Freie Universität Berlin

Forschungszentrum für Umweltpolitik

Environmental Policy Research Centre

Societal transformations:

Objects, driving forces and potential to govern them

Authors: Klaus Jacob, Holger Bär, Lisa Graaf

Paper for the Degrowth-Conference Leipzig, 2014

Forschungszentrum für Umweltpolitik
Freie Universität Berlin
Fachbereich Politik- und Sozialwissenschaften
Otto-Suhr-Institut für Politikwissenschaft

Summary

Many participants in the German political discourse have emphasized the need for a comprehensive transformation of the political system, the economy and society to meet the challenges of sustainable development. However, the scope, the speed and the means that are necessary to initiate and to advance such processes, is subject to controversial debate. Against this background, this paper will first of all, identify existing definitions of (societal) transformations and their theoretical assumptions in the scientific literature.

Transformation is often understood as a comprehensive process of change that affects many subsystems of society as a whole. The change processes in these subsystems are interdependent, meaning they mutually influence each other – changes in one subsystems will affect the other subsystem and vice versa. They can either both strengthen or weaken the others impact depending on their direction. The sum of such change processes will give a direction to societal development. Transformations designate the process of changing from one equilibrium state to another.

There is a multitude of competing visions for the future with different conceptions how this future will look like – ranging from the transformation to a sustainable society, to low carbon economies to forms of societal development that are decloupled from the "need" for economic growth. In order to classify and order the various contributions to this debate, to structure their assumptions about causalities and the need for governance, this paper uses three guiding questions: What are the objects of transformations? What are their driving forces? Can societal transformations be governed at all – and if so, how?

These questions have been answered based on a review of literature on the subject. The analysis was conducted in 2012 so that later publications on the subject have not been considered in this paper.

Content

1 Introduction

Many participants in the German political discourse have emphasized the need for a comprehensive transformation of the political system, the economy and society to meet the challenges of sustainable development. Some have referred to a "Third Industrial Revolution" (for example former president Köhler or the former environmental minister Gabriel), "Great Transformation" (WBGU 2011) or a "Green New Deal" (for example, the Heinrich Böll Foundation). The German energy transition has been identified as a major national project. The German Bundestag set up by a consensual decision between all parties represented in parliament a study commission on Growth, Wellbeing and Quality of life, which discussed several options for fundamental changes in the economic system. In the run-up to the Rio+20 conference, many institutions and authors have developed concepts to give impetus and provide direction to the debate on sustainable development. Controversies and disagreement exists primarily regarding the scope, the speed and the means that are necessary to initiate and to advance such processes of change. The understandings of what transformations are, if they can be governed or at least given some direction and if so, with what kinds of instruments, vary significantly. Against this background, it is a useful first step to study the existing different facets of the concept and to analyse the theoretical assumptions on which the various concepts are based on.

Thus, the question is how to order the different concepts of the future, models and studies and to study how they are related to each other. The different studies and scenarios develop various concepts, typologies and terminologies that are sometimes understood and used completely differently. The concepts are often based on different causal models on how change processes are initiated and thus also different ideas about how this change can be governed. Often, these underlying assumptions are contained in the concept only implicitly.

In the first part of the paper, we study the concept of transformation in greater depth: what is meant when referring to a transformation, what are objects of transformative processes, what are they driven by and can they be governed or given direction? For that we analyse literature on the theory and the conception of transformation. Thus, the paper provides an overview on existing views on transformation and provides a basic definition how societal transformations can be understood. Beyond that, the paper contributes to systematizing the debate on transformations towards sustainability and to a governance theory of transformation processes.

2 What are societal transformations?

We understand societal transformations as *comprehensive processes of change* that affect *multiple subsystems of society as a whole*. These change processes in different subsystems are *interdependent* – they influence (reinforce or lessen) each other: changes in one subsystem can trigger changes in another and vice versa.

The term transformation designates the passage from one societal equilibrium state to another. During this process 'new' and 'old' coexist next to each other – this is true for technologies, entire industrial sectors or even economic and political systems. Societal subsystems are often in competition with each other for natural or financial resources, for markets, budgets or legitimacy, which can easily lead to **conflicts**. The economic and structural change accompanying transformations is connected with the devaluation of existing resources and the creation of something new: examples for this phenomenon are skills and qualifications, the shifting (of resources) between different regions or the devaluation of bounded capital investments, etc. (Bär and Jacob 2013). The 'old' is usually well represented in the existing (political) system because (technical) standards, qualifications and social practices have developed in order to support the former. They have developed incrementally over long periods of time to fit as well as possible with the existing necessities. For innovators and their 'new' ways of doing things, these structures often pose significant **barriers** – for the established actors they reduce risks associated with the (maybe not sufficiently tested) 'new'. Transformation processes thus will be slowed down or confined to developments within established paths (compare Foxon 2011: 2263). Some authors question in this context in how far transformations are even possible within "closed" social systems – arguing that it might be hard, structural breaks (rather than incremental changes) that historically have marked the transition to the new (Bender et al. 2012: 209).

One feature of transformations is that its direction is open. It is not foreseeable if an innovation – or which innovation - is going to succeed and become established over time. Only the course of a transformation, it will become apparent in which direction society will develop and if this development is reversible or not. With the continuous experimentation with novelties, organisations of and institutions for innovators develop that challenge the established structures of society. A competition between 'new' and 'old' is not an imperative – a **co-existence** of old and new structures, technologies, actors is possible in principle. The more scarce societal resources are, the more likely it becomes that 'old' and 'new' compete over their distribution. Besides occasional conflicts, a co-existence means that one doesn't challenge the other in its core and the question which is going to dominate the future (and give direction to a transformation) is open. For example, a feature of the transformation processes in Eastern Europe is that traditional political governance features, such as central planning, co-existed with new open, market-based approaches in other subsystems of society. These different processes of change in various subsystems – the economy, in law or in societal development – influenced each other and provided a direction to the overall development (Kornai 2006: 217). The co-existence of renewable and fossil energy sources is another and absolutely current example for the relationship between 'old' and 'new'.

Turning points in this relationship are characterized by the build-up of a critical mass of innovators that challenge the co-existence of 'old' and 'new'. The image that is connected with reaching such critical masses is that of a **tipping point**. After reaching these points

change processes start enforcing each other (vgl. Lenton et al. 2008, Lenton 2013). Tipping points accelerate the diffusion of innovations that replace the structures of the old, established system. For example, the development of energy storage technologies or smart grids has the potential to drastically improve the competitiveness of renewable energies vis-à-vis the established fossil technologies. At the end of such change processes is a new equilibrium state that will be remarkably different from the point of origin. The 'result' of a transformation is a new configuration of institutions, technologies and culture. Within each subsystem, incremental changes and innovations are still possible – however they will not challenge the established system itself.

A great density of changes characterizes the transformation process, while the number of changes before or after will be significantly lower. The duration of transformative processes is generally shorter than in the phases of relative stability. Nevertheless, depending on the object of change, a transformation can last for decades. Typically, the duration of a transformation corresponds to the cycles of renewal of the object under question – thus, for example an investment cycle in an industrial sector in the case of products or technologies or a human generation for cultural changes.

The term transformation is used and understood ambiguously in the literature – thus for example with regard to the objects of transformation ("what is being transformed"), by which factors these transformations are driven as well as if and how they can be governed. This paper aims to provide an overview on this multitude of approaches and understandings.

In clarifying what a transformation is, its relationship to the term *transition* needs to be discusses as well. Their relationship in the literature is uneven with some authors – particular in the English-speaking world – using them synonymously (vgl. Fischer 2010).[1] Other authors, particularly those coming from an innovation or evolutionary economics perspective, use the term *transition* to refer to changes in the socio-technical regime. Thus it refers to a societal subsystem, e.g. mobility or living, and its technologies that are affecting societal practices and regulations (see for example Foxon 2011; Geels 2005).

Grin et al invert the use of both terms: while *transition*, as just discussed is used to refer to change within a socio-technical system, *transformations* in their understanding refer to phases within such *transitions* (Grin et al. 2010). Others use the term *Transition* (in German) to refer to crossovers from one political-institutional system to another (Reißig 2009:31).

[1] A practical example for this is the translation of the report of the German Advisory Council on Global Change. While the German title „Welt im Wandel. Gesellschaftsvertrag für eine große Transformation" uses one term, the English title „World in Transition. A Social Contract for Sustainability" uses the other.

3 Objects of transformation

What are the objects of transformation? What is it that is undergoing a change? Looking at the studies, the analyses and scenarios that have been published in the recent political and scientific debates on the further development of sustainability politics, we can find a broad selection of objects that can be at the centre of transformation processes. Depending on the objects, the duration of transformation processes can vary significantly, ranging from short to medium-term for examples for technologies, business models or institutions to long-term for the case of comprehensive transformations affecting the entire society as in the case of the industrial revolutions that came about as the result of the interplay of transformation processes in several subsystems of society.

One of the most formative descriptions of transformation was coined by Karl Polanyi in his work "The Great Transformation" in which he describes transformations as a higher-ranking category of societal change (Polanyi 1944). Transformations in this sense affect the entire societal system. Thus, according to Polanyi and other authors that use the same notion, there have been two transformations so far in human history: (1) the Neolithic (or Agricultural) Revolution when nomads became sedentary and (2) the Industrial Revolution with its change from an agrarian to an industrial society and self-regulating market economy. This notion is typically the starting point for debates about transformations – for example, the German Council on Global Change (WBGU) refers to Polanyi in its work (WBGU 2011). The WBGU defines 'great transformations' as follows: "Great transformations are … the consequence of interlinked dynamics occurring at different time scales, which then, in their compounded form, create a certain direction of the transition" (WBGU 2011: 83).

Objects of transformation can be individual **states**, in which the political, societal or economic structures and institutions change. Examples are the changes in Middle and Eastern European countries from socialist to democratic societies with capitalist market economies after 1989, the changes in many Latin American countries from dictatorships to democracies in the 1970s or the developments in China since following Chairman Mao[2].

A central object in nearly all concepts of transformation is the change in the **economic and financial system**. Examples can be found in the developments of the industrial revolution – the creation of elements typical of capitalist economies, such as the priority of profit maximization, the separation of ownership and management of a company, limited liability, etc., or similarly in socialist economies the public ownership of companies and natural resources, central planning of several sectors of society, etc. (Kornai 2006). The change processes in the economic and financial system in a transformation thus mainly concern questions like 'according to which principles are allocation decision being made?',

[2] Note that these changes that are limited to the political-institutional system are referred to as *transitions* by some authors (Reißig 2009:31).

'which interests and aspects are being considered in decision-making processes?, 'who benefits and who carries the costs of economic activities'?

Another object of transformation is a change in the **resource base of an economy**. Central to this is the change of the energy base of the economy – from wood to coal to oil that each have caused major developments in various sectors of the economy and society as a whole. Similarly impacts can be expected from a future energy economy based o renewable resources (Jänicke, Jacob 2008; Rifkin 2011).

A further understanding of transformation - as self-enforcing processes of great density from one equilibrium to another, also considers **ecosystems** as objects of transformation. On one hand, such changes are the direct result of human activities, for example in the cases of deforestation or land-use changes (Rockström et al 2009). On the other hand, for example in climate science, transformations of ecosystems are considered self-enforcing processes that cannot be directly influenced by human activities. Finally, natural resources can be institutionalized in a way that they become drivers for societal changes. Property rights for land, water or other ecosystems as well as the concept of ecosystem services are examples by which natural resources or services become viewed as economic assets (see for example TEEB 2010).

Also **technologies** can be an object of transformation. Typically, literature uses the term *transition* as these phenomena are typically studied in innovation or evolutionary economics. Studies in the field often investigate developments in socio-economic systems that are shaped at their core by technologies and the social practices and regulations of their use in society (e.g. Foxon 2011; Grin et al. 2010). These socio-economic systems fulfil basic functions such as housing, mobility, nutrition or the provision of energy. *Transitions* of technologies in this sense concern system innovations and the questions *how* certain basic services are provided – thus for example the transition from coal or wood-based heating to gas or the transition from sailing boats to steam-powered ships. These changes therefore affect a significant subsystem of society, but not society as a whole.
The analysis of the comprehensive change in socio-technical system in an evolutionary economics perspective is often based on the work of Schumpeter and his interpretation of Kondratieff's work, how long-term changes can be explained. According to this, technologies undergo long-term cycles from invention to innovation and their diffusion in markets that is supported by continuous improvements. At some point, the potentials for further innovation diminish or even disappear and a technological paradigm will rise and likely replace the former (Schumpeter 1944).

Transformative processes, however do not just affect society as a whole. At the micro-level, **organisations** are also objects of transformation. Organisations or businesses can undergo major restructuring or reconfigurations in what they do as a way of responding to changing framework conditions. Examples for that come from diverse areas such as business administration (e.g. Lessem, Schieffer 2009; Paech 2005), but are also used for military organisations (Dembinski 2006; Bundeswehr 2012).

Finally, **culture and lifestyles** can be objects of transformation. Leggewie and Welzer (2009) for example highlight the important role of the enlightened and critical consumer for a comprehensive societal change towards sustainable development.

In conclusion, literature uses the term *transformation* inconsistently to refer to a variety of change processes. Regularly, different objects of transformation are linked to certain terms. A further approximation to the core of the concept will be pursued in the next section that looks at the drivers of transformations. It will show that not only the objects vary, but also the assumptions about what causalities are driving transformations.

4 Driving forces of transformations

What is driving change? What are the causal connections between individual processes of change whose sum makes of what we consider a transformation of society? Closely connected to these questions is the consideration of their governance – its mechanisms and actors that will be discussed in the following section. Some objects of transformation (such as technologies or ecosystems) from the previous section reappear here also as drivers of transformations. This lack of clarity is unavoidable as they play different roles in change processes according to the perspective one takes: both *are being* transformed but they also *drive* changes in a certain direction.

Drivers of changes are developments in the **environment**. The category includes for example public opinion, actions by governments, the structure of markets or demographic changes. These processes are creating pressures for actors and provide innovation incentives and thus accelerate the development of new technologies (see Berkhout et al. 2004). Such a systemic understanding of societal change processes can be found in the social sciences in the research on the transformation of Middle and Eastern Europe after 1990 (Reißig 2009:31). This perspective on systemic change distinguishes *transformation* from *social change* as not just a process of social change within established structures and orders, but which includes the change of the system itself by changing it structures, institutions, rules, cultural foundations and models of societal development (Reißig 2009: 33ff).
A further, albeit largely exogenous driver on the macro-level are changes in **ecosystems** and the services they provide. Examples for ecosystems as drivers of changes are climate change and its significance for energy production (towards decarbonisation) and energy use (towards greater efficiency) or the overfishing of the oceans as a driver for changes in fishing practices and peoples' diets (compare also Foxon 2011).

The **co-evolution** of sub-systems is considered a driver of transformation in many publications as well. It refers to change processes going on in parallel that influence each other. The direction of their development is open. When ecological, economic, technological and institutional subsystems are developing in a similar direction, they tend to reinforce each other and provide a direction to societal changes (compare Foxon 2011:4; Grin et al. 2010). The principle of co-evolution underscores that, in general, one cannot determine a priori which societal actors have the greatest capacity to influence societal change. Much

more, it highlights that many individual processes of change that develop in a similar direction can reinforce each other and thus become an important force determining the direction of the overall development.

Many concepts of transformation view **innovations and niches** as the point of origin for change. Innovations that can grow in market niches question and potentially challenge existing socio-technical regimes. If an innovation – be it technical, cultural or social nature – will replace an established competitor is shaped and determined by societal principles that manifest themselves in existing markets, regulations, infrastructures and behaviours.

Actors and actor networks are considered central drivers of change in some concepts. Examples for such actors are politicians, scientists, business leaders, representatives of civil society as well as consumers. They function as drivers of processes of change by propagating certain narratives and ideals, develop innovative technologies and accelerate their diffusion in society. This thinking is opposed to concepts, such as the "Systems of Innovation" approach (Edquist 1997) that highlights the systemic origins of change. The latter emphasise that technological innovations do not come about because of individual actors, but by the interactions of many in innovation networks – for example between businesses, universities and research institutions (Geels 2005:7). Besides businesses, Foxon highlights the role consumers, especially user practices play in establishing a demand for sustainable products and services. Thus, by co-evolution, changes in technologies and institutions alter the design of supply chains towards greater sustainability (Foxon 2011: 2263).

Some authors further identify **ideas and principles** as drivers of change. They argue that these ideas and principles shape markets, regulations, infrastructures and usage patterns and thereby influence the diffusion of innovations. Narratives that explain principles and reduce their complexity can accelerate the diffusion of innovation and thus influence the direction of development (WBGU 2011: 90).

Interactive learning in the sense of „co-design and learning" between different stakeholders can foster the exchange of theoretical and practical knowledge and experience (Grin et al. 2010:4f). Some authors underscore the importance of such interaction in order to establish new knowledge in society.

A central assumption made my many authors is that **institutions and the political culture** are central to transformation processes as they institutionalise rules and norms and thus enable or hinder certain changes. Institutions can be defined as the sum of written and unwritten 'rules of the game' that guide the actions of individuals (Mayntz, Scharpf 1995; March, Olson 1984). While formal rules and norms (e.g. technical regulations and laws) can change frequently, societal norms and moral convictions change only on much longer timescales. Different institutions thus can be a cause, object and barrier for transformation processes. Research in institutional economics (e.g. by Nelson and Winter 1982 or North 1990) has studied the significance of institutions for the economic performance of societies. Successful economic systems tend to have not only simple („self-enforcing") trade re-

lations between actors, but they provide an institutional framework that allows for complex interactions between various actors and ensures an impartial enforcement of the collective rules (Olson 2000). Institutions historically have grown in societies in interactions with societal and technological developments, which are reflected – at least – in the codified set of rules and laws. Such an embedment of norms in cultural systems also explains why the simple transfer of formal institutional structure, e.g. as it was done with the set of laws of Western European states in formerly socialist states of Middle and Eastern Europe, has been only partially successful in terms of creating economic success (see Olson 2000). Institutions require a context and embedment in the cultural foundations of a society to be effective.

This ambivalent role of institutions refers to the complexity of governing social change in subsystems and particularly, the governance of a transformation. The next section will discuss the need for governance, possible approaches to it and mechanisms for it.

5 Governance of transformation processes

Is it possible to govern transformations? If so – which actors, which institutions, which mechanisms and instruments are suitable for it? If the term transformation is used in the sense Polanyi did for the Neolithic or industrial revolution it is hard to believe that a targeted, intentional governing is possible. A transformation in Polanyis sense of the word is an emergent phenomenon resulting of different change processes, that take place at the same time in different areas of society.

In this understanding societal actors and institutions of society are themselves subjects of a fundamental change. Within the industrial revolution not only the invention of the steam engine or the railway took place, but new forms of businesses were developed, of statehood (guaranteeing property and civil rights), urbanization etc. These societal innovations challenged existing practices and institutions, e.g. noble landowners or professional organizations. Often it could not be foreseen which institutions would become accepted in the end and often this was subject of harsh debates. From this perspective governance of transformation is not possible.

If on the contrary one looks at the transformation of different subsystems – e.g. states, economic sectors, socio-technological systems – it is possible to identify some possibilities of governance. Scientific contributions of e.g. on the transformation of middle eastern-european economies, of transformations from socialist to capitalist states or on transition management of socio-technological systems are relevant here (z.B. Kornai 2006, Fischer 2010, Geels 2005, Meadowcroft 2011, Kemp et al. 2007).

Governance mechanisms for these transformations correspond to conventional policy instruments. A ‘transformative policy’ in this sense results of the coactions of these ‘regular’ instruments and a co-evolution of transformative processes – when various policy measures create synergies between different change processes, reinforcing each other into one direction of change. Another characteristic of transformative policy is the long-term nature

and strategic orientation of such policy mixes. They aim at supporting pioneers and experiments, at institutionalizing those experiments that were successful and finally at promoting their diffusion. Transformative policy develops in such areas where different subsystems overlap, it recognizes its interactions and initiates such processes that self-enforce each other – in other words: transformative policy promotes synergies between different change processes in subsystems which influence each other in a co-evolutionary manner and give a direction to the overall societal developments.

But transformation processes in subsystems are also characterized by conflicts between 'old' and 'new' and by issues of distribution and power. New technologies, a new resource base or liberalization of economies result in structural change. Some businesses, economic sectors or regions and its interest groups respectively (e.g. trade unions) lose, while others gain importance. These conflicts have to be taken into account: new or modified institutions, new goals or instruments are results of these changes. Typically existing institutions are not replaced from one day to the other but 'old' and 'new' exist next to each other for some time.[3] This means that within the course of a transformation the possibilities for governance can change, too. Distributive issues are reflected in political institutions. This is why the governance of transformative processes even in subsystems is a very challenging task.

Some take another perspective and describe governance of transformation as an active and intentional activity. In this perspective it is not the change processes that are in the focus, but transformation is seen as a trigger and the designing of these processes. One representative of this perspective is Rolf Reißig. He defines the term transformation as an intentional process but at the same time stresses its selfdynamic (Reißig 2009, 34f.).

In any case transformation processes challenge the capacities of political systems. Conflicts that result from transformation processes are mirrored in the political system. Goals and instruments are therefore always the result of debates and compromises. If sustainability and environmental requirements are taken into account depend on the respective capacities of the political system (Jacob, Volkery 2006).

Possibilities for governing and mechanism of transformations thus depend on three aspects: 1) the object of a transformation, 2) the driving forces and 3) the expectations, possibilities and limits of governance. From a pessimistic perspective, where transformation is seen as comprehensive change of an entire system, the possibilities for governance are little. From a more optimistic view, which assumes that actors are able to influence change processes in different subsystems, a number of different fields, levels and instruments can be identified. This latter perspective comprises steering and governance by non-state actors.

[3] Mancur Olson stresses e.g. that (inofficial, illegal) markets existed within communist economies. He sees this as an example of the supremacy of the capitalist system over planned economies (Olson 2000).

Which level of governance of a transformation, which actors – state or non-state actors – and which instruments are most important is however seen differently.

5.1 Levels of governance

World regions, international, national, subnational: global environmental problems like climate change, loss of biodiversity or resource overuse hamper coordination and coherent state actions. The WBGU therefore puts emphasis on international coordination (WBGU 2011:236). This is based on the idea that climate change is a collective good and that free-riding of individual states beyond international agreements of burden-sharing undermine effectiveness of the efforts and at the same time reduces the willingness of states to contribute to the collective good.
Some authors therefore stress the importance of the subnational level (Schreurs 2008) or contracts between fewer parties, that are more capable of consensus (Falkner 2010). Jänicke and Weidner (2002) underline the importance of national states and the learning between them respectively (diffusion), which initiates processes of change. Other authors refer to multi-level-governance, which creates possibilities for governance in de-nationalized problems beyond the nation state (Zürn 2008:572).

5.2 Actors of governance

States, civil society, businesses: Many authors stress the fact that hierarchical rule-setting, which traditionally was the domain of national sates and intergovernmental organizations, is replaced by newer, non-hierarchical forms of governance (Pattberg 2004; Zürn und Joerges 2005; Mayntz 2008; Zürn 2008, Bache und Flinders 2004; Dingwerth und Pattberg 2006:191). Societal actors increasingly claim to be involved in decision making via transnational rule-making (Zürn, Binder, Ecker-Ehrhardt et al. 2007:149). More and more private actors – NGOs, businesses, civil society – set up standards, often without the help of governments (Biedermann 2006:2). There are also more and more partnerships between governments and private actors, so called public-private partnerships (Börzel und Risse 2002; Lenox und Nash 2003).

5.3 Governance mechanisms and instruments

Dependent on their perspectives different authors focus on different mechanisms and instruments to promote change towards a sustainable society.

Regulatory and structural policy: 'To set the regulatory framework' – this is mainly seen as a task of national states (z.B. WI 2008, OECD 2011a, UNEP 2011). The regulatory framework usually consists of a policy mix of regulatory, market-based and informational instruments.

In order to speed up change towards sustainability some authors stress the necessity to accelerate structural change. In order to do so it is seen as important to promote new technologies, but also burden the old ones (vgl. Acemoglu et al., 2010; Aghion et al., 2009).[4] This way negative external effects can be internalized (e.g. eco taxes or emission trade) and existing subsidies can be reduced. New technologies on the other hand can be promoted via short-term subsidies, R&D, incentives or *Payments for Ecosystem Services* (Bär und Jacob 2013).

Discourse / persuasion / information: Many authors refer to the necessity of behavioral change of individual actors (e.g. consumers) (Welzer und Leggewie 2009). Non-sustainable behavior can either be a result of a lack of willingness or a lack of information. In order to achieve behavioral change on the individual level, they point at indirect steering mechanisms like influencing certain belief systems via general guiding principles, information or structuring of discourse (Huber 2011:134ff.). Another possibility consists in connecting those general guiding principles with policy instruments, e.g. informational instruments, like eco labeling of products or financial incentives, e.g. eco taxes (e.g. OECD 2011b:97ff.). A critical mass of actors who act sustainably are able to create a certain dynamic, speeding up the transformation. This group will not only demand for sustainable products but also demand sustainable behavior of other actors.

Innovation: The state can initiate processes of change by innovation policy or by leading by example. Besides of classical innovation policy instruments like promoting R&D, dynamic regulatory standards can give important incentives (e.g. top-runner). On the European level demand side instruments of innovation policy have gained momentum. These instruments aim at speeding up technological change, e.g. via public procurement of innovative products and technologies (COWI & European Commission 2009; Jacob et al. 2010). Giddens stresses that it is not the role of the state to steer change processes, but to set incentives for private actors to initiate such processes and together with them reach certain goals (e.g. reduction of CO2 emissions) („ensuring state“) (Giddens 2008:8f.).
Some authors believe in mechanisms for promoting innovation in niches (so called pioneers of change) that, after some time, can replace existing regimes (see transition management, see Loorbach 2002, Quitzow 2011; and the strategic niche management vgl. Grin et al. 2010:81). Other authors criticize these approaches and stress that innovation processes are emergent phenomena which cannot be steered (z.B. Smith et al. 2005). Another argument against these processes is that they can be influenced by interest groups and political institutions (e.g. Jacob 2007).

[4] „This means that there are not one but two major issues that must be dealt with: the environmental externality generated by polluting production activities, as in the standard models, but also the fact that past or current technological advances in dirtier technologies make future production and innovation in clean technologies relatively less profitable.“ (Aghion et al., 2009)

Besides technological innovations social innovations can be promoted, too, e.g. experiments with sustainable lifestyles etc. Taking the example of China, Fischer analyses how the central government created niches in different policy fields to test out policy-experiments and institutions before they were introduced on a wider base (Fischer 2010:303). In different cities various policies were tested and compared before the central government decides which one to set as a national guideline. The knowledge that is created out of testing allows for a better adaptability of the political system, which is seen by the author as a comparative advantage in other transformative processes compared to other states (Fischer 2010:309).

Non-state actors, too, intentionally experiment with different lifestyles etc, e.g. eco villages, which are based on a redesign of different societal areas and a strengthening of regional economic circles (see Wuppertal Institut 2008: 241).

Infrastructures: Creating and maintaining public infrastructures is one of the core responsibilities of the state. The existence of infrastructure (e.g. universities, education institutions as well as physical infrastructures) at the same time is a prerequisite for the development of niche innovations. Meadowcroft points to the 'inherent political' dimension of designing societal structures – especially in regard to the normative concept of sustainability (Meadowcroft 2011:71). Due to its long-term nature, its costs and its indirect effects on other technologies (complementary or competing ones) infrastructures (especially in the area of mobility, construction and energy) are central for guiding strategic course of action. These decisions influence success or failure of other technologies, e.g. investments in CCS technology influence energy infrastructures (the question e.g. if fossil energy structures can prevail, if and how renewable energies should be further developed etc.) (see Meadowcroft 2011:72; Meadowcroft, Langhelle 2011). Due to this and from a transformation perspective it is necessary to strengthen the long-term perspective on current infrastructure planning in political decision making. This can be done by an increased public participation or via ombudsmen for the future.

Compensation of negative external effects: Like every other change process the transformation towards sustainability will have positive as well as negative distributive impacts. In order to preserve the necessary societal acceptance for the transformation it is necessary to have compensatory measures for the negative effects in place. The OECD Green Growth study emphasizes in this context that distributive effects are likely to be regressive in nature and therefore further supportive measures are necessary in order to support the weaker members of society (OECD 2011a:13). One example is the necessity for training people in order to guarantee availability of new qualifications on the labor market.
Structural economic change affects different regions, too, e.g. regions that are dependent of certain economic sectors, which result of the rise and fall of certain technologies and sectors. In both areas it is a political task to cushion the effects of change – e.g. create new possibilities for structurally weak regions via regional policy or cushion the effect on certain economic sectors via structural measures. Besides promoting innovations (see

above) governing structural change moreover comprises the question how to deal with existing sectors and how environmental harmful subsidies can be reduced, that hamper structural change (vgl. Baer et al. 2011).

Coherence / Integration:

Coherence of policies is important for efficient governance. Moreover, all impacts and side effects of policies are to be taken into account, including effects on the environment, in order to increase overall benefit. This is why consideration of environmental aspects is necessary in every policy. Other authors go even one step further and justify integration of environmental aspects from a normative point of view (z.B. Lafferty, Hovden 2003). Irrespectively of the justification for the necessity of environmental policy integration scientific literature describes several governance approaches in order to secure such an integration (z.B. Goria et al 2010). Suitable institutions, strategies, instruments and policy processes for integrating environmental aspects today are established one form or another in all of the OECD states (Jacob et al. 2008).

6 Contribution to a governance theory of transformation

The transformation towards sustainability is widely discussed in public. This is why the question if and if yes, how the transformation can be governed, is a very important one. While the Neolithic and industrial revolution both can be seen as transformations that weren´t steered towards one overarching goal, the transformation towards sustainability requires a certain amount of 'direction', in order to save the planet.

Against this background this paper is a contribution to the debate about societal transformation processes. The different ideas behind the concept and the different understandings that can be found in literature have been analyzed along three dimensions: the objects of transformation, the driving forces and the approaches for governing a transformation.

The analysis has shown that governing of transformation is possible in subsystems only. The notion of co-evolution is a central one and serves for focusing on different societal subsystems and their interactions, in order to achieve synergies between different change processes. Through the coordination of 'normal' policy instruments incentives for transformative processes can be given. Through targeted promotion of pioneers and experiments and the necessary framework conditions it is possible to help diffuse such innovations, which again can help to speed up transformative processes and give them a direction towards sustainability.

References

Acemoglu, D., Egorov, G., Sonin, K. (2010). Political Selection and Persistence of Bad Governments, Acemoglu, D., Aghion, P., Bursztyn, L., & Hemous, D. (2010). The Environment and Directed Technical Change. Harvard Working Paper: 1–55.

Aghion, P., Hemous, D., & Veugelers, R. (2009). No green growth without innovation (No. 07). bruegel policy brief (Vol. November, 1–8). Brussels: Bruegel.

Bache, I. and Flinders, M. (2004): Multi-level Governance. Oxford: Oxford University Press.

Bär, H. & Jacob, K. (2013): Nachhaltige sektorale Strukturpolitik. In M. von Hauff & T. Nguyen (Eds.), Nachhaltige Wirtschaftspolitik. Baden-Baden: Nomos.

Bär, H., Jacob, K., Meyer, E., & Schlegelmilch, K. (2011): Wege zum Abbau umweltschädlicher Subventionen. WISO Diskurs 08/2011.

Bender, H., Bernholt, N., & Winkelmann, B. (2012): Kapitalismus und dann? Systemwandel und Perspektiven gesellschaftlicher Transformation. München: oekom.

Berkhout, Smith and Stirling (2004): Socio-techonological regimes and transition contexts. In: Elzen, B., Geels, F., Green, K. (Ed.). System Innovation and the Transition to Sustainable Development. Theory, Evidence and Policy. Edward Elgar Publishing: 48–75.

Biedermann, R. (2006): Private Governance durch gemeinsame Standards: Mechanismen, Macht und Gegenmacht in drei globalen Branchen. Manuskript. Macht, Ohnmacht, Gegenmacht: Nichtstaatliche Akteure im globalen Regieren. Hanse-Wissenschaftskolleg Delmenhorst, 15./16. Juni 2007.

Binswanger, H. (2009): Vorwärts zur Mäßigung. Perspektiven einer nachhaltigen Entwicklung. Murmann.

Börzel, T. and Risse, T. (2002): Public-Private Partnerships: Effective and Legitimate Tools of International Governance? , Prepared for the Edgar Grande/Louis W. Pauly (eds.), Complex Sovereignty: On the Reconstitution of Political Authority in the 21st Century: http://userpage.fu-berlin.de/~atasp/texte/021015_ppp_risse_boerzel.pdf.

Bundeswehr (2012): Zentrum für Transformation der Bundeswehr. Zuletzt abgerufen am 13.08.12 von http://www.zentrum-transformation.bundeswehr.de/portal/a/ztransfbw

COWI, & European Commission. (2009): Bridging the Valley of Death: public support for commercialisation of eco-innovation (pp. 1–129). Zuletzt abgerufen am 13.08.12 von http://ec.europa.eu/environment/enveco/innovation_technology/pdf/bridging_valley_report.pdf.

Dembinski, M. (2006): Die Transformation der NATO. Amerikanische Vorstellungen und Risiken für Europa. HSFK-Report 11/2006

Dingwerth, K. and Pattberg, P. (2006): Global Governance as a Perspective on World Politics. Global Governance 12: 185–203.

Edquist, C. (1997): Systems of innovation: technologies, institutions, and organizations. Routledge.

Falkner, R., Stephan, H., & Vogler, J. (2010): International Climate Policy after Copenhagen: Towards a “Building Blocks” Approach. Global Policy, International Climate Policy, 1(3), 252–262. doi:10.1111/j.1758-5899.2010.00045.x

Fischer, D. (2010): Comparing Transitions: Insights from the Economic Transition Processes in Former Socialist Countries for Sustainability Transitions. Osteuropa-Wirtschaft, 55(4), 289–310.

Foxon, T. (2011): A coevolutionary framework for analysing a transition to a sustainable low carbon economy. Ecological Economics.

Geels, F. W. (2002): Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research Policy, 31(8-9), 1257–1274. Elsevier.

Geels, F.W. (2004): Understanding system innovations: a critical literature review and a conceptual synthesis. In: Elzen, B., Geels, F., Green, K. (Ed.). System Innovation and the Transition to Sustainable Development. Theory, Evidence and Policy. Edward Elgar Publishing: 19–47.

Geels, F. W. (2005): Technological transitions and system innovations. a co-evolutionary and socio-technical analysis. Edward Elgar Publishing.

Grin, J., Rotmans, J., & Schot, J. (2010): Transitions to Sustainable Development. New Directions in the Study of Long Term Transformative Change (Routledge Studies in Sustainability Transitions.). New York: Routledge.

Goria, A.; Sgobbi, A., von Homeyer, I. (2010): Governance for the environment: a comparative analysis of environmental policy integration Edward Elgar Publishing.

Huber, J. (2011). Allgemeine Umweltsoziologie. Heidelberg: Springer.

Jacob, K., Volkery, A. (2006): Modelling Capacities for Environmental Policy-Making in Global Environmental Politics. In: Jänicke, Martin / Jacob, Klaus (Eds.): Environmental Governance in Global Perspective. New Approaches to Ecological Modernisation. pp. 67-94

Jacob, K. (2007): Management of industrial transformation: Potentials and limits from a political science perspective. In: Lehmann-Waffenschmidt, Marco (ed.): Innovations towards Sustainability. Conditions and Consequences. 95-102. Physica Verlag.

Jacob, K., Volkery, A., Lenschow, A. (2008): Instruments for Environmental Policy Integration in 30 OECD Countries. In: Jordan, A.J.; Lenschow, A.(Eds.): Innovation in Environmental Policy? Integrating the Environment for Sustainability. Edward Elgar Publishing. Jacob, K., Bär, H., Kahlenborn, W., & Knopf, J. (2010). Innovationspotentiale umweltfreundlicher öffentlicher Beschaffung (1–184).

Jackson, T. (2009): Prosperity without Growth. Earthscan.

Jänicke, M. (2007): Umweltstaat — eine neue Basisfunktion des Regierens. Umweltintegration am Beispiel Deutschlands. In: Jacob, K., Biermann, F., Busch, P., Feindt, P., Henning (Hrsg.:) Politik und Umwelt. Politische Vierteljahresschrift. Sonderheft 39. 342-259.

Jänicke, M., & Jacob, K. (2008): Eine Dritte Industrielle Revolution? Wege aus der Krise ressourcenintensiven Wachstums. In Die dritte industrielle Revolution — Aufbruch in ein ökologisches Jahrhundert (10–32). Berlin: BMU.

Kemp, R. , Loorbach, D. (2006): Transition management: A Reflexive Governance Approach, in: J.-P. Voss, D. Bauknecht, & R.P.M. Kemp (eds.), Reflexive Governance for Sustainable Development, Edward Elgar, Cheltenham: 103-130.

Kemp, R., Loorbach, D., & Rotmans, J. (2007): Transition management as a model for managing processes of co-evolution towards sustainable development. International Journal of Sustainable Development & World Ecology, 14:1, 78–91. doi:10.1080/13504500709469709

Kornai, J. (2012): The great transformation of Central Eastern Europe: Success and disappointment. Economics of Transition, 14:2, 207-244.

Lafferty, W., Hovden, E. (2003): Environmental policy integration: towards an analytical framework, Environmental Politics, 12:3, 1-22.

Leggewie, C. (2010): Futur Zwei. Klimawandel als Gesellschaftswandel. In: Aus Politik und Zeitgeschichte, 32-33 2010, 9. August 2010, 40-46.

Leggewie, C., Welzer, H. (2009): Das Ende der Welt, wie wir sie kannten. Klima, Zukunft und die Chancen der Demokratie. S. Fischer Verlag, Frankfurt am Main.

Lenox, M. J. and Nash, J. (2003): Industry self-regulation and adverse selection: a comparision across four trade association programs. Business Strategy and the Environment 12(6): 343-356.

Lenton, T. (2013): Environmental Tipping Points. Annual Review of Environment and Resources. doi:10.1146/annurev-environ-102511-084654

Lenton, T. M., Held, H., Kriegler, E., Hall, J. W., Lucht, W., Rahmstorf, S., & Schellnhuber, H. J. (2008). Tipping elements in the Earth's climate system. Proceedings of the National Academy of Sciences, 105(6), 1786–1793.

Lessem, R., Schieffer, A. (2009): Transformation Management (Transformation and Innovation). Ashgate.

Loorbach, D. (2002): Transition Management. New mode of governance for sustainable development. URL: http://repub.eur.nl/res/pub/10200/proefschrift.pdf (zuletzt eingesehen am 23.1.2012).

March, J., Olsen, J. P (1984): The New Institutionalism: Organizational Factors in Political Life. American Political Science Review 78 (September): 734–49.

Mayntz, R., Scharpf, F. (1995): Gesellschaftliche Selbstregelung und politische Steuerung. Campus Verlag.

Mayntz, R. (2008): Von der Steuerungstheorie zu Global Governance. In: Governance in einer sich wandelnden Welt. PVS-Sonderheft 41.(Hrsg.) Schuppert, G. F. and Zürn, M. Wiesbaden: 43-60.

Meadowcroft, J. (2005): From Welfare State to Ecostate. In: John Barry/ Robyn Eckersley (2005): The State and the Global Ecological Crisis. MIT Press.

Meadowcroft, J. (2011): Engaging with the politics of sustainability transitions. Environmental Innovation and Societal Transitions, 1(1), 70–75. Elsevier B.V. doi:10.1016/j.eist.2011.02.003

Meadowcroft, J., & Langhelle, O. (2011): Catching the Carbon. The Politics and Policy of Carbon Capture and Storage. Edward Elgar Publishing.

Nelson, R., & Winter, S. (1982): An Evolutionary Theory of Economic Change. Harvard University Press: Cambridge, Massachusetts.

North, D. (1990). Institutions, Institutional Change and Economic Performance. Cambridge University Press: Cambridge, UK.

OECD. (2011a): OECD Green Growth Studies: Towards Green Growth. OECD: Paris.

OECD. (2011b): OECD Green Growth Studies: Fostering Innovation for Green Growth. OECD: Paris.

Olson, M. (2000): Big bills left on the sidewalk: why some nations are rich, and others poor. Journal of Economic Perspectives, 10(2).

Paech, N. (2005): Nachhaltiges Wirtschaften jenseits von Innovationsorientierung und Wachstum. Eine unternehmensbezogene Transformationstheorie.

Pattberg, P. (2004): The Institutionalisation of Private Governance: Conceptualising an Emerging Trend in Global Environmental Politics. Global Governance Working Paper No 9. Potsdam, Amsterdam, Berlin, Oldenburg: The Global Governance Project.

Polanyi, K. (1944): The Great Transformation. Politische und ökonomische Ursprünge von Gesellschaften und Wirtschaftssystemen. Suhrkamp.

Quitzow, R. (2011): Towards an integrated approach to promoting environmental innovation and national competitiveness. Working Paper No. 4 within the project: Lead Markets. Funded under the BMBF Programme „WIN 2". Zuletzt abgerufen am 23.01.12 von http://kooperationen.zew.de/fileadmin/user_upload/Redaktion/Lead_Markets/Werkstattberichte/WB4_Quitzow.pdf

Reißig, R. (2009): „Gesellschafts-Transformation" – Die Suche nach einem neuen Konzept sozialen Wandels. In Gesellschafts- Transformation im 21. Jahrhundert. Ein neues Konzept sozialen Wandels (pp. 29–66). Wiesbaden: VS Verlag für Sozialwissenschaften.

Rifkin, J. (2011): The Third Industrial Revolution. How Lateral Power Is Transforming Energy, the Economy, and the World. Macmillan.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., III, Lambin, E. F., et al. (2009): Planetary boundaries: exploring the safe operating space for humanity. Ecology and Society, 14(2), 32.

Rotmans, J., Kemp, R., van Asselt, M. (2001): More evolution than revolution: transition management in public policy. In: foresight, Vol. 3, No 1, 16-31.

Schreurs, Miranda (2008): From the Bottom up. Local and sub-national climate change politics. In: Journal of Environment and Development. 17: 4, 343-355.

Schumpeter, J. (2003 [1943]): Socialism, Capitalism and Democracy. Routledge. London & New York.

Smith, A., Stirling, A., et al. (2005): The governance of sustainable socio-technical transitions. Research Policy, 34(10), 1491–1510.

TEEB (2010): The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB.

UBA (2010): Energieziel 2050: 100% Strom aus erneuerbaren Quellen. Dessau-Roßlau: Umweltbundesamt.

UNEP. (2011): Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. Nairobi: UNEP.

WBGU. (2011): World in Transition – A social contract for sustainability. Berlin: WBGU.

Weiland, S. (2012): Reflexive governance – a way forward for coordinated natural resource policy? In: Karl Hogl, Eva Kvarda, Ralf Nordbeck und Michael Pregernig (Hg.): New Modes of Governance in Environmental and Natural Resource Policy: Analytical Perspectives and Empirical Insights.

Welzer, H., Wiegandt, K. (2011): Perspektiven einer nachhaltigen Entwicklung. Wie sieht die Welt von morgen aus? Frankfurt am Main, Fischer Taschenbuch Verlag.

Wuppertal Institut (2008). Zukunftsfähiges Deutschland. Frankfurt am Main, Fischer Taschenbuch Verlag.

Weidner, H., Jänicke, M. (2002): Capacity Building in National Environmental Policy. A Comparative Study of 17 Countries.

Zürn, M. and Joerges, C. (2005): Law and Governance in Postnational Europe: Compliance beyond the Nation-State. Cambridge, Cambridge University Press.

Zürn, M., Binder, M., Ecker-Ehrhardt, M., et al. (2007): Politische Ordnungsbildung wider Willen. Zeitschrift für Internationale Beziehungen 14(1): 129-164.

Zürn, M. (2008): Governance in einer sich wandelnden Welt — Eine Zwischenbilanz. In: Poli-tische Vierteljahresschrift Sonderheft 41: Governance in einer sich wandelnden Welt.(Eds.) Schuppert, G. F. and Zürn, M. Wiesbaden, Verlag für Sozialwissenschaften.