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Transition Management: toward a prescriptive model for multi-level governance systems

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Introduction

Over the last decades, we have witnessed a shift from the centralized government-based nation-state, towards liberalized, market based and decentralized decision-making structures. Due to societal developments the power of central government to make policies and implement these has decreased, leading to increasingly diffuse policy-making structures and processes stratified across sub-national, national and supra-national levels of government (Hooghe and Marks 2001). Generally referred to with the term 'governance' (Kooiman 1993), the current practice of government in making policy is in interaction with a diversity of societal actors. At the European level, this development has led to multi-level, participatory decision-making structures in which for example regions are dealing directly with EU-offices, NGO's and businesses are involved in the development of policies and top-down decisions are limited to the politically most controversial issues. But governance has also become common practice at the global as well as on a regional scale, where influence of non-governmental organizations (NGO's), business and science slowly becomes part of policy-making.

Governing societal change, or how to structure and influence societal development in a desirable direction, has been the focus for research by public administration and political scientists and other social scientists for many decades. There seems to be an increasing degree of consensus in this hybrid research field that traditional forms of steering are not suitable for societal challenges with a high degree of complexity. Both classical top-down steering by government ('the extent to which social change can be effected by government policies') as well as the liberal free market approach ('the extent to which social change can be brought about by market forces') are outmoded as effective management mechanisms to generate sustainable solutions at societal level. Many researchers therefore argue for new forms of governance to reduce, or better still, eliminate this lack of direction. However, governance itself is perceived to be an ambiguous development that is directly related to the emergence of the network society. Both the benefits as well as the negative aspects of diffuse forms of governance are emphasized regarding the involvement of stakeholders, the democratic and legitimizing issues related to interactive policy-making and the inevitable necessity of dealing with the reality of networks and diffusion of power (e.g. Kooiman 1993; Eising and Kohler-Koch 1999; Hooghe and Marks 2001; Voss 2005). Although these authors also stress problems related to the shift from government to governance, they generally interpret the problems as temporary and hypothesize on how governance could be more effective and transparent.

Although it is not easy to generalize, the new forms and theories of governance developed over the last fifteen years are highly descriptive and analytical and rarely offer operational models for governance. Our society is however confronted with many areas in which complex and unstructured problems occur (for example in our welfare systems, environment, agriculture, energy, mobility, health-care) for which long-term solution strategies need to be developed at the level of the society. Generally, this is referred to as Sustainable Development: a long-term development that takes in to account the adverse side-effects of modernization and fundamentally redefines its own dynamics and workings. Not only does this imply a new paradigm on economic and technology development, it also includes a redefinition of how to govern society.

Transition management as presented in this paper is a governance approach based on insights from complexity studies, sociology and complex systems theory. On this basis, a framework is built that discriminates between different, recursive levels of governance, that can be used to structure and 'manage' governance processes so that these converge and reinforce each other. Transition management is innovative for two reasons: it offers a prescriptive approach towards governance as a basis for operational policy-models and it is explicitly a normative model by taking Sustainable Development as long-term goal. Transition management is itself still in development. The new, hybrid, research field of transitions in which interdisciplinarity and practice oriented research are central approaches, is still in a pre-paradigmatic stage (Rotmans, Grin et al. 2004). This means that the thoughts and concepts presented in this paper can be subject of debate. In fact, it is through scientific and societal debate upon issues addressed in this paper that our thinking and practice of governance for sustainable development advances.

Governance and complexity

Society has become increasingly complex on three levels: the level of society itself, of the problems facing our society and of dealing with these problems (governance). Trends such as internationalization, informatisation, integration and individualization have led to the emergence of the network-society (Teisman 1992; Castells 1996) and an increasing societal complexity. This development has led to the emergence of a new type of problems at the societal level, which cannot be solved with simple, short-term solutions. These problems are defined as persistent problems: they are unstructured (Hisschemöller 1993) and highly complex because they are rooted in different societal domains, occur on varying levels and involve various actors with dissimilar perspectives, norms and values. Solutions to such problems are not given and purely analytical approaches will not suffice.

Policy-making itself has become highly complex in the context of these persistent problems, as different actors and perspectives need to be dealt with and clear solutions or mechanisms to assess progress and success are lacking. On the short-term, different new concepts and approaches have emerged concerning how to deal with a network society as government; interactive, participatory, network and process approaches. These new governance arrangements focus on facilitating network processes around formulation and implementation of policy problems on the short- and mid-term. Dealing with persistent societal problems on the long-term however will require approaches that give special attention to learning, interaction, integration and experimentation, since every implemented solution will reflexively lead to changes in the societal structures, in turn transforming the problem itself.

A recently emerging holistic paradigm for analysis of complex systems is systems theory (or 'systems thinking'). Systems theory refers to a universal language to address complex patterns of interaction between different components in complex adaptive systems. 'Systems thinking' has quickly gained popularity during the 1990s in the context of organizational sciences and management practice, but has since then been introduced in a number of disciplines. Often linked to the evolutionary or co-evolutionary perspective, system theories have emerged in one form or another as a useful analytical approach in sociology (Giddens 1984; Luhmann 1984), economics (Boulding 1970; Allen 2001), ecology (Gunderson and Holling 2002), policy sciences (Kickert 1991) and organizational sciences (Senge 1990). Recently, the approach has been explicitly introduced into governance and political sciences (Rotmans, Kemp et al. 2001; Kemp 2005) through the concept of transitions and transition management. It offers a conceptual lens to analyze and understand societal and governance complexity.

Systems thinking originated in the context of technical closed systems in the 1950s. General systems theory and Applied systems theory (Von Bertalanffy 1956; Midgley 2000) linked 'systems' to '(organized) complexity' through the introduction of concepts such as feedback and generic patterns, which enabled dealing with complexity in specific systems. In these theories, complexity was seen as a specific characteristic of a system (as opposed to simple systems) instead of a condition. Later on, under the influence of scientific disciplines such as biology, economics and mathematics, new mechanisms were attributed to complex systems. Examples here-of are: dissipative structures, bifurcations (Prigogine 1987), nested structures (Simon, 1962 in:(Midgley 2000), adaptivity and path-dependence (Gell-Man 1994), co-evolution and self-organisation (Holland 1995; Kauffman 1995). These are all concepts that have since the 1960s been introduced to gain better understanding of the dynamics of so-called complex adaptive systems, whereby co-evolution, self-organisation and emergence seem to be core concept which we will explore further.

Complex adaptive systems are strongly associated with ecological and evolutionary studies (e.g. Gunderson and Holling, 2002) since similar systems-dynamics are observed in both fields of study: emergence, co-evolution, feedbacks, variation and selection etc. The Darwinian paradigm of continuous gradual evolution is not supported by studies of complex ecological systems (Gould, 2002; Gunderson and Holling, 2002). Such studies, along with similar studies into complex-systems dynamics in other fields, suggest a model of punctuated equilibrium; short periods of revolutionary change that interrupt longer periods of gradual incremental change. This phenomenon of 'transitions' as rapid structural changes leading from one dynamic equilibrium to another has been studied in many scientific disciplines[1]. Taking a complex systems' perspective, transitions are fundamental changes in a system structure, generating new and relatively stable structures. When we integrate the perspective of complex adaptive systems to societal systems and focus on governance herein, societal change can be defined as the outcome of interacting actors at different levels and on different time horizons. This perspective has been descriptively conceptualized as multi-level and network governance.

Societal actors (governments, business, scientists, NGO's, intermediary organizations) create formal and informal networks, because they have the same vested interests and

[1] Originally used in the term ''demographic transition', the transition concept has been applied in psychology, organisational science, biology, chemistry etc. (see also Gersick, 1991)

they are striving towards the same objectives, something that they cannot do well without each other and which they can better achieve jointly than individually. Within these networks, decisions and strategies are developed, negotiated and implemented. The formal policy process in this view is only part of 'governance'. Network management or governance (joint management by all interested parties within a network) has become a common phenomenon (Mayntz 1991; Kickert, Klijn et al. 1997; Sabatier and Jenkins-Smith 1999; Dirven, Rotmans et al. 2002). Networks do not have a clear hierarchical structure like institutions and organizations but, after a certain time, they can silt up and develop into institutions or organizations with the same rigid structures (Dijk. 2001). In terms of managing networks or steering based on the idea of networks, researchers often refer to process management (Bruin 1998).

A specific emerging form of network-governance is multi-level governance as observed to develop in the European union (Scharpf 1994; Hooghe 2001). Although the idea of multi-level governance has been applied as analytical framework on other levels of government (for example: Kuks and Bressers 2000), it predominantly refers to government-based network governance at different levels in the European context (regional, national and European). The governance-levels are intertwined and actors can move across the levels that are intertwined, so that regional actors can participate at the European level and vice versa. Over the last decade in Europe a system of multi-level governance took shape, more or less de facto. Authors such as Scharpf (1997) and Hooghe argued that the policy-making process is changing fundamentally as a result of the European integration. The chaotic and unguided process has led to a multi-level governance structure whereby at each level, different actors are involved in the decision-making process, resulting in "a polity with multiple, interlocked arenas for political contest, of which the European level is one, where state executives, but also European institutions and a widening array of mobilised interests, contend." (Hooghe 1996). Although this structure has emerged autonomously to a large extent, it has generated a lot of development and discussion in relation to the democratic effectiveness and legitimacy of such governance structures. A better coordination of policy developments at different levels in a democratic way could be the ideal for multi-level governance, but in general theoretical and practical problems and barriers are observed. The central problem is that policy-making this way has become less transparent; the division of power as well as the accountability issue is no longer clear.

Without being specified or being developed into a prescriptive model, the concept of multi-level governance draws attention to the nestedness of governance systems. In other words, governance itself is not independent from its surrounding environment, be it political, social or other. Driven by trends such as European integration, internationalisation and empowerment of societal actors the multi-level governance structures seemingly have emerged autonomously in all sectors of the economy and society. Not surprisingly, the interactive policy approach has recently become wide spread as a specific form of network-management or network governance where government involves societal stakeholders in the policy making process. The organization and design of these interactive processes itself has become subject of study (e.g. Edelenbos 1999) and has led to the emergence of the field of process- and network-management (De Bruijn 1997; Kickert, Klijn et al. 1997; Eising and Kohler-Koch 1999; Milward 2000). Besides the government, other societal actors also attempt to direct a process where they have mutual influence (Bruin 1998; Dirven, Rotmans et al. 2002). A specific form of interactive policy-making has become that of participation or participatory methods (Van Asselt 2002; Kasemir 2003). Participatory methods are more

specific in selecting actors related to policy goals in a certain context, while interactive policy-making refers to the process of interaction between different actors in the context of policy-making in general.

Based on an overview of existing literature, we can conclude that governance has become a complex activity that needs to take into account, pluriformity, uncertainty, heterogeneity of society and the decreased possibilities for inducing long-term change by government. In light of the ambition of realizing long-term sustainable development in the context of this complexity, governance models need to take into account that:

- All societal actors direct, being aware of the opportunities as well as the restrictions and limitations of directing. Through agency and interaction in networks society is shaped as well, to which we conceptually refer as 'governance'
- Top-down planning and market dynamics only account for parts of societal change, network dynamics and reflexive behavior account for other parts.
- Steering of societal change is a reflexive process of searching, learning and experimenting.

What now does governance of societal complexity mean in terms of management? It means that we do not view complexity as a problem or obstacle, but rather as a means of leverage. Greater insight into the dynamics of a complex, adaptive societal system leads to improved insight into the feasibility of directing and influencing it. In other words: application of complexity theory can result in a collection of basic principles or guidelines that can be used to direct complex, adaptive systems. Of course we cannot easily transpose concepts from complex systems' theory onto societal systems and derive prescriptive rules for governance from this. We can however draw more general conclusions from the insight into the behavior of complex adaptive systems and take these as starting points for governance, while realizing the limited scope and possibilities of governance or steering in the context of a complex societal system.

The analysis of societal complexity makes clear that uncertainties, non-linear processes of change and innovation and emergence are important features of societal change. Obviously these need to be taken into account when conceptualizing a form of governance that aims to deal with these processes in such a way that on the long-term society evolves into a desired direction. While classical and top-down forms of management, steering and organization still have a function in modern society, the complex networked society requires additional strategies and approaches. A Dutch public administration expert (Kickert 1991) has drawn lessons for management of complex, adaptive systems, even though these were relatively abstract and fragmented. In the meantime, complexity theory has evolved further (though the theory is still far from maturity) and more empirical knowledge has been gained from practical experience with the management of complexity (Rotmans, Kemp et al. 2001; Geldof 2002; McCarthy 2003; Loorbach 2004).

The general conclusion from the theory overview is that there is a huge variety and diversity of concepts, analytical models and theories existent that seem to provide at least some of the jigsaw pieces. None of the mentioned sociological or governance theories seems to address the full societal and steering complexity in terms of multi-level, multi-phase, multi-actor and multi-domain in a prescriptive manner. However we have found that in almost all theories and concepts touched upon here, different elements are provided for such an inclusive form of governance. Such are: actor-network interaction, of different levels of scale, of different social domains with specific

characteristics, of the plurality of actor perspectives and the new instruments, practices and approaches that emerge within the field of steering and government.

A shared message seems to be that there is a relationship between the nature of a 'system' and the dynamics. This would imply that any form of organization or governance need to take into account the ongoing dynamics of the subject at hand as a basis for steering and action. In terms of our topic, persistent societal problems, this would imply taking into account the dynamics on different levels, in different domains and over a longer period of time as starting point for governance. This is why the transition concepts of multi-level and multi-phase, linked to the notion of sustainable development as integral societal concept provide a good framework to start from. Complexity theory and concepts can additionally be used to further analyze the specific societal trends and developments. Conceptually, based on this complex systems approach to governance, governance should be based on the following starting points.

Starting points for governance based on complexity theory

Transition management is thus based on complexity sciences and governance theories. The analytical concept enabling a structural analysis of societal processes of change is the transition concept (Rotmans 2000). Without explaining the concept in detail here, it is useful to roughly sketch what the transition concept entails. Transitions of societal systems can be considered as a particular case of complex systems dynamics (Rotmans 2005). In a transition a complex, adaptive system is successfully adjusted to changed internal and external circumstances and the system thus arrives at a higher order of organization and complexity. In societal systems a small group of newcomers might build up niche regimes that are able to ultimately break down the incumbent regime and ultimately establishing a new regime. Here we define a regime as a conglomerate of structure (institutional setting), culture (prevailing perspective) and practices (rules, routines and habits). Newcomers have not yet been moulded by the existing equilibrium and are therefore able to break though it, but for this they need to be shielded in a protected environment, what we call and arena. The transition path leads to a shift from the dominant regime to a new regime with a new structure, culture and practices better adjusted to the requirements of the environment. However, this is more the exception than the rule: in almost all cases the system gets stuck somewhere; it follows a sub-optimal path, digs itself in even deeper whereby it eventually collapses and dies (Rotmans, Loorbach et al. 2005). This is not surprising, because a transition pattern encompasses a far-reaching process of innovation, with all the associated risks and, in a certain sense it follows the most dangerous route.

Based on a multi-level and multi-phase understanding of transitions in complex adaptive societal systems, the following starting points for a form of governance based on complexity have been formulated (Loorbach and Rotmans 2006; Rotmans 2007):

- The dynamics of the system create feasible and non-feasible means for steering: this implies that content and process are inseparable. Process management on its own is not sufficient – insight into how the system works is an essential precondition for effective management. Systems-thinking in terms of more than one domain (multi-domain) and different actors (multi-actor) at different scale levels (multi-level); analyzing how developments in one domain or level gel with developments in other domains or levels; trying to change the strategic orientation of regime actors in one form or another is therefore necessary.
- Long-term thinking (at least 25 years) as a framework for shaping short term policy in the context of persistent societal problems. This means back- and fore-casting: the

setting of short-term goals based on long-term goals and the reflection on future developments through the use of scenarios
- Objectives should be flexible and adjustable at the system level. The complexity of the system is at odds with the formulation of specific objectives. With flexible evolving objectives one is in a better position to react to changes from inside and outside the system. While being directed the structure and order of the system are also changing, and so the objectives set should change too.
- The timing of the intervention is crucial. Immediate and effective intervention is possible in both desirable and undesirable crisis situations.
- Managing a complex, adaptive system means using disequilibria rather than equilibria. In the long term equilibrium will lead to stagnation and will in fact hinder innovation. Non-equilibrium means instability and chaos, which forms an important impetus for fundamental change. The relatively short periods of non-equilibrium therefore offer opportunities to direct the system in a desirable direction (towards a new attractor).
- Creating space for agents to build up alternative regimes is crucial for innovation. Agents at a certain distance from the regime can effectively create a new regime in a protected environment. For this to happen a certain degree of protection is needed (a nucleus) to permit agents to invest sufficient time, energy and resources.
- Steering from 'outside' a societal system is not effective: structures, actors and practices adapt and anticipate in such a manner that these should also be directed from 'inside'.
- A focus on (social) learning about different actor-perspectives and a variety of options (which requires a wide playing field)
- Participation from and interaction between stakeholders is a necessary basis for developing support for policies but also to engage actors in reframing problems and solutions through social learning.

Transition management: multi level framework

The challenge obviously is to translate these relatively abstract management rules into a practical management framework without losing too much of the complexity involved and without becoming too prescriptive. We have attempted this by designating transition management as a multi-level, cyclical process of development. The main instrument of transition management is the transition arena: a legitimate experimental space permitted by regular policy in which the actors involved use social learning processes to acquire new knowledge and understanding that leads to a new perspective on a transition issue. This new perspective manifests itself in the form of a shared perception of a problem, a long-term orientation on the future with joint objectives, a common agenda and strategic actions and experiments. By actively involving a range of pioneering actors at various levels in different phases a form of network management can be applied in the transition arena. This creates room for manoeuvre for self-steering and self-organization within the limits set.

The multi-level framework is used to integrate and structure analysis and action to be able to strategically select the most effective process, instruments and participants based on an assessment of the state of the system under governance. It distinguishes between different levels of abstraction, based on the type of activities carried out by actors. It is thus not based on geographical or institutional levels of scale. The transition management framework distinguishes between strategic, tactical and operational types of activities, that in itself can be identified at all levels of scale. There is no necessary

hierarchical relationship between these levels; they mutually influence each other and exist simultaneously in time. The distinction between these levels can be made because of the intrinsic differences between the activities and the actors involved.

The transition management framework

Strategic level

At the strategic level we identify processes of vision development, strategic discussions, long-term goal formulation, collective goal and norm setting and long-term anticipation. In essence, all activities and developments that affect the '**culture**' of a societal system are included: debates on norms and values, identity, ethics, sustainability and functional and relative importance for society. In the context of regular policies, especially in periods of pre-development and take-off discussions of this nature draw more attention. These are periods in which uncertainty around future developments is high and opinion leaders and innovative alternatives are able to voice alternatives and influence societal and political debate. However, the way in which future visions, structural reflection on ongoing and future trends and developments and debate on how innovation should contribute to desired changes is often more implicit than systematically structured. Long-term concerns and governance has no institutionalized place in regular policy making, which is generally focused on the short- and mid-term because of political cycles, individual interests, public pressure. The ambition of transition management is to integrate (in a sense institutionalize, although this is contrary to the nature of transition management) long-term governance activities into the realm of policy making. Not as a regular and formalized activity, but as a fundamentally necessary element of policy making for sustainable development.

Tactical level

At the tactical transition management level we identify steering activities that are interest driven and relate to the dominant **structure** of a regime of a societal system. This includes all institutions such as rules and regulations, organizations and networks, routines and infrastructure. The context in which actors at this level operate is in terms of societal systems a sub-systems of a societal system, which is why at this level we define innovations at this level as 'system innovations'. These sub-systems could be for instance sectors or themes, but are by no means always rigidly defined or prescribed but are flexible and their demarcation and importance change over time. For example, sub-systems or themes observed within the energy system could be the different sources of energy (coal, gas, oil, sustainable), or could be different 'domains' such as technology, policy, market and consumption. Actors operating at this level focus their activities on achieving goals within their specific context but are almost never concerned with the over-all development of the societal system. They generally have a time-horizon of 5-15 years which is 'strategic' to them. A company or organization will probably have a 5 year plan or a strategic vision, and understandably so, but from the perspective of transition management, this leads to fragmentation of policies and mediocre, consensus based outcomes at the systems' level. For the government, obviously the actor that could be expected to be responsible first for development and change at the level of the society, the institutional fragmentation in terms of different ministries, departments, executive offices and directorates is a major barrier for integrative long-term policies. The same might be true for other actors such as business, science and NGO's that are operating in networks negotiating change or projects and running their day-to-day operations. Sometimes these actors are not able or willing to contribute to system innovation but often they are unaware of the possibility. Not because they are not functioning at their

own level but because an integrative strategic governance level is missing, there are only very limited instances of successful integrated long term governance.

Operational level
The operational transition management level includes those activities and experiments that have a short-term horizon and are often carried out in the context of innovation projects and programs, in business and industry, politics or civil society and generally referred to as 'innovation'. In the context of transition management it is important to emphasize the inclusive definition of innovation as including all societal, technological, institutional and behavioral **practices** that introduce or operationalize new structures, culture, routines or actors. Action at this level is often driven by individual ambitions, entrepreneurial skills or promising innovations. In innovation and socio-technical literature, the process of innovation is often presented as an emergent, often random and uncertain, process. In practice, these innovations often seem to emerge in niches (Kemp, Schot et al. 1998) without any link to broader policies or agendas and can under specific conditions develop into mainstream options. From this perspective, innovations almost never lead to system innovations and transitions except by chance.

Transition management levels	**Focus**	**Problem scope**	**Time-scale**	**Level of activities**
Strategic	Culture	Abstract/societal system	Long-term (30 y)	System
Tactical	Structures	Institutions/regime	Mid-term (5-15y)	Sub-system
Operational	Practices	Concrete/project	Short-term (0-5y)	Within sub-system

Table 1. Transition management levels and their focus

The three levels itself are also recursive. Activities at the different levels can also be structured according to the three levels; and operational project will have a strategic ambition (to be realized within 5 years), an agenda and a day-today operation. Similarly, a within a sub-system or theme at the tactical level, an ambition and agenda (the transition paths) are necessary for achieving institutional innovations in practice. This recursiveness has a certain elegancy because it allows for all sorts of interactions between and within the levels. In transition management practice, these interactions and their effects are unpredictable and not directly managed, but because they fit within the same over-all direction and emerge within a network of actors, they can contribute largely to collective goals. In a sense this type of self-organization is thus indirectly managed: the conditions are created in terms of structured process and substance under which self-organization arises. The governance-system that subsequently develops is a network operating at different levels in which actors sometimes even unconsciously contribute to shared goals.

To strategically influence the governance activities at the different levels and to direct them in a specific direction, 'systemic instruments' need to be developed that are based on the type of individuals and actions defined at the different levels and their interaction. The framework for transition management therefore also contains a process dimension that distinguishes between different clusters of activities that are recognizable throughout a policy or governance process. These are the typical phases identified by

many policy-process model, but fundamentally different in their focus on societal processes, persistent problems and normative direction. This process model has been influenced primarily by iteration between theoretical reflection and practical experiments with new systemic instruments. This has resulted in a number of new governance-instruments that enable a coupling of process-structuring and substance-structuring with the aim to influence societal processes in a normative direction.

The systemic instruments are captured in a cyclical process model as a basis for operational management of multi-level governance. This so-called transition management cycle consists of the following components (Loorbach 2002; Rotmans 2003; Loorbach and Rotmans 2006): (i) structure the problem in question and establish & organize the transition arena; (ii) develop a transition agenda, a vision of sustainability development and derive the necessary transition paths; (iii) establish and carry out transition experiments and mobilize the resulting transition networks; (iv) monitor, evaluate and learn lessons from the transition experiments and, based on these, make adjustments in the vision, agenda and coalitions. In reality there is no fixed sequence of the steps in transition management. The cycle only visualises the need to connect activities and presents some possible logical connections, but does not suggest a sequential order of activities. In fact, the analysis of societal transition processes informs the governance strategy to be developed. In other words, the state of transition (the phase it is in, the activities and developments observed at the different levels) defines which governance activities should be undertaken at which level.

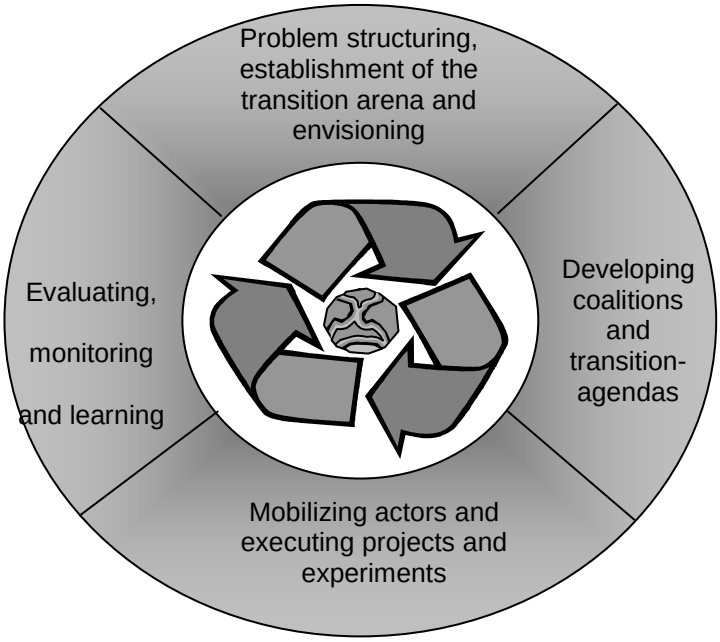

Figure1 : The transition management cycle

The operational transition management model

The transition management framework does provide the basis for managing transitions in an operational sense. Although every operational transition management process will be unique in terms of context, actors, problems and solutions, it is possible to present a generic operational model that is flexible enough for adaptation but prescriptive enough

to be functional in practice. The general approach towards national transition in a predevelopment phase is, based on theoretical development and practical experience, as follows. Transition management draws together a selective number of forerunners (creative minds, strategists and visionaries) in a transition arena for the development of a sustainability vision and thoroughly analysing the persistent problem(s), making use of complex systems analysis. Entrepreneurial and innovative actors at the tactical level are involved for the further practical development of transition images and transition pathways. This is organized in arenas of arenas (scaling up through network forming and coalitions) in which project leaders, programme managers, heads of departments and entrepreneurs develop a transition agenda with long-term goals. A similar innovation oriented approach is followed at the operational level; the main parties involved here are inventors, go-getters, practical innovators and practical organizations. By conducting transition experiments new forms of cooperation, coalitions, networks and arrangements can be developed and stimulated. The priority here is that parties who hardly ever meet will look for new solutions and learn from each other, which need to be monitored and evaluated. During the transition process the vision as well as the programme of measures will become more and more specific, whereby the focus of attention will (have to) shift to 'regime' actors who represent certain interests within the existing situation. Initially participants will be sought from this group for regime actors geared to innovation, later in the process more conservative regime actors will have to be brought on board. This also is monitored and evaluated. The whole process thus is based on a strategic management of activities at the three levels of transition management and their interaction. Every level can be managed by using specific systemic instruments.

Strategic: the transition arena

The transition arena is a multi-actor innovation network around a specific transition issue, within which various perceptions of the persistent problem and possible directions for solutions can be deliberately confronted with each other and subsequently integrated. The actors to be involved have their own perception of the transition issue in question from their specific background and perspective. A relatively small number of forerunners from various networks should be involved the transition arena at a strategic level. These people participate on a personal basis and not as a representative of their institution or based on their organizational background. They are identified and selected based on their competencies, interests and backgrounds. There should not be too many actors (10 – 15 is sufficient) and they should not all be the same kind of actor. The competencies expected of them and are: (i) ability to consider complex problems at a high level of abstraction; (ii) ability to look beyond the limits of their own discipline and background; (iii) enjoy a certain level of authority within various networks; (iv) ability to establish and explain visions of sustainable development within their own networks; (v) they can think together; (vi) open for innovation instead of already having specific solutions in mind. These forerunners do not necessarily need to be experts; they can also be networkers or opinion leaders. They should also be prepared to invest time and energy in the process of innovation and to commit themselves to it. And finally, it is important that there are an equal number of forerunners from the societal pentagon: government, companies, non-governmental organizations, knowledge institutes and intermediaries (consulting organizations, project organizations and mediators).

The fundamental issue here is not that the existing establishment and interests (incumbent regime) come together within the transition arena, but that niche actors who can operate more or less autonomously are involved. Indeed, a certain representation from the existing regime is necessary, also with an eye to the legitimacy and financing of

the process of innovation. But a transition arena is not an administrative platform or a consultative body, but a societal network of innovation. This demands a critical selection of forerunners, not by a 'gatekeeper' who selects who may or may not participate, but by an initiating core group in which experts on the process and on the transition subject are involved, that considers matters carefully. The arena process is an open, evolving process of innovation that implies variation and selection: after a certain period of time some people drop out and others join in. Management therefore means creating sufficient space and favourable conditions for the forerunners, such that the envisaged process of innovation begins to take shape. It does not mean gathering together a wide range of bodies around the arena, such as a steering group, a consultation group or advisory board, because that is exactly the recipe for limiting the space for innovation and management that has just been created.

When such a group of forerunners has been brought together to focus on a certain transition issue, an attempt is made to reach a joint perception of the problem by means of a strongly interactive process. By deploying a participative integrated systems approach, the complex problem(s) can be structured and made easier to understand (Hisschemöller, 1993). The convergence of the various problem perceptions is facilitated from the articulation of diverging perspectives of the actors involved, which in turn will lead to new insights into the nature of the problem(s) and the underlying causal mechanisms. These insights form the prelude to a change in perspective, which is a necessary but insufficient pre-condition to realizing a transition. Based on this new perspective and through discussion and interaction sustainability visions are generated. These visions are particularly qualitative, inspiring, challenging and imaginative pictures of the future.

Visions are an important management instrument for achieving new insights and starting points and therefore a change of attractor. The visions created evolve and are instrumental: the process of envisioning is just as important as the ultimate visions themselves. Envisioning processes are very labour-intensive and time-consuming, but are crucial to achieving development in the desired direction. This direction, as long as a sufficiently large group of forerunners supports it, provides a focus and creates the constraints, which determine the room for manoeuvre within which the future transition activities can take place. Based on the sustainability vision developed, a process can be initiated in which transition paths are developed and a common transition agenda is drawn up. A common transition agenda contains a number of joint objectives, actions points, projects and instruments to realize these objectives. It should be clear which party is responsible for which type of activity, project or instrument that is being developed or applied. Where the sustainability visions and the accompanying final transition-images and transition objectives form the guidelines for the transition agenda, which is to be developed, the transition agenda itself forms the compass for the forerunners which they can refer to during their search and learning process.

Tactical: the transition agenda

The change in perspective, described by the visions and the accompanying transition-images of the future, should be further translated to and find root within various networks, organizations and institutions. Focus at this tactical level is therefore the structural (regime) barriers to development in the desired direction. Such barriers include regulatory, institutional and economic conditions but could also involve consumer routines, physical infrastructures or specific technologies. In an expanding transition network stemming from the transition arena this vision is further translated by self-

formed coalitions into so-called transition paths: routes to a transition-image via intermediate objectives, which, as they come closer, can be formulated more quantitatively. Different transition paths can lead to a single transition-image and conversely a single transition path can lead to several transition images. In this phase the interests, motives and policy of the various actors involved (non-governmental organizations, companies, governments, knowledge institutes and intermediaries) come out into the open and there will be negotiations about investments, and individual plans and strategies will be fine-tuned. The actors who should be involved at this stage are those who represent one of the organizations involved and who are willing and able to operate for more than just a short period of time. Within this tactical layer actors should be recruited who, in particular, have sufficient authority and room for manoeuvre within their own organization and who also have insight into the opportunities for their organization to contribute to the envisaged transition process. An important condition for this is that the actors involved have the capacity to 'translate' the transition vision and the consequences of this to the transition agenda of their own organization. When the organizations and networks involved start to adjust their own policy and actions in this way, tensions will arise between the transition arena and the everyday policy agendas. Then the direction will have to be reviewed at a strategic level and if necessary a new arena will have to be established with some of the existing actors, but also with new ones.

Operational: implementation
At the operational level of transition management transition experiments and transition actions are carried out. The practical implementation of a broad new body of thought is quite demanding, because there are very many actors involved who all act from their own perspective, have conflicting interests, and at the same time are embedded in and are dependent on a broader societal web. There is also a diverse application for transition experiments from the vision and transition paths developed. These may compete, complement each other or investigate various options. Diversity is an important aspect, as long as these experiments at the systems level are in a position to contribute to the envisaged transition.

Transition experiments are practical experiments with a high level of risk (in terms of failure) that can make a potentially large contribution to a transition process. New transition experiments are derived directly from the developed sustainability vision and transition objectives and they fit within the identified transition paths. On the other hand, experiments can be linked to innovation experiments that are already taking place as long as they fit into the context of the transition. Often, many experiments are running concurrently, but these have not been set up or carried out systematically, whereby coherence is missing. Transition experiments in the form of projects also have a higher than average risk to fail, because they are searching and learning processes in which the results might be disappointing. When an experiment has been successful (in terms of evaluating its learning experiences and contributions to the transition challenge) it can be repeated in different contexts (broadening) and scaled up from the micro- to the meso-level (scaling up). This requires a considerable amount of time, approximately 5 to 10 years. Transition experiments are often costly and time consuming, so it is important that, wherever possible, existing infrastructure is used for experiments and that their feasibility is continuously monitored. Efforts here focus on creating a portfolio of related transition experiments that complement and strengthen each other as much as possible, which have a contribution to the sustainability objective that can be scaled up and which are significant and measurable.

Box: The energy transition

In 2001 the Dutch Ministry of Economic Affairs initiated a transition process that is ultimately intended to lead to a sustainable energy supply system in the Netherlands. The Ministry is the initiator, but companies, consumers and non-governmental organizations are also involved. Three themes were chosen: gas, industrial energy efficiency and biomass, because these invariably form part of the scenarios for a sustainable energy supply system in the long term. In addition, the Rijnmond area (greater Rotterdam) was chosen as the 'experimental space'. In consultation with stakeholders, various visions were developed (where do we want to go?), transition paths were formulated (how can we get there?) and transition experiments were drawn up (how do we get started?). In the ultimate vision a sustainable energy system in 2050 is: (a) clean (offers a solution for the climate change problem); (b) affordable (functional and energy-efficient); and (c) secure (dependable, reliable, guaranteed supplies).

This vision for sustainable energy was translated into general transition-images for 2050, strategic ambitions for 2020, and five main routes along which the energy transition policy is defined: (1) efficient and green gas; (2) efficiency in the chain; (3) green raw materials; (4) alternative fuels; and (5) sustainable electricity. For these five main routes 22 transition paths have been worked out in detail, and 16 of them have been authorized.

Within the main route for sustainable electricity, transition paths for ‘biomass’ and ‘wind’ have been worked out in detail and within the main route – efficient and green gas – the transition paths ‘energy saving in built-up areas’, ‘micro and mini combined heat and power’, ‘clean natural gas’, ‘green gas’ and ‘glasshouse horticulture savings’ have also been detailed. A total of 70 proposals for potential transition experiments have been submitted for these transition paths. See (Energieraad 2004; EZ 2004) and www.senternovem.nl/energietransitie

Conclusions: towards governance systems?

In this paper we presented a new governance framework for addressing persistent societal problems. This transition management framework is based on common notions from complex systems theory, social theory and new forms of governance, that are welded to a new governance paradigm. Transition management could be characterized as a kind of ‘perspective incrementalism’: a visionary approach towards long-term planning through small steps based on searching, learning and experimenting. What makes it distinguishing from other new forms of governance is the strong link of content and process. Understanding the dynamics of complex, adaptive systems provides insight into the opportunities, limitations and conditions under which it is possible to direct such systems. The combination of analytic insights into systems complexity and understanding of the process of governance complexity is new and has resulted in a set of management principles which forms the basis for the management framework. The management principles are far from deterministic, however, but rather reflexive: they reflect a limited degree of directing transitions, by furthering transition processes towards sustainability. Applying these principles implies adjusting them to the new conditions and dynamics that will change as a result of applying these principles.

The transition management framework and cycle aim to integrate and relate those governance activities that deliberately aim to contribute to a transition and by doing so distinguishes between 'regular policies' and 'transition policies'. What we call 'regular policies' are activities that are not primarily focused on long-term and structural innovation and take place within established institutions. The purpose of the framework is to achieve better interaction, integration and co-evolution between activities related to sustainable development and innovation so that they will impact the present system and regular policies more rapidly, more directed and more efficient. The goal is to develop multi-level governance systems that are partly based on structuration, selection, shared general discourse and visions, while simultaneously creating room for self-organization, emergence, diversity, competition and strategic individual action. While in initial phases of the transition the system as a whole will be subject of discussion and study, in later phases the process of fundamental change becomes increasingly concrete, thereby shifting the focus of governance to lower system levels.

The concept of transition management and the derived framework is promising but needs to largely prove itself empirically. Elements of the concept have already been empirically tested in the many transition experiments that are currently going on. More than that, the management framework itself has been the result of experiences within testing grounds. As such the framework has evolved in the past couple of years. Nevertheless it is a great challenge to empirically validate the partly descriptive and partly prescriptive parts of transition management the coming period, in such a manner that a scientifically well grounded concept and framework can be used and further developed in a broad societal context, also internationally.

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