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The role of narratives in socio-technical transitions—Fukushima and the energy regimes of Japan, Germany, and the United Kingdom

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ABSTRACT

In order to reconfigure global socio-economic systems to be compatible with social imperatives and planetary boundaries, a transition towards sustainable development is necessary. The multi-level perspective (MLP) has been developed to study long-term transformative change. This paper complements the MLP by providing an ontological framework for studying and understanding the role of narratives as the vehicle of meaning and intermediation between individual and social collective in the context of ongoing transitions. Narratives are established as an analytical entity to unpack how disturbances at the level of the socio-technical landscape are translated into and contribute to the transformation of socio-technical regimes. To illustrate and test the approach, it is applied to the case of the Fukushima catastrophe: The narratives in relation to nuclear power in Japan, Germany and the United Kingdom are scrutinized and it is explored how these narratives have co-determined the policy responses and thus influenced ongoing transformation processes in the power sectors of the respective countries.

1. Introduction

Starting from the Club of Rome's "limits to growth"-report [85] it has been increasingly evident that industrialised societies, their lifestyles, consumption patterns exceed what the planetary system can provide over the long run [94]. At the same time both within countries as well as in between countries great inequalities still exist. Basic human needs such as food, water, health and energy are not met for billions of people all over the world. The social foundations of our global society remain fragile [76]. In other words, our global socio-economic system is highly unsustainable and needs to be transformed.

More concretely, for the energy sector in order to abate dangerous climate change means that "*[t]he stabilization of greenhouse gas concentrations at low levels requires a fundamental transformation of the energy supply system, including the long-term phase-out of unabated fossil fuel conversion technologies and their substitution by low-GHG alternatives*".([63], p. 46).

This certainly is a daunting task, but it is often less an economic or technical problem than a political one. Take climate change as an example: Technical options to mitigate climate change and limit global warming to below 2 °C are available and the cost are considerably lower than many have expected and certainly much lower than the cost of inaction [63]. Still, change does not happen or at least not at the required speed. A reason is that the global economy is locked-in into unsustainable practices not only through the legacy of the infrastructures that have been built up in the past but also through political and institutional settings and processes that are resisting change [112].

It is this socio-political environment to the various production and consumption regimes and in particular industrial and manufacturing regimes [24,110] that this paper is particularly interested in. The paper builds mainly on two strands of literature: (1) transition research, in particular the Multi-Level Perspective (MLP) as an heuristic for understanding sociotechnical transformations, [36,37] and (2) Structuration Theory which heavily influenced the development of the MLP [46,107].

The MLP research framework separates three levels of transition analysis. The Regime level "*is the rule*-set *or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artefacts and persons, ways of-defining problems*; *all of them embedded in institutions and infrastructure.*" ([93], p. 338). Technological Niches "*are spaces where networks of actors experiment with, and mutually adapt, greener organizational forms and eco-friendly*

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technologies." ([100], p. 427). In these Niches, outside or at the fringe of the socio-technical Regime, novelties and innovations can emerge and mature under protected conditions [101]. The socio-technical Landscape level *"forms a broad exogenous environment that as such is beyond the direct influence of regime and niche actors"* ([42], p. 23).

A necessary condition for a successful socio-technical transformation in a given field is the existence of both successful innovation activities in niches and external pressure on the socio-technical regime coming from the landscape level: *"There is no simple cause or driver in transitions. Instead, there is co-evolution within and between levels, i.e., processes at multiple dimensions and levels simultaneously. Transitions come about when these processes link up and reinforce each other."* ([42], p. 27).

However, the three levels and their respective interactions have not received equal scholarly attention in the past. There is substantial literature available on niches: What the conditions are for creating a fertile soil for innovation in niches, how interactions between the niche and regime level can play out, and even how niches can be strategically managed to nurture innovation [80,100,68,114,79,101,46].

Interactions between the regime level and landscape level have received much less attention, though. In line with Grin et al. this article conceptualizes the socio-technical landscape as the universe of influences exogenous to the various co-existing socio-technical regimes [46]. The central questions this article addresses are the following: How is the socio-economic landscape reflected in socio-technological regimes? And how can changes in the landscape translate into socio-technical regimes?

The article sets out to explicitly integrate narratives in the conceptual framework of transition research. It introduces narratives as a key analytical entity (Section 2) and formulates a theoretical framework which helps to understand how narratives can influence and in fact co-determine everyday decision-making by regime actors (Section 3); it discusses how narratives contribute to delimiting the space of what is 'politically feasible', thus contribute to the inertia of regimes with respect to socio-technical change beyond technological and political potentials (Section 4). The usefulness of this conceptual approach is tested by applying it to the case of the Fukushima earthquake and the associated nuclear meltdown in the Fukushima Dai-ichi power plant (Section 5). This landscape shock has had significant impact on the energy regime in Japan and energy regimes worldwide. The article illustrates how differences in discursively prominent narratives in Japan, Germany, the United Kingdom have co-determined policy responses with strong effects for the ongoing structural change of the socio-technical systems, specifically changes in the power sectors of these countries. The article concludes (Section 7) by evaluating the usefulness of the approach and developing ideas of how the narrative approach could be improved and expanded in the future.

2. Definition

What are narratives? In this article narratives are defined in line with Roe as simple stories that describe a problem, lay out its consequences and suggest (simple) solutions [95]. Incumbent actors typically formulate their basic patterns of arguments about the challenges confronting their respective socio-technical regimes in the form of narratives. Talking of narratives is essentially talking about meaning encoded in language. This language does not only represent the facts and objects under consideration, but arguably this language also shapes the recipients' understanding of the same facts and objects through its ordering function [34]. For this analysis, the 'objective truth' of narratives is not a relevant property, as the success and traction of a narrative is determined much more by its internal logic and rhetorical persuasiveness in the context of the concerns and believes of those who use them and their audience than on any empirical verification ([34], p. 70; [67]).

In this way, narratives characterize a system framing that becomes the action guidelines for the regime actors ([16], p. 9). However, there might also be narratives that are less visible. Narratives that are used by more marginal groups and that frame identical challenges in a different, sometimes even contradictory, way ([52], p. 39). What both have in common is that they are *"subtle articulations of collective certainty"* and thus describe collective rather than individual patterns of meaning ([34], p. 68, translation by the author). Again, this 'certainty' is not an objective one. It may as well assert certainty over objectively uncertain formations or impose uncertainty on objective certainties. An example for the latter may be seen in the strategies that 'climate sceptics' apply. Despite strong scientific consensus that climate change is real and that its causes are anthropogenic, conservative think tanks such as the Heritage Foundation have been very successful in collaboration with a network of media outlets in establishing and maintaining a narrative of "the science is not settled yet and hence climate protection measures should not be taken as they unduly burden the economy" [90].

Both narrative analysis and discourse analysis are concerned with language as a filter any representation of reality has to go through. While in common language both terms have substantial overlap and the semantic borders of both can be blurry, in the academic tradition there are clear differences between the two.

'Discourse' has been defined as *"an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices."* ([49], p. 175) or as *"a shared way of apprehending the world. Embedded in language, it enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts. Discourse constructs meanings and relationships, helping define common sense and legitimate knowledge"* ([27], p. 9). Both definitions have in common that they refer to discourses as shared set of terms and concepts, instantiated in language, of a rather exclusive community. The ideological frameworks and shared world views of these communities are of ultimate interest of discourse analysts. The analysis of their language is the means to interpret these ideologies and world views.

Contrary to that, narrative analysis is interested in the more immediate effects of the use of language in political debate. *"Stories commonly used in describing and analysing policy issues are a force in themselves, and must be considered explicitly in assessing policy options."* ([95], p. 2). Narrative analysts ask rather what language and speech does, than what it means or presupposes, which are characteristics of discourse analysis ([34], p. 80).

Narratives can be understood as the basic elements of discourse, as *"phenomena embedded in discourses"* ([113], p. 64). However, not one narrative defines any given discourse and neither is a given narrative exclusively to be part of only one discourse. Any narrative can fit well into a variety of discourses, even if the interpretation of those who articulate a narrative or are confronted with it may vary.

Knowledge of discourse and discourse communities can complement narrative analysis as to provide a background against which the perception and interpretation of narratives by different actors can be understood. This is, however, limited to cases in which complexity and uncertainty do not obscure a political controversy to an extent that an identification of clear cut discourse communities is not possible anymore ([34], p. 80).