complexity of this issue. The research agenda by Köhler et al. (2019 p. 3) points out that "Transitions involve many kinds of agency […], which makes them very complicated processes that cannot be comprehensively addressed by single theories or disciplines." Geels (2011, p. 29) argues that "the MLP [Multi-Level Perspective] is shot through with agency, because the trajectories and multi-level alignments are always enacted by social groups (…) [and] the different structural levels are continuously reproduced and enacted by actors in concrete activities" However, the constituting elements of the theory focus on structural elements. Thus, while the importance of agency and actors is emphasized, their specification and description in transitions is still underdeveloped and by their ubiquity poses a challenge to analysis, so that they sometimes seem lost in transition.

Recently, important conceptual contributions have been made to unlock complexity and vagueness: First of all, a variety of papers has zoomed in to analyze certain societal actors, especially companies and policy makers (Köhler et al. 2019; Farla et al. 2012). These micro-level foci have inspired claims to more strongly involve other disciplinary perspectives like psychology in transitions research which per se take an actor-centered approach (Upham et al. 2019; Bögel and Upham 2018; Wullenkord and Hamann 2021). Adding to this body of literature, some progress has been achieved recently by deepening the focus on some key aspects: Wittmayer et al. (2017) have extended the understanding of roles as recognizable sets of activities in transitions and de Haan and Rotmans have defined some actor roles focusing on transformative change agents, but explicitly disregarded "actors whose role it is to counter or slow down change" (2018, p. 280). Avelino and Wittmayer (2016) connected the issue of power with an actor-centered perspective in transitions. Others have furthered the conceptual understanding of agency (Duygan et al. 2019). Finally, drawing on three theoretical schools underpinning the MLP, namely social construction of technology, evolutionary economics, and neo-institutional theory, Geels (2020) puts forward a multi-dimensional characterization of agency emphasizing its relational nature.

This paper now zooms in more specifically on agency in transitions in order to make actor roles – both in favor of and against the transition – and transition-related activities more tangible. In contrast to de Haan and Rotmans (2018), who claim that our understanding of transitions should be re-conceptualized by taking actors and agency as the starting point, our approach is to build on current theories of sustainability transitions, namely the MLP,

and to provide conceptual extensions and refinements that allow for taking an actor-focused lens when looking at transitions. From our point of view, the under-conceptualization of agency results from the historical development of transitions research as well as the complexity outlined above. The main nature of this paper is a conceptual one. We start by bringing together the three concepts of actors, roles, and agency, defining them and then taking an in-depth look at their interplay. Building on this groundwork, the paper links this actor-focused perspective with the phases of a transition (Bodenheimer 2019; Penna and Geels 2015) to acknowledge the dynamic nature of transitions. This leads to a unique contribution to the literature as it provides a framework to analyze (1) how different **roles influence the progress** of a transition, (2) how **roles and their relevance change dynamically** over the course of the transition, and (3) how a **variety of actors** can take on certain roles in transition processes, which opens the debate to a more recent understanding of actors in the innovation process outside conventional categories (Warnke et al. 2016).

The outline of this paper is as follows: First, to set the stage for our conceptual development, we give a short introduction on socio-technical transitions, specifically introducing the Dialectic Issue Lifecycle as a model to distinguish phases of a transition. Afterwards, we explicate our understanding of the terms actors, roles, and agency. In the third and main chapter of the paper we combine transition phases with roles and agency. Finally, we outline open research questions and derive conclusions.

2 Setting the stage

To set the stage for our conceptual contribution, we start referring to the MLP as one of the major transitions frameworks and then move on to phases of transitions before defining the basic concepts for our actor-focused approach.

2.1 The lifecycle of sustainability transitions

The MLP originated in the realm of historical-technological analysis, most famously to analyze the transition from sailing ships to steamships (Geels 2002). More recently, scholars have begun to distinguish between historical transitions and sustainability transitions (Geels 2010; Smith et al. 2010; Lachman 2013), the latter of which are the focus of the current paper. The basic understanding of a transition is that niche innovations attempt to challenge and change the so-called regime, i.e. the established and relatively stable dominant part of the system. Transitions usually encounter resistance from the existing regime, which is "stabilized by lock-in mechanisms" like previous investments, production processes, infrastructure systems, skill sets, built-up tacit knowledge, laws, and regulations (Geels 2010,

p. 495). The path dependence that results from these lock-in mechanisms thus makes sustainability transitions complex and multi-dimensional processes whose success depends on a large number of interrelated factors being just so at the right time. In addition to the regime, the MLP describes the landscape-level, representing exogenous developments and structures, as well as the so-called niche. It is assumed that radical innovations emerge in these niches. They may start putting pressure on the regime, which usually co-occurs with and is enabled by tensions and windows of opportunity created by the landscape level (Köhler et al. 2019).

As transitions require many interactions and reconfigurations, they are long-term processes. To structure this process, Penna and Geels (2015) developed the Dialectic Issue Lifecycle Model (DILC) building on the Public Issue Lifecycle (Waddock and Rivoli 2011), which examines the development of public responses to a specific trigger event or issue. 'Issues' are understood as "social problems that may exist objectively but become 'issues' requiring managerial attention when they are defined as being problematic to society […] by a group of actors or stakeholders […] capable of influencing either governmental action or company policies" (Mahon and Waddock 1992, p. 20). Thus, not all societal problems become an issue and only if they do and, thus, receive societal attention, a transition may possibly emerge. Originally, the DILC was developed to describe industry transformation, more specifically the car industry (Penna and Geels 2015, 2012; Geels and Penna 2015) and strongly intertwined with the Triple Embeddedness Framework (Geels 2014). Following prior work by Bodenheimer (2019) to connect the DILC with the MLP, our understanding is that the phases do not only apply to the transition of an industry, but more broadly also to other types of sustainability transitions and the altering of an existing regime. The DILC encompasses five phases (Penna and Geels 2015): (1) problem emergence and regime neglect, i.e. a topic is identified as problematic by societal actors, usually through some type of trigger event, who try to bring it to broader attention, but do not yet elicit reactions by the existing regime. In the second phase, (2) rising societal concerns and defensive regime responses push the issue further, a first development of solutions starts while the existing regime aims for incremental developments to solve the problem. (3) Political debate, controversies and defensive regime hedging characterize the third phase, including attention from specialized policy fields while the current regime tries to block more radical change, instead of focusing on incremental changes and voluntary implementation. In phase 4, a window of opportunity opens up for the transition to take place with (4) the formation and implementation of substantive policy (changes) as well as industry diversification starting to materialize. Finally, in the last phase, (5) strategic reorientation as well as broad adaptation of supply and demand take place. The regime re-enters a restructured and newly organized equilibrium.

Both the MLP and the DILC model describe transition processes and how they (ideally) develop over time. Building on work by Bodenheimer (2019), Figure 1 shows an integration of the two models.

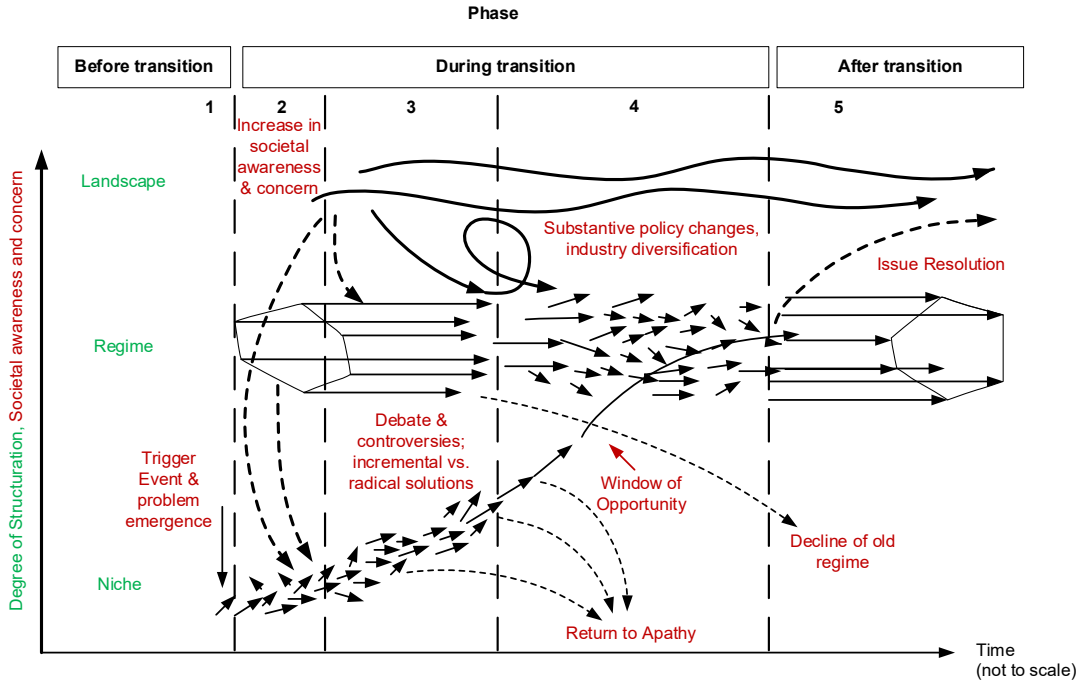

Figure 1: Integration of the MLP and DILC phases (based on prior work in Bodenheimer 2019)

Both representations of a transition as well as the integrated scheme outline an ideal process at the end of which an issue is resolved and a regime changed. It is important to note that this is not necessarily the case. This has been elaborated in detail by the various transition pathways of the MLP (Geels and Schot 2007) and similarly applies for the DILC model. As suggested by Geels and Penna (2015) and further conceptualized by Bodenheimer (2019), issue lifecycles are often more cyclical than linear. Furthermore, many issues that are discussed publicly never reach later phases. Instead, societal attention may stop intensifying or even decrease and become minimal (return to apathy) unless another trigger event rekindles concern for the issue. In such a case, future cycles are possible (Bodenheimer 2019). This is in line with the conceptualization of transitions in the MLP, which assumes that they often take place over two to three decades and tend to be anything but continuously linear.

2.2 Agency, Actors, and Roles in Sustainability Transitions (Research)

The aim of this paper is to zoom in more specifically on agency, actors, and roles in transition to make this aspect of transitions more tangible and, ultimately, more a subject of research. As a foundation for the remaining paper, this section explains our understanding of agency, actors, and roles.

Defining Agency

As outlined in the introduction, this paper seeks to contribute to the conceptual gap in sustainability transitions research that is related to agency. Agency itself is defined as the capacity to act intentionally (de Haan and Rotmans 2018). While theories like the MLP or the Technological Innovation System (TIS) take a structural angle, it is also obvious in the way these theories describe systems and their transformation that they inherently imply actors and enacted agency within the system, reproducing and stabilizing it as well as refining and sometimes transforming it. A recent paper by Geels (2020) aims at extending our understanding of agency and concludes with outlining three basic dimensions of agency, i.e. iterational, projective and practical-evaluative. Iterational agency encompasses action that is guided by technological frames, routines or schemes that emerged in the past (Geels 2020, p. 12), i.e. similar to what psychologists describe as habitual behavior on the individual level, which is often repetitive and triggered by external stimuli. Such type of agency is highly prevalent in stable regimes. Transitions, however, emerge if projective and practical-evaluative types of agency gain importance. This includes future directed (new) sense-making, guided search, visions, and strategies on the one hand and on the other hand debates, decisions, and reflexivity related to the present (Geels 2020; Emirbayer and Mische 1998). Some authors like Duygan et al. (2019) restrict their understanding of agency to its transformational element and define "agency as the capability of transforming institutions through institutional work" (p. 16), thus excluding iterational types of agency. However, as a transition always includes the encounter with the existing regime, we follow Geels (2020) in a broader conceptualization of agency. In addition, our understanding of agency takes a center position in the discussion around the polarity between structures and agency: while we emphasize the importance of agency, we nevertheless acknowledge that agency is embedded in and thus limited by structural constraints, available resources, etc. (Duygan et al. 2019). At the same time, we see agency as relational as it emerges from an interplay between different actors and existing structures and by this attribute is both enabled and limited in its impact. Given these premises, we define agency in this paper as the capability to act that arises from the combination of an actor's interests and resources. If agency is actually enacted, this results in and becomes visible in activities.

Defining Actors

Agency is enacted by actors. Actors typically analyzed in transitions research include citizens, bottom-up initiatives, policy makers and companies (Köhler et al. 2019). These examples show that the category "actor" encompasses not only individuals, but also collective actors, which seems to add a lack of clarity (Fischer and Newig 2016) or "some confusion regarding levels of aggregations" (Avelino and Wittmayer 2016, p. 631). In our understanding, single individuals form the most basic level of actors. Usually, actors are categorized in transition studies and several individuals or collectives can populate a single category of actors. Many different categories and types of actors have been proposed in prior work, following a wide variety of perspectives and intentions. For example, Avelino and Wittmayer (2016) use the broad categories of state, market and community, while others separate them according to their contribution in the transition process, e.g. innovation champions in contrast to incumbent actors (Verhees et al. 2015) or their type of agency, e.g. frontrunners or supporters (de Haan and Rotmans 2018) or intermediaries as those connecting actors (Kivimaa et al. 2019). Within these categories, actors form collectives that may to a larger or smaller extent form alliances and act accordingly (de Haan and Rotmans 2018), so that usually, the frame of reference is not an independently acting individual. Furthermore, actor categories also include collective actors, such as companies, initiatives or governments. Collective actors are created by a group of people and usually held together by certain rules and structures. It is often possible to say who is part of the collective and who is not, i.e. by identifying employees, representatives or members. Agency is ascribed not only to individuals, but also to the collective as an entity, e.g. when analyzing the strategy of a company in relation to a transition. In this paper, we use the term "actor" to refer to all of these different understandings, i.e. including individuals as well as collectives.

Defining Roles

Following up on prior work by Turner (1990), Wittmayer et al (2017) define roles as "a set of recognizable activities and attitudes used by an actor to address recurring situations" (p. 49). The authors further distinguish between the more general category of 'social roles' – their focus – and the sub-category of 'transition roles', which they define more specifically as "roles through which actors support or hinder a specific sustainability transition" (Wittmayer et al. 2017, p. 47). Our focus in this paper is on transition roles; nevertheless, characteristics of the broader category of social roles constitute an important foundation for this paper. By taking up this understanding of roles, this concept can be used to "analyse the (changing) interactions and relations of actors as part of a sustainability transition. (…) The concept of roles can be situated 'in between' the individual and society (…)" (Wittmayer et al. 2017, p. 46). This definition implies that actor and role are somewhat independent categories, i.e. a certain actor can hold a variety of roles at a certain point in time, as well as

over time (de Haan and Rotmans 2018). Thus, the role of a specific actor may change over time and during the process of an ongoing transition.

In the transitions process, different roles exist at a given point in time, which leads to constellations or relationships of roles. As acknowledged by Wittmayer et al. (2017), changes in one role are likely to have repercussions for other roles. This results in different role constellations, which can take on a variety of interactional forms:[1]

- roles may cooperate and be synergistic;
- roles may mutually influence each other without direct cooperation;
- actors in one role may seek to influence those from another role, either by shaping opinions or actions, or by exerting pressure on them (influence in a single direction); in turn, the other role is the recipient to these messages;
- roles may be antagonistic, adversarial or competitive with each other;
- some roles may be fully independent of each other, even within the same transitions process.

Agency, Actors, and Roles

Figure 2 provides an overview of our conceptualizations of agency, actors, and roles. The focus here is on those actors and roles that are relevant to or involved in the transition. It is important to note that agency, as used here, not only refers to agency that supports the transition but also to resistance to or even lack of interest in the transition, i.e. it is the relevance to the transition that creates the boundaries of our interest. Individual actors, who are understood to be either a single person or a single collective entity, such as an organization, firm or association, are found at the bottom of the diagram. Agency is enacted by actors, determined by interests (or value-driven motivations, as described by de Haan and Rotmans (2018)) and enabled or limited by available resources. The specific transition-related interests include seeking to advance the transition in general or in a specific direction, or alternatively, wanting to prevent the transition from taking place. Each actor, moreover, has specific resources at her/his disposal that can be used to advance her/his own agenda in the transition (Duygan et al. 2019; Wittmayer et al. 2017). These can include access e.g. to financial, social, political, cognitive and technical resources and mirror the limitations and constraints from the existing system. The combination of personal interests, available resources and relationships with other actors determines the actor's possible transition-related activities. For this level, we will primarily focus on actors' activities for the rest of this paper, as they are the visible contribution to the transition process.

[1] These interactional forms are loosely based on the typology of power relations described in Avelino and Wittmayer 2016.

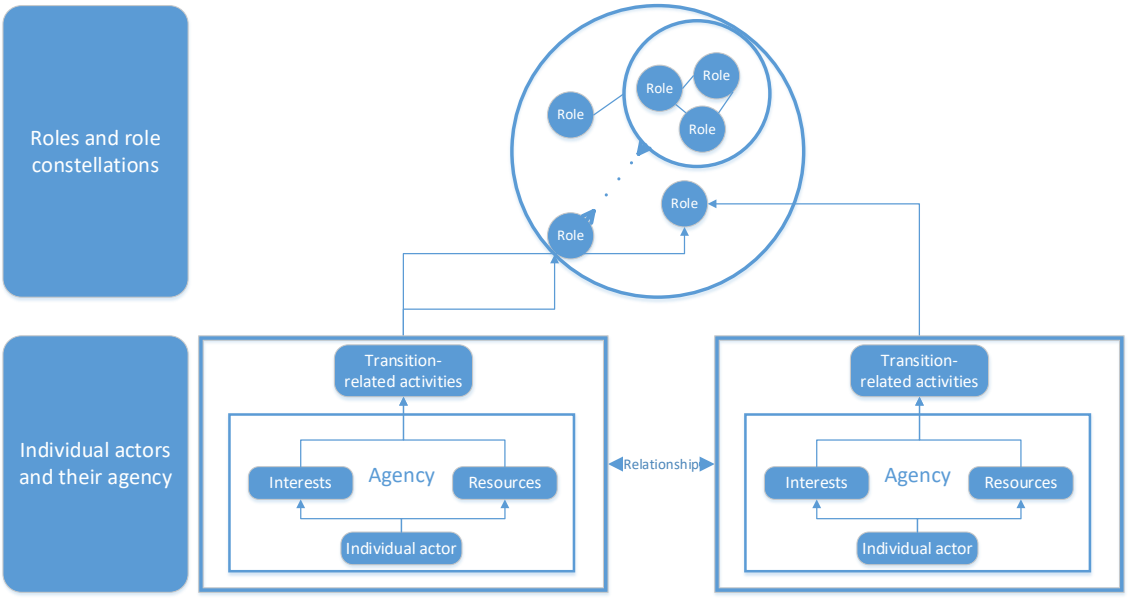

Figure 2: Interplay of agency, roles and actors in transition

Through their activities, resulting from their agency, actors take on certain roles in the transition process. Within the transition (see upper level in Figure 2), actors take on different roles, whereby each actor can take on one or multiple roles; multiple roles can be taken on simultaneously or consecutively; and multiple actors can take on the same role. If and which role(s) actors choose to take on is in part determined by their interests regarding the outcome of the transition as well as occasions offered by the existing system state to take on that role. Thus, on the one hand, a lack of resources can limit access to certain roles or force actors into less desirable roles. On the other hand, certain (often powerful or influential) roles may require a threshold level of resources to take on; in turn, they can then provide access to further resources that were not available to the actor before.
Because transitions take place over time and through different stages (macro-level with DILC phases before, during and after transition, see Figure 1), actors do not hold static roles throughout the transition. Rather, as the dynamic of the transition changes, so do the roles and role constellations that are available to actors and that make sense for them to take on. In the following chapter, we discuss these roles and role constellations in detail, as they appear in each of the five phases of transition.

3 Conceptualizing Roles according to Phases of Transitions

The goal of this chapter is to link the actor-focused perspective represented in Figure 2/Chapter 2.2 with the phases of the transition as shown in Figure 1/Chapter 2.1. We use

the DILC phases in their combination with the MLP to describe the process of a sustainability transition and focus on identifying roles and role constellations.

Each phase of the transition has its own focus and dynamics and thus provides room for different sets of roles and role constellations. Over time, some actors change their roles, others enter or leave the transition process at particular points in time. In this chapter, we go through the five phases (Chapter 2.1) and describe them in depth. The centerpiece of each section is a table (Table 1 through Table 5), which includes the most detailed information on the relevant roles of each phase, including their activities, possible actors performing these activities, role constellations (relationship toward other roles in the same phase), and the role's impact on the development of the transition. Each role is given a unique alphanumerical identifier in the tables (ID). In the text, we highlight the key aspects of each phase, but do not reiterate all the details from the tables.

Our approach is descriptive in nature, i.e. we provide an ideal-type overview on transitory phases and the agency enacted through transition-related roles by relevant actors. In contrast to e.g. the framework by de Haan and Rotmans (2018), our identification of roles includes transformative roles but also refers to further actors that are part of the regime under focus.

3.1 Phase 1

Phase 1 is the very beginning of the transition, in which an issue first begins to emerge. We postulate three roles in this phase: 1a) **identifying the issue**, 1b) **generating attention for the issue**, and 1c) **maintaining the status quo**. The assumption is that the first two roles are carried out by those who are either directly or indirectly impacted by the issue or generally concerned by it, whereby the second role also requires some amount of reach or outreach. If these two roles are taken on, this constitutes the emergence of a new niche that previously did not exist. At the time, this may be difficult to recognize, but in hindsight, this represents the earliest stage of the transition.

The two roles have a cooperative and synergistic relationship to each other and may, but do not have to be carried out by the same actors. These can come from a wide variety of backgrounds, ranging from private individuals, low-level policymakers or political administrators acting privately outside their formal hierarchy, to organizational actors, such as NGOs, research think tanks, small niche firms or individual units within larger companies.

The third role (1c), maintaining the status quo, represents the role of the regime in the first phase, which is at this point often not even aware of the issue yet or choosing to ignore it. Therefore this role does not include any specific activities and does not yet have any impact

on the transition. In terms of the role constellation, at this early stage, role 1c is independent of the other two roles, whereas roles 1a and 1b can be considered antagonistic to 1c.

Phase & ID	1a	1b	1c
Role	**Identifying issue**	**Generating attention**	**Maintaining status quo**
Activities	Identifying and naming issue	Starting discourse on issue (local, in own network, very specialized media outlets), recruiting allies	None (not aware of issue yet or ignoring issue)
Role Constellations	- 1a & 1b cooperative, synergistic - 1a & 1b antagonistic towards 1c	- 1a & 1b cooperative, synergistic - 1a & 1b antagonistic towards 1c	- 1c independent of 1a & 1b - 1a & 1b antagonistic towards 1c
Relevant Actors	Those impacted directly or generally concerned	Concerned actors with some amount of reach/outreach	Establishment/ regime actors
Impact on Transition	In hindsight: start of the transition process	In hindsight: start of the transition process	None

Table 1: Phase 1

3.2 Phase 2

In phase 2, the general public begins to develop first awareness of and concern about the issue in question. Against this backdrop, niche actors seek to build momentum and drive the transition further forward, whereas established regime actors for the most part try to prevent or at least slow down this process. This is the stage where many actors become involved, but not much coordination or coalition building has taken place yet, leading to many separate actor roles.

The first three roles, 2a–2c, are taken on by niche actors interested in driving the transition forward. Innovators and innovation champions begin **scanning for and developing early (radical) solutions to the issue** (2a), which can encompass technical, organizational or social innovations. This sets the competition for a dominant design or solution in motion. Innovation champions may create, use, and show off early homemade solutions, thereby raising awareness for the issue and drawing attention to creative solutions. At the same time, niche actors seek to **stabilize the issue within the niche(s)** (2b) by raising awareness through communication activities, building and activating networks and coalitions, and getting further actors to commit to their cause. Finally, innovation champions and/or

intermediaries begin the process of **agenda setting** (2c), seeking to convince policymakers and other societal decision-makers to address the issue in question. This is the first step in which the debated issue reaches out to the regime and moves beyond the niche(s).

Phase & ID	2a	2b	2c	2d	2e
Role	**Scanning for & developing early (radical) solutions**	**Stabilizing issue within the niche(s)**	**Agenda setting beyond the niche(s)**	**Resisting change**	**Audience/resonance chamber**
Activities	- Searching for solutions which solve problem, cause-oriented - creating, using & showing off early homemade solutions; - talking about early solutions with others	- Raising awareness & nurturing concern - building & activitating networks & coalitions; - getting actors to commit to the cause	Convincing policy makers and other societal decision-makers of issue importance	Disseminating alternative frames which downplay problem	Receiving messages from 2c-d, forming an opinion
Role Constellations	- 2a-c cooperative, synergistic - 2a-c antagonistic to 2d - trying to influence 2e	- 2a-c cooperative, synergistic - 2a-c antagonistic to 2d - trying to influence 2e	- 2a-c cooperative, synergistic - 2a-c antagonistic to 2d - trying to influence 2e	- 2d-e: cooperative, synergistic - 2d antagonistic to 2a-c - trying to influence 2e	2a-d try to influence 2e
Relevant Actors	Innovators, innovation champions	Innovators, impacted & concerned, innovation champions, intermediaries	Innovation champions, intermediaries	Establishment actors, especially those who have something to lose	Policy makers, opinion leaders, media, public
Impact on Transition	- Beginning competition for dominant design - contributing early ideas to possible designs	Establishing niche, possibly multiple niches	Reaching out to regime, moving beyond the niche(s), raising greater awareness	Preventing transition, eliminating niche(s)	Impact (positive or negative) depends on whether there is resonance

Table 2: Phase 2

At this stage of the transition, established actors from the regime generally remain skeptical and dismissive of the issue, seeking to **resist change** (2d) by disseminating narrative framings of the issue that seek to downplay the problem and to slow down or prevent the transition while keeping the niche small. Beginning in phase 2, the role of the **audience or resonance chamber** (2e) also emerges, being the recipient of different framing messages from the various niche and regime actors involved in roles 2a through 2d.

3.3 Phase 3

During phase 3, the issue reaches a certain degree of stability, at least within the niche: while the final outcome of the transition continues to be uncertain, it is less likely that the issue will disappear again completely. At the same time, the debate around the issue becomes more intense in phase 3 and early markets begin to develop.

Phase & ID	3a	3b	3c	3d	3e	3f	3g
Role	**Narrative framing and communication strategies beyond the niches**	**Creating, maintaining or diversifying coalitions**	**Proposing incremental solutions**	**Starting market development**	**Developing early demand**	**Audience/resonance chamber**	**Investigating issue**
Activities	- Competition about discourse leadership, access to media and policy makers - prioritizing this issue publicly over others - communication strategies can also include public protest	- Struggling for power and resources, (internal) agreement on common goal/vision - niche proposes more radical visions, regime proposes more incremental visions - niche coalitions become more professional and institutionalized - competition and coalitions between different niches	Proposing small changes that do not impact status quo, symptom-oriented	- Product development & improvement (necessary infrastructure?) - marketing strategies - business model development - financing - professionalization	- Adopting new system/innovation/ product - giving feedback to producers	- Evaluation of messages and starting to take sides - weighing this issue against other relevant current issues - possibly societal resistance to change emerges	- Formal evaluation of identified problem and proposed solutions - state-funded pilot projects - first additions to existing regulation to allow for experimentation
Role Constellations	- 3a-b & 3f-g mutual influence - 3a-c within same side cooperative, synergistic; with other side incl. other niches antagonistic	- 3a-b & 3f-g mutual influence - 3a-b within same side cooperative, synergistic; with other side incl. other niches antagonistic	- 3a & 3c cooperative and synergistic within same side - 3c & 3d-e antagonistic	- 3d & 3e mutual dependence - 3c & 3d-e antagonistic	- 3d & 3e mutual dependence - 3c & 3d-e antagonistic	- 3a-b & 3f-g mutual influence - recipient to messages from 3a & 3g	3a, b & 3f-g mutual influence
Relevant Actors	Both regime and niche actors	Both regime and niche actors	Establishment/regime actors (industry, policymakers, lobbyists, scientists)	Firms, entrepreneurs, investors, scientists - both from niche and early mover R&D from regime	Early adopter/moral consumers, innovation champions	Policy makers, public, opinion leaders, media	Policy makers, political administration, consultants, scientists
Impact on Transition	First potential "tipping point" of transition: who wins majority of public approval in discourse?	Leads to transition process continuing	Slowing down or preventing transition through minimal changes & keeping niche small	Advances transition by providing commercially available solutions (availability may still be limited by infrastructure, legislation/norms, etc.), niches begin to put pressure on regime	Advances transition by increasing demand for new solutions, puts pressure on regime	First potential "tipping point" of transition: who wins majority of public approval in discourse?	- Impact (positive or negative) depends on results - can either advance transition by providing reliable facts in favor of it or hinder/slow down transition, if facts go against new solutions - Creating institutional framework for experimentation to take place

Table 3: Phase 3

At this point, some roles can no longer be clearly assigned to only the niche or regime; instead, actors from both levels may take on the same roles (3a, 3b), although in pursuit of different goals. Both sides engage in **narrative framing and communication strategies** (3a) in favor of their issue, competing to win the majority of public approval. If the niche is successful in convincing the public, policy makers and/or opinion leaders (**audience/resonance** chamber, 3f) of its merits through discourse, this can be a first potential "tipping point" in the transition. Internally, both sides continue to engage in networking by **creating, maintaining or diversifying their coalitions** (3b). Niche coalitions become more professional and institutionalized and there may be several niche coalitions competing for dominance with each other.

In phase 3, **early market development** (3d) for niche alternatives begins, driven primarily by niche actors, but also potentially including R&D departments or pilot projects from early mover regime actors. In parallel, **early demand develops** (3e) among early adopters and more formalized **issue investigation** (3g) begins. This may include scientific evaluations of

the identified problem and proposed solutions, state-funded pilot projects or even first additions to existing regulation to allow for experimentation.

Finally, as a result of increasing pressure on the issue, regime actors begin **proposing incremental solutions** (3c) at the same time, which are generally symptom-oriented and do not significantly impact the status quo of the dominant regime, and whose goal it is to prevent a larger transition from taking place.

3.4 Phase 4

The dominant theme of phase 4 is that of shaping the concrete outcome of the transition. The debate no longer centers around whether a change will take place at all with regard to an issue, but rather what that change will look like specifically. Associations, intermediaries and lobbyists from both sides, niche and regime, continue to engage actively in **lobbying and shaping opinions** (4a), negotiating how much will change in the established system, which exceptions might be tolerated and in general, how incremental or radical innovations will be. In addition to public or sector-specific discussions, these negotiations often involve legal challenges as a response to initial policy making, in which stakeholders seek to shape the final outcome of the transition in their favor. Evidence supporting the different positions is presented in the form of formal scientific enquiries and economic evaluations of the solutions under discussion (**evaluating solutions**, 4b) and all of these inputs once again come together in the **resonance chamber** (4c) of all those not directly involved in the discussions. At this point, there is general public acknowledgment of the issue as such. While diverse opinions continue to exist on the viability of different solutions, public opinion begins to converge into a small number of separate narratives and pressure is exerted on both policy makers and the established regime to address the issue.

Phase & ID	4a	4b	4c	4d	4e
Role	**Lobbying/shaping opinions**	**Evaluating solutions**	**Audience/resonance chamber**	**Policy making**	**Adjusting regime to new conditions**
Activities	- Discussion moves from if to how: how much will change, what exceptions will be tolerated, how incremental/radical will the changes be - legal challenges	- Scientific enquiries into solutions - economic evaluation of solutions - alignment with culture/regions/ historic developments	- Confirming/ acknowledging problem and issue, convergence on narratives - diverse opinions on solutions exist - pressure exerted on policy makers and industry to address issue	- Policy creation and implementation, policy mix becomes relevant	- Growing market & demand for new solution - emergence of new consumer segments as well as suppliers, diversification of supply side - first movers from regime enhance pressure on regime - incumbent actors either adjust or leave market - adjustments in necessary infrastructure are made - (start of) adjustments to norms and standards
Role Constellations	4a & 4d strong mutual influence	4b influences 4d	- Recipient to messages from all others - 4c exerts pressure on 4d	- 4a & 4d strong mutual influence, - 4d influenced by 4b & 4c	4e strongly shaped by 4d, also shaped by 4a-4c, especially soft institutions
Relevant Actors	Associations, intermediairies, lobbyists from both sides	Policy makers, political administration, consultants, scientists, opinion leaders	Policy makers, public, opinion leaders, media	Policy makers, administrators, consultants	New and transformed industries, investors, entrepreneurs, incumbent actors, Infrastructure, Consumers (B2B & B2C)
Impact on Transition	Shaping concrete outcome of the transition	Shaping concrete outcome of the transition	Shaping concrete outcome of the transition	Creating institutional framework for transition to take place	Implementation of transition

Table 4: Phase 4

Policy making (4d) takes center stage in phase 4. Through the process of policy creation and implementation, a new institutional framework is created within which the transition can take place. Stakeholders from all backgrounds – industrial actors, investors, entrepreneurs, incumbent and new actors, managers of infrastructure, B2B and B2C consumers, etc. – begin **adjusting the regime to the new conditions** (4e) as they emerge and thereby implement the transition in real life. This is a complex and versatile process: On the supply side, new solutions emerge on the market, which may require new suppliers, changes in production networks, and potentially an adjustment in infrastructure. Early movers from the old regime, who already began researching and developing new solutions in phase 3, increase the pressure on other incumbent actors, who either adjust to the new rules or leave the market. On the demand side, new consumer segments may emerge and stratify, especially if there are multiple new solutions on offer.

3.5 Phase 5

This is the final phase that leads out of the transition. **New solutions** that have arisen out of the transition are **included in legislative frameworks** (5c) and formally become part of the new system, i.e. the new regime, in the form of formal/hard institutions (Negro et al. 2012). As a result, the market fully **adapts its supply** (5b) to these new conditions, reacting to new system structures, incentives, and opportunities. Consumers **adapt their demand** (5a) to the new market conditions, including adjusting their preferences and practices. Depending on the issue and changes in question, this may also include changes in culture or other soft/informal institutions. With time, the newly created regime is mainstreamed and stabilized and establishes its own new equilibrium.

Phase & ID	5a	5b	5c
Role	**Adapting demand**	**Adapting supply**	**Including new solutions in legislative frameworks**
Activities	Shifting consumer preferences and practices, potentially including cultural factors and other soft/informal institutions	Adapting to new system structures, incentives & opportunities	New solutions become formally/ systematically part of the system (hard/formal institutions)
Role Constellations	- 5c influences 5a & 5b - 5a & 5b mutually dependent	- 5c influences 5a & 5b - 5a & 5b mutually dependent	5c influences 5a & 5b
Relevant Actors	Mainstream (all) consumers	Whole industry and service sector/ associated industries	Institutions and policy makers
Impact on Transition	Mainstreaming, stabilization and equilibrium in new regime	Mainstreaming, stabilization and equilibrium in new regime	Institutionalizing/ formalizing new regime, establishing framework conditions for new regime

Table 5: Phase 5

4 Summary & Conclusions

This paper set out to disentangle agency, actors and roles and to link them with the phases of a transition over time and typical activities in these phases. Agency is defined as the capability that arises from the combination of individual interests and resources of individual and collective actors. Roles are characterized as a set of recognizable activities by an actor and activities are understood as agency put into practice. We attached typical roles to the five phases of transitions as they are described in the Dialectic Issue Lifecycle Model and sketched out what activities describe these roles, how they relate to the further development of the transition and how they relate to each other. This undertaking is of course just a first step into this direction and will need empirical underpinnings that will certainly lead to refinements.

Furthermore, the scheme presented above is an idealized form of how a transition takes place, meant to make it easier to think about and identify the different roles and steps necessary to push the dynamic process of a transition forward. As always, reality is more complex, which has several implications: First of all, the roles and activities described for each phase will not always be as clearly separated in time as they are described here, which makes the assignment of specific events or activities to one of the five phases less unequivocal in practice than it is in theory. Many roles in later phases are continuations of the previous phases, such as 2c, 3a and 4a or 3d/3e and 4e, and the shift from one phase to the next phase is fluid. The determination of when a transition is in a particular phase and when it moves on (or back) to the prior or next phase has to be based on the overall trend across all roles and activities, rather than on single events, which may still be leftover from prior phases or may already indicate the beginning of the eventual path to the next phase (see also Bodenheimer 2019). We also assume that moving on between the phases is not always a distinct event, but that to some extent phases may overlap, e.g. with some roles from earlier phases still prevailing while some later roles and their activities have already started.

Second, in reality transitions do not always move continuously forward from one phase to the next, but may instead move backwards or in repeated cycles between two or three phases (see also Bodenheimer 2019; Geels and Penna 2015). Possible reasons for moving backward include issue competition and issue fatigue. Issue competition results from the fact that there appears to be a limit of how many issues society at large can be concerned about at any given point in time. As an example, the inclusion of particular topics in the news media is zero-sum, meaning that for every topic that is included, another one is not. An obvious example here is the Covid-19 pandemic that has clearly suppressed many other topics. Different types of issues tend to be associated with varying degrees of dominance: for example, Djerf-Pierre found that coverage of the economy, wars and situations of armed conflict tend to crowd out coverage of environmental issues in the news (2012). Issue fatigue takes place when "prolonged exposure to similar messages eventually results in an exhaustion of interest" (Djerf-Pierre 2012, p. 501) and is often associated with topics that are perceived to be both negative and complex (Kuhlmann et al. 2014).

Finally, this paper (partly) neglects the role of systems and structures as it changes sides and looks at transitions from an actor- and issue-focused point of view. As explained earlier, this does not come with the intention to deny their relevance, but rather to fill a gap in the current state of theorizing transitions.

As next steps, we see the need to validate and refine our proposed framework with empirical research. From a theoretical perspective, we think the framework could be further informed by literature, e.g. from psychology (Bögel and Upham 2018; Upham et al. 2019; Wullenkord and Hamann 2021) or political science (Weible and Ingold 2018). This could

shed further light on how networks and alliances emerge and how they support or hinder moving through the different phases.

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