EXTRAITS !

Reflexive Governance for Sustainable Development

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Jan-Peter Voß and René Kemp

INTRODUCTION

Disappointment abounds in public discourse about sustainability. Many say that the outcome of sustainability strategies has been meagre compared to the outpouring of rhetoric regarding the concept towards the end of the last century. The long-standing definition of the Brundtland Commission – 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' – is accepted everywhere as a general normative orientation (WCED 1987), as is the criterion for a good society of equal consideration for ecological, economic and social development goals (UNCED 1992, Ch. 8). But when it comes to practical implementation, the concept seems to dissolve into rhetoric that masks familiar conflicts over concepts, goals and instruments that for decades have dominated societal action in problem areas such as energy, transport, agriculture and housing.

A widespread attitude is that the concept of sustainability adds nothing new for the treatment of practical problems. It is said that the concept waters down the new parameter of political decision making introduced by the concept of ecological carrying capacity (see Matthes 2002). The organisational and technological arrangements of modern society are said to be reproduced with all their ambivalences under the banner of sustainability (Conrad 1997). The vague label diffuses concrete challenges and presents a veil behind which particular interest groups can evade responsibilities and commitments that they had previously been urged into through public pressure and political struggle. For many, sustainability appears at best an empty phrase and at worst a Trojan horse for the redefinition of the public interest by a powerful few.

This book takes a different standpoint. It argues that the multidimensional and dynamic concept of sustainability (Rammel et al. 2003) has fundamental implications for the governance of modern society.

The systemic and long-term nature of social, economic and ecological

development brings complexity and uncertainty to the fore as key issues for sustainability. Sustainability cannot be translated into a blueprint or a defined end state from which criteria can be derived and unambiguous decisions taken to get there. Instead, it should be understood as a specific kind of problem framing that emphasises the interconnectedness of different problems and scales, as well as the long-term and indirect effects of actions that result from it. Societal discourse on sustainability has highlighted the ambiguity of social goals, uncertainty about cause and effect relations and the feedback that occurs between steering activities and social, technological and ecological development. Sustainability calls for new forms of problem handling. These differ from the forms that are adequate for delimitable, decomposable problems that can be managed in a linear way. The concept of sustainability has brought with it recognition of the limits of rigid analysis and the inadequacy of policy approaches that aim at planning and achieving predetermined outcomes.

From this perspective, sustainable development is more about the organisation of processes than about particular outcomes. It is about the modes of problem treatment and the types of strategies that are applied to search for solutions and bring about more robust paths of social and technological development. We set out to explore these new modes of societal problem treatment under the heading of 'reflexive governance'.

REFLEXIVE GOVERNANCE

Reflexive governance refers to the problem of shaping societal development in the light of the reflexivity of steering strategies – the phenomenon that thinking and acting with respect to an object of steering also affects the subject and its ability to steer. Examples of such reflexivity include research policies bringing up new knowledge that shifts policy objectives, or subsidies increasing the lobbying power of supported industries and thereby changing political force fields. Reflexive governance thus implies that one calls into question the foundations of governance itself, that is, the concepts, practices and institutions by which societal development is governed, and that one envisions alternatives and reinvents and shapes those foundations.

As suggested by Beck's notion of reflexive modernisation (Beck 1994; Beck et al. 2003), the reflexivity of governance also includes the possibility that certain governance patterns undermine themselves by inducing changes in the world that then affect their own working. Rationalist problem solving (being central to modernity and past and present governance) undergoes change to deal with problems overlooked in past problem solving. It is

easy to understand why this is so. Rationalist problem solving depends on both the analysis of system dynamics to predict the effects of alternative options and the precise definition of goals and assessment of options to determine which is the best to be implemented through powerful interventions and sophisticated control systems. This kind of problem solving seeks to eliminate uncertainty, ambivalence and interference from uncontrolled influences. Using this approach, it was possible to achieve tremendous technological developments, sophisticated patterns of social regulation and high economic efficiency of production. The trick is simple: to decide and act rationally, one needs to isolate discrete dimensions of complex reality, that is, to select relevant elements, express cause and effect in linear form, establish the priority of goals and assign responsibilities. This pattern of productive reduction of complexity orchestrates modern science, technology development, bureaucratic organisation, project management, policy making and broader patterns of social organisation such as the differentiation of functional subsystems for economics, law, science, politics and so on (see Luhmann 1990; Schimank 1996; Mayntz 1999). This problem-solving approach yields tremendous power because it constructs a multitude of specialised perspectives, enabling more precise targeting of purposes, concentration of action capacities and control over processes within the system boundaries thus defined (Schimank 1988). At the same time, however, this kind of problem solving leads relentlessly to unintended consequences (Dörner 1989; Böhret 1990). The more problem solving is disengaged from the full, messy, intermingled natural reality and oriented towards the worlds of specialists, the larger is the share of interdependencies and dimensions of embeddedness ignored in the development and implementation of supposed solutions. The more evasive such problem solving is, the more effective it becomes with respect to particular instrumental purposes and the stronger the impacts of unintended consequences become.

These impacts are perceived either as 'externalities', from the perspective of other specialised problem orientations or, from the problem solver's own perspective, as 'side-effects' or 'repercussions'. Examples include interference between different policy or corporate departments – such as transport and environment or R&D and marketing – as well as traffic congestion, technological risks, environmental problems and individualisation as results of industrialisation. These unintended consequences cause new, often more severe problems that are more difficult to handle because they require setting aside specialised problem solving. These can be called second-order problems (Jahn and Wehling 1998). Sustainability is one, if not the main second-order problem of modernist problem solving. Second-order problems work successively to disrupt the structure of modernist problem solving because to grasp them – to reconstruct them cognitively, to

assess them and to get competences together to act on them – they require putting aside the isolation of instrumental specialisation, widening filters of relevance, trading off values and engaging in interaction with other specialists. In short, these problems require transgressing the cognitive, evaluative and institutional boundaries, which, paradoxically, undermines the modernist problem-solving approach. Problem solving becomes paradoxical in that it is oriented towards constriction and selection to reduce complexity but is forced into expansion and amalgamation to contend with the problems it generates (see Beck 1993). This is what we call the constellation of reflexive problem handling or, on the societal level, reflexive governance.

Reflexivity has two different but related meanings here that are often confused in accounts of reflexive modernisation. The first meaning of reflexivity refers to how modernity deals with its own implications and side effects, the mechanism by which modern societies grow in cycles of producing problems and solutions to these problems that produce new problems. The reality of modern society is thus a result of self-confrontation. This can be called first-order reflexivity. The second meaning of reflexive modernisation refers to the cognitive reconstruction of this cycle in which problem solving through instrumental rationality generates new problems. The impacts of technology, scientific knowledge production and the legitimacy and effectiveness of democracy are examples of problem areas where such reflection has brought up critical reassessments of rational problem-solving methods and led to the development of alternative methods and processes of problem handling that are more open, experimental and learning oriented. Often these approaches aim to foster interaction between different perspectives and actively explore the uncertainties, ambivalences and control problems articulated in such a confrontation of rationalities. Constructive technology assessment, deliberative policy making and transdisciplinary research are alternative concepts to rational problem solving that all underlie concrete practices. New problem-handling paradigms and institutional arrangements based on critical assessments of modern problem solving and its reflexivity have themselves become characteristic features of reflexive modernisation. But these phenomena are reflexive in a different way from that of the self-confrontation of modernisation with its own side-effects. They represent a second-order reflexivity that entails the application of modern rational analysis not only to the self-induced problems, but also to its own working, conditions and effects. In this way, second-order reflexivity interrupts the automatism of executing problem-solving routines. It transcends particular rationalities, and breaks the vicious circle of first-order reflexivity. Reflexive modernisation, or reflexive governance, comprises both the condition of being shaped through its own side-effects and the transcendence of this cyclic pattern through reflection of the

modern understanding of rationality itself. It is shaped by the interplay of first-order and second-order reflexivity. This book focuses mainly on second-order reflexivity and particularly on the emergence of an additional level of integrative, unrestrained and open-ended 'second-order' governance that reflects, orients and supervises diverse specialised problem-solving processes. In this way, the powers of specialisation and integration can check and balance each other. The benefits of rational problem solving can be exploited while the fact that problem solving is embedded in more complex contexts and their dynamics is accepted as a constraint. Such second-order governance, however, can no longer be called problem solving. Only unambiguous and confined problems can be 'solved' in a deliberative manner. Second-order governance consists of a procedural approach towards reflecting the interdependencies, understanding aggregate effects of specialised concepts and strategies, and engaging in the modulation of ongoing societal developments by establishing links and organising problem-oriented communication and interaction among distributed steering activities (for related ideas about steering see for example Rip 1998; Beck 1993; Dobuzinskis 1992).

Various reflexive governance approaches can be identified that confront the challenge of shaping sustainable development by reflecting the complex interactions underlying problematic development. By initiating procedures through which problem perceptions, assessment criteria and action strategies of different actors can be exposed to each other, actors can begin mutually to adapt their perceptions, criteria and strategies before such adaptation is imposed in a much more costly way as a consequence of the external effects of specialised problem-solving processes.

Such governance approaches often focus on specific dimensions of problem handling such as analysis, goal definition, assessment or strategy implementation. Constructive technology assessment, foresight exercises, transdisciplinary research, participatory decision making and cooperative policy making are examples of those approaches. Others, such as transition management and adaptive management, are more comprehensive. However, they all share a general understanding, which is related to the concept of reflexivity as outlined above. By creating interaction between various rationalities, they take account of the complexity of interlinked social, technological and ecological development, the fundamental uncertainty with respect to system dynamics, the ambiguity of sustainability criteria and assessment and the contingency of the effects of human action in the context of long-term system change. Reflexive governance modes are therefore geared towards continued learning in the course of modulating ongoing developments, rather than towards complete knowledge and maximisation of control.

Practical instances of reflexive governance can be found in different parts of society – in general ways of producing knowledge and making policy and in production-consumption systems such as energy and agriculture. They can also be found at different levels of problem treatment – from the management of an individual organisation to networks and sectors and up to the global level. Governance practices within these different contexts follow particular streams of historical development and are usually discussed within the framework of professional concepts and language. Similarities are therefore not easily recognised. One concern of this book is to develop a perspective in which the similarities and linkages between these approaches become visible. This will help us to take stock of governance innovations in various practice areas that reflexively deal with the complexity and ambivalence inherent in sustainable development, to compare the conditions and historical paths from which they have emerged and to enable mutual learning in terms of concepts and practical experience. Finally, an integrated review of reflexive governance innovations helps to shift the debate about the usefulness of the concept of sustainability from immediate outcomes to more hidden process innovations and ways of structuring and handling problems. Even if their effects are of a more diffuse and long-term nature, they should not be overlooked in assessing what has come out of the sustainability concept and in discussing strategies to develop its potential.

To establish a common frame of reference for diverse kinds of governance innovation for sustainability, we elaborate some strategic cornerstones of the concept of reflexive governance. We do this by first defining a broad notion of governance as the patterns of processes by which society handles its problems and shapes its own transformation. We then discuss the specific problems of governance for sustainable development along the dimensions of systems analysis in the light of complexity, goal formulation in the light of the ambiguity of sustainability and strategy implementation in the light of distributed control. In the course of this discussion, we derive cornerstone strategies that help to identify adequate ways of handling governance problems of sustainable development. A compilation of these strategies represents a practically-oriented framework of reflexive governance that can serve as a common reference for the diverse conceptual aspects and practical instances discussed in the remaining chapters of the book.

Governance as Problem Handling

In this volume, we use the term 'governance' to describe the characteristic processes by which society defines and handles its problems. In this general sense, governance is about the self-steering of society.

Problem handling and self-steering, however, do not imply that governance is a linear process that follows a plan or is controlled by a specific actor or group of actors. Rather, governance is understood as the result of the interaction of many actors who have their own particular problems, define goals and follow strategies to achieve them. Governance therefore also involves conflicting interests and struggle for dominance. From these interactions, however, certain patterns emerge, including national policy styles, regulatory arrangements, forms of organisational management and the structures of sectoral networks. These patterns display the specific ways in which social entities are governed. They comprise processes by which collective problems are defined and analysed, processes by which goals and assessments of solutions are formulated and processes in which action strategies are coordinated. We use the term governance to describe the process of societal problem handling that comprises these three dimensions. As such, governance takes place in coupled and overlapping arenas of interaction: in research and science, public discourse, companies, policy making and other venues. To understand how specific patterns of social change come about or to assess the performance of problem handling, it is important to take into account interdependencies across various arenas of governance.

System Analysis and Complexity

A principal feature of the problems confronting sustainable development is that the systemic interconnections to which these problems refer are enormously complex. With the exception of quite narrowly defined disciplinary or professional situations, the problems of sustainable development cannot be grasped by means of simple models. Sustainable development focuses the long-term dynamics of particular forms of social organisation within a global context. Even single companies or local communities consist of a large number of very different elements of a social, technological or ecological nature. They contain subsystems or are themselves differentiated at various levels of organisation. The unfolding of processes within these structures – even more so the change of the structural configuration itself – is thus not sufficiently grasped by models that have only a few independent and dependent variables and assume clearly-defined, linear relationships of cause and effect. The understanding, explanation and analysis of the problem of sustainable development thus becomes a problem in itself. With sustainability problems it is difficult to isolate a unique cause or to predict the effects, both desired and undesired, of a particular intervention (Funtowicz et al. 1998). Three specific features associated with the complexity of sustainable development problems are discussed in the next three

sections: first, the heterogeneity of elements, which precludes relying on disciplinary expert knowledge; second, the impossibility of predicting system developments and the effects of interventions, which makes errors unavoidable; and third, the irreversibility of social development, which embeds a strong path dependency in decision making.

Heterogeneous interactions

The understanding of long-term transformations in socio-ecological systems such as, for example, energy production and use, transport or agriculture requires knowledge about the very heterogeneous elements of these systems. Such elements include technological artefacts and networks, chemical substances in soil, water and the atmosphere, the organisation of firms and markets, political institutions, scientific theories and cultural values and attitudes. Knowledge is needed about the processes in which they each change and about how they relate and interact with each other. Conventional disciplinary science does not deliver this kind of knowledge about the 'interlinked and complex nature of reality' (Gallopín et al. 2001: 228). Instead, it concentrates on a very specific selection of elements and interactions – analytical 'slices' of reality. In real world entanglements, however, there is no clear boundary between these categories and the networks of cause and effect that cut across them. Each specialised perspective defines the systemic embedding of the particular analytical abstraction with which it is concerned as non-existent. In specific cases, this may be methodologically justifiable because linkages have been found to be insignificant. Parts of reality can sometimes be viewed in isolation without losing important aspects. In most cases, however, especially in the area of sustainability problems, linkages extend well beyond the scope of the problems as they are defined by disciplines and the cognitive models that are used to understand them.

The knowledge restrictions of specialised perspectives relate not only to scientific disciplines but also to the scientific method of knowledge production in general. The full set of factors and interactions that are relevant in real world problem settings cannot be handled through systematic modelling alone. More synthetic kinds of knowledge, gained from practical experience, are an important complementary source. Knowledge production for sustainable development cannot therefore rely only on scientific knowledge produced within the institutions and along the methodological guide rails of formal science. It also needs to integrate the tacit knowledge of societal actors. This tacit knowledge often cannot be subjected to conventional methods of scientific inquiry. It can only be generated in interactive settings in which knowledge is co-produced by scientists and actors from respective fields of societal practice. But also with respect to practice, it is important to integrate a diversity of perspectives because professional roles also entail selective perspectives.

Considering the heterogeneity of the elements that play a part in sustainable development, effective problem treatment calls for the use of methods of integrated knowledge production that transcend the boundaries between disciplines and between science and society. Practical and conceptual steps in this direction have been taken under the heading of transdisciplinary knowledge production (Nowotny et al. 2001; Hirsch Hadorn 2003; Bechmann and Frederichs 1996; Thompson Klein et al. 2001; Bergmann 2003).

Uncertainty

The interdependence of social, technological and ecological elements makes system transformation a complex and uncertain process. The overall process, its factors and drivers, cannot be analysed by linear models of cause and effect because feedback is pervasive. If the process of sustainable transformation – for example, of electricity provision or agriculture – is further understood as a process that takes place within a multi-level structure of nested subsystems at the local, regional and global level, the interaction on each level adds to the overall complexity. The result is that socio-ecological transformation cannot be predicted. Unpredictable interactions may give rise to self-stimulating processes like self-organisation, or to destructive resonance. Examples of such contingencies include topics in public discourse, social movements, BSE, strategic action under regulation and stock market crashes. Thresholds for catastrophic change cannot be defined by a single parameter but rather are driven by a confluence of many factors, not all of which can be sufficiently ascertained to determine corridors of safe levels of activity. Examples of this kind of difficulty include ecological pressure that causes a breakdown of ecosystem resilience, social injustice that causes upheaval or tax increases that lead to an economic depression. This is a fundamental constraint because of the impossibility of measuring all incremental factors that are relevant, especially the human factor. Non-linear system dynamics may give precisely those apparently minor factors a significant voice in where the system will go, as in the 'butterfly effect' (Gleick 1998; Byrne 1998). Here an apparently small effect tips the balance (examples can be found in Gladwell 2000).

This is why it is not possible to rely on simple models of the causes underlying sustainability problems. Even if complexity is excluded from cognitive models, the world still remains as complex as ever and the connections that are ignored will still be effective (Dörner 1989). Inadequate problem constructions thus return in the form of unexpected consequences when strategies are implemented in the real world (Böhret 1990). This means that

for processes of socio-ecological transformation, we face fundamental uncertainty about the effects of policy interventions or management decisions (see Dobuzinskis 1992; Stacey 1996).

The only way 'out' of this dilemma is to remain within it – but to do so consciously: to accept that there will always be a high degree of ignorance and uncertainty connected to societal action within socio-ecological systems. Unintended consequences will persist because no comprehensive and exact model for the prediction of socio-ecological dynamics is possible. With a growing impact through the scale and depth of human intervention, a high probability of unintended consequences needs to be assumed as an essential condition of problem-solving strategies. This would mean that ignorance and uncertainty are actively dealt with rather than being denied by pretending complete knowledge and the existence of 'best solutions' (Walker et al. 2001).

A second requirement for the adequate treatment of sustainability problems can therefore be stated: because of inherent uncertainty about long-term dynamics and systemic effects, strategies as well as cognitive, institutional and technological structures need to be adaptive to allow for error and learning. This process necessitates the capacity to respond to unexpected effects and developments. Strategies should feature experimentation, monitoring and evaluation so that they may respond systematically to new experiences, altered interpretations and changed circumstances.

Path dependency

In addition to being unpredictable, socio-ecological developments and the effects of human activity within them feed into a continuous process of structural changes. These ongoing transformations are sometimes more subtle, hidden in the background of system structures, and sometimes more visible as in the overthrowing of established patterns. Increasingly, it is human activity that shapes world development – including its ecological dimension – even when it is not the intention to do so. The global climate is a prominent example. Deep-rooted changes associated with modernisation cannot be attributed to particular policies or other strategies. Instead, such changes are brought about as the aggregate and long-term effect of unsuspected daily practices in production, consumption and political regulation (Rip and Kemp 1998). Metaphorically speaking, one could say that future socio-ecological system structures grow behind the backs of the actors who create them.

In this continuous process of development, patterns emerge in which social values and institutions, technology and ecological systems become interdependent. Positive feedback may occur between developments in technology, corporate organisation, regulation, consumption habits and ecological factors. This response leads to a mutual stabilisation of the various elements within a given socio-ecological regime (compare the notion of regime in Kemp 1994). In addition to stabilisation, positive feedback can also give rise to structural dynamics that give regions or key industrial sectors a 'life of their own' beyond the control of any single actor. Initially minor changes and marginal developments may evolve into massive structural configurations that then restrict the variety of directions open to future changes. The cognitive, institutional, technical and economic patterns thus established become a selection environment for innovations and future change. In this way, socio-ecological transformation is path dependent. Future developments are influenced, enabled and constrained by structures that have grown out of particular historical developments. Both the fossil fuel-based electricity system and the individual transport-based mobility system are examples of such path dependency. Even the renewable energy component within the electricity system can be seen as a regime developing according to its own path dependency.

Path dependency imposes severe constraints on the transformations needed to achieve sustainability. Because certain social and technological functions must be maintained, revolutionary disruptions are to be avoided. This means that even when an extreme hazard of certain regimes become apparent – as is now the case with greenhouse gas emissions from fossil-fuel electricity generation – it takes great effort, much time and high costs to work against the dynamics of system development and shift it to a different trajectory. Though some sophisticated strategies are being developed to counteract these rigidities and to induce and modulate system innovations or regime shifts systematically, the prospects for success remain uncertain. For some problems, long lead times of as much as 50 years may simply be too long to motivate change. This underscores the importance of shaping new technologies, social practices and institutional arrangements at an early stage of their development while they are still malleable. Later they may become stabilised through manifold interconnections within their contexts. It remains a dilemma that at this early stage impacts are not known yet and cannot always be predicted (Collingridge 1980). However, some alternative paths of future development and possible impacts can be anticipated using methods such as scenario forecasting.

Sustainable development therefore requires careful anticipation of the long-term systemic effects of ongoing actions and developments and assessment of the resulting paths. Due to the complex dynamics of socio-ecological transformation, development paths cannot be predicted with certainty. Rather, anticipation refers to an explorative evaluation of alternative development paths that may be spurred by the actions that are taken today. Such actions should take into account various possible future

developments. The general aim is to explore future opportunities for which a portfolio of options should be kept open and to avoid lock-in to trajectories that forestall the achievement of sustainable development. Such processes can, for example, be based on scenario construction, participatory modelling or policy exercises (Godet 1987; Elzen et al. 2002).

Goal Formulation and the Ambiguity of Sustainable Development

Sustainable development is often referred to as a normative orientation. Generically, however, it refers to a functional condition – a process that can be sustained over time without eroding its own foundations. From this perspective, the concept of sustainable development is normative only to the extent that it implies a value decision to sustain societal development on earth rather than to annihilate it. It can hence be rephrased as the long-term viability of socio-ecological systems. On this level of abstraction, not surprisingly, there is overwhelming consensus. But the crucial question is: how can societal development be sustained? Which kinds of practices or production and consumption structures are needed to sustain societal development? A prerequisite to answering this question would be to know and assess the full systemic consequences of alternative practices and the steps that would need to be taken to get there. This would require the ability to produce certain knowledge about complex social and ecological systems, the ways in which they are coupled, the dynamics of their development and the factors that influence that development. Viewed in this way, sustainable development is a cognitive, analytical question, not an evaluative, normative one. It could therefore be argued that the definition of targets for sustainability is not a matter of ethical discourse or politics, but of science.

In spite of the functional condition at the heart of the concept of sustainable development, however, other problem features, such as those elaborated in the paragraphs above, impede an 'objective' scientific clarification. The fundamental limitations to predicting socio-ecological system development mean that there can be no certain knowledge about the dynamics and thresholds critical to the resilience of societal systems and ecosystems, such as the concentration of greenhouse gases in the atmosphere or the unequal distribution of wealth in societies. It may be possible to determine parameters within which stable system behaviour can be expected with satisfying probability. These may be used to define 'corridors of sustainability' within which dangerous system change can be avoided by, for example, using indicators for emissions and living standards. In practice, however, sustainability assessment almost always deals with parameter values at the fringe of so-called sustainability corridors. For these issues uncertainty is high, thus the evaluation of risk becomes decisive. Risk assessment, however, is highly value- and world-view dependent. Evaluations of what is an acceptable risk differ greatly between actors and contexts. Several values come into play and may need to be traded off against each other. Such questions cannot be decided scientifically.

People hold different values. This also means that if they evaluate options, they make different decisions. Even if everybody agreed about what is good and what is bad, there would be differences in how certain values are ranked. This is especially relevant for sustainability assessment since equally legitimate goals – such as social justice, the reduction of environmental risk or economic viability – can only seldom be achieved simultaneously and to the same extent. Sustainability problems concern many differentiated social contexts – such as everyday family life, technology development laboratories and global business – in which particular value structures are dominant. Value trade-offs are therefore a common characteristic in the daily practice of dealing with sustainability and they effectively feed social disputes about what is sustainable and what is not. These disputes, however, can only partially be resolved scientifically, but also need to be addressed with social discourse or political decision.

Taken together, this means that sustainable development necessarily remains a contested concept. Its substantial content – a definition of the structure and the parameters of socio-ecological systems that can sustain their development – cannot be scientifically determined as 'objective knowledge' but will always incorporate normative valuations that only become ascertained in the process of social interaction. Sustainability as an orientation for societal development therefore delivers ambiguous goals. It may not be possible to eliminate the inherent discrepancies that exist between different goals or to define a clear ranking order by way of rational argumentation and empirical evidence. Social conflicts are inherent in the concept and need to be carried out with it.

Another aspect is that sustainability goals cannot be determined once and for all. Because substantial notions of sustainability are built on the basis of uncertain knowledge and social evaluation, they must be expected to change over time. Knowledge about socio-ecological system dynamics changes with scientific progress and with it the public articulation of everyday experiences of societal change. Moreover, value changes are endogenous to the process of socio-ecological transformation. They may lose importance precisely because they are being followed successfully. And there is no way to know what the needs of future generations will be.

Sustainability is thus an ambiguous and moving target that can only be ascertained and followed through processes of iterative, participatory goal formulation. In principle, sustainability goals and assessments cannot be determined permanently, but only through participatory processes that

need to be carried out for specific assessment situations. The broad participation of affected societal actors in the process of goal formulation is necessary, because their values and respective perception of problems constitutes a basic condition of sustainable social development.

Strategy Development and Distributed Influence

A third feature of shaping sustainable transformation is related to the implementation of strategies. Even if certain knowledge about socio-ecological systems, clear goals and defined conditions for sustainability could be taken as given, specific difficulties with implementation must still be addressed. These refer to the distribution of capacities to influence the direction of socio-ecological transformation. Those capacities are at the disposal of a broad range of actors. Societal development is not steered from a single point, but from the interaction of state actors and interest groups, producers and consumers, scientists and the media, just to name a few. To influence long-term societal change, it is necessary to coordinate the actions of various actors at different places along the lines of collective strategies.

The fact that influence is dispersed is a general characteristic of governance in modern societies rather than an exclusive property of sustainability problems. There is a growing awareness of this, which is evident in the shift, with regard to societal management, from government to governance (Kooiman 1993; Rhodes 1996). The capacity to influence societal change is distributed between different governance levels, for example, the nation state and the EU, different functional domains – such as production, consumption and political regulation – and between different actors within these domains (Schneider and Kenis 1996; Mayntz 1998; Kohler-Koch and Eising 1999). Public officials are only one type of actors among several, although they are equipped with democratic legitimacy as a special source of power. Moreover, the competencies of the state are fragmented into disparate bodies such as governmental departments, regulatory agencies, political parties and so on that often have different positions on issues concerning sustainable development. These conditions have to be taken as a starting point for strategy formulation and implementation. Of course, differences among governance situations do exist with respect to the extent to which resources for control are dispersed and whether one actor, such as the head of government, or a small coalition of actors, hold sufficient power to make other actors follow a collective strategy. Generally, however, the coordination of different actors' strategies cannot be taken for granted, but it needs to be asserted anew for each specific problem.

Control capacities regarding problems of sustainable development are, in general, particularly widely distributed because they touch upon the

fundamental institutional and technological structures of modern society. Structural innovations are highly contingent upon a multitude of factors in the hands of many different actors – more so than governance processes that take place within established structural frameworks.

There are no established, overarching competencies and procedures for shaping structural, 'governance of governance' change. Transformation thus appears to happen uncontrolled as a result of daily interactions between consumers, producers, policy makers, researchers, journalists and various other actors. Actors involved in shaping socio-ecological transformation follow their own vital interests, partly in cooperation and partly in conflict. And they each have power over specific resources to enforce their strategies. Transformation, ultimately, results from the intended and unintended effects of these fuzzy interactions. In contrast to 'normal' policy arenas such as health or energy, the governance of transformation is not institutionalised. This is also the case for informal policy networks in which all important actors work towards a collective strategy for sustainable development.

Distributed control capacities thus have to be taken into account when devising strategies for sustainable development. In shaping socio-ecological transformation, it is necessary to coordinate heterogeneous actors. Such coordination cannot rely on institutionalised hierarchies, but must take place in networks in which the perception of problems, the interests and the practical knowledge of the various stakeholders become linked together in processes of interactive strategy development.

STRATEGY ELEMENTS OF REFLEXIVE GOVERNANCE

The basic problems of shaping sustainable development have been outlined in the preceding paragraphs. From that discussion of the resulting difficulties for system analysis, goal formulation and strategy implementation, we have derived and briefly discussed particular requirements for strategies of reflexive governance. Compiled into a strategic framework, those requirements can be taken as a reference for discussing governance innovations needed for sustainable development. Table 1.1 gives an overview.

Integrated (Transdisciplinary) Knowledge Production

Sustainability problems require integrated concepts. Since the problem of sustainable development is one of unintended side-effects, different perspectives that specialise in particular aspects of the world such as economics, politics, culture, technology and ecology need to work together to

define problems and perform analysis without exclusions. This refers to both the involvement of different scientific disciplines and the participation of actors from other subsystems of society. Problem definition and analysis for promoting sustainable development must be based on integrated knowledge produced in relation to the relevant perspectives.

Adaptivity of Strategies and Institutions

Because it is impossible to predict socio-ecological transformation accurately and because underlying values may change, solutions to the sustainable development problem cannot be defined *ex ante*. Particular strategies, even if they appear to be the best solution from the perspective of current problem definitions, must therefore be seen as hypotheses that are to be probed in practical interaction with the world. This requires that the effects are thoroughly monitored and that strategies, policy programmes and the respective institutions can be adapted according to experience and learning. Responsiveness and adaptability of social and technical structures can therefore serve as procedural criteria for sustainable development.

Anticipation of the Long-term Systemic Effects of Action Strategies

Within socio-ecological system dynamics, effects may appear detached from their causes. The repercussions of action strategies often occur at different places – in different social subsystems or in other parts of the world – and appear long after the triggering event took place. If system boundaries of space and time are drawn restrictively, problem analysis and the assessment of action strategies are likely to ignore important effects. Positive feedback dynamics that may lead to increasing self-stabilisation of undesired development paths, or 'lock-in' are particularly important with respect to socio-technical development (Arthur 1997; Pierson 2000). Lock-in can be avoided through the construction of explorative scenarios that integrate the perceptions and expectations of various actors. Such scenarios raise awareness of a range of interdependent factors that feed into the process of societal development and can highlight the structural dynamics that may be triggered by seemingly minor decisions. Governance for sustainable development should therefore pursue the systematic and interactive anticipation of indirect effects and long-term dynamics linked to present actions.

Iterative Participatory Goal Formulation

Sustainability goals cannot be defined objectively once and for all. This would require ascertainment of the necessary conditions for the long-term

Table 1.1 Strategy elements of reflexive governance

Aspect of problem treatment	System analysis			Goal formulation		Strategy implementation
Specific problem features	Co-evolution of heterogenous elements across multiple scales (society, technology, ecology)	Uncertainty and ignorance about transformation dynamics and effects of intervention	Path-dependency of structural change, high societal impact	Sustainability goals involve value trade-offs, are endogenous to transformation		Capacities to influence transformation are distributed among actors
Strategy requirement	Trans-disciplinary knowledge production	Experiments and adaptivity of strategies and institutions	Anticipation of long-term systemic effects of measures	Iterative participatory goal formulation		Interactive strategy development

viability of socio-ecological systems. Involved risk assessments and trade-offs of values cannot be decided scientifically but only through social discourse or political decisions. Moreover, values may change in the course of transformation processes. Sustainability goals thus constitute ambiguous and moving targets. This needs to be taken into account in participatory processes for formulating sustainability goals. Goals need to be revised regularly to adapt to changing values and perceptions of problems in the course of transformation.

Interactive Strategy Development

Socio-ecological transformation is an outcome of social interactions. These interactions cut across institutionalised policy fields and functional domains such as production, consumption, regulation, research or the media. A broad range of heterogeneous actors is involved who follow their own interests and have control over specific resources of influence. Government and other public actors are only one type of actor among many, although they are equipped with political legitimacy as a special source of influence. To shape transformation processes, diverse actions have to be aligned in a collective strategy. Strategies therefore have to be developed in interaction with relevant stakeholders to integrate their know-how and resources and assure support for implementation.

REFLEXIVE GOVERNANCE IN DISCUSSION – OVERVIEW OF THE CHAPTERS

At the beginning of this chapter, we claimed that reflexive governance provides a framework that can connect various concepts and practices of governance for sustainable development. We also stated the hypothesis that many recent governance innovations, which can be described and analysed with respect to the framework of reflexive governance, are related to the discourse of sustainable development and can be considered a practical consequence of the concept itself. The following chapters of this volume present evidence for these assertions. They provide theoretical reflections on the concept of reflexive governance and in-depth analyses of governance processes in various applied fields of societal problem handling, from research management to global politics. The chapters are organised so that they lead from general and abstract treatment of reflexive governance to more concrete empirically-grounded analyses of governance practice.

In Part One, Ulrich Beck, John Grin and Arie Rip take this introduction as a starting point for reflections on the concept of reflexive governance.

In so doing, they establish linkages between reflexive governance and other strands of theoretical discourse such as transnationalisation of governance, policy analysis, co-evolution and risk assessment. They also work out some critical aspects and articulate further conceptual questions about reflexive governance.

Ulrich Beck elaborates on aspects of how reflexive modernisation affects the very categories in which politics is conceived and discussed. He recaptures the theory of second modernity with an emphasis on ambiguity, uncertainty and unpredictability and the resulting demands for a new logic of political action. Sustainable development plays a role in this context as it eclipses 'old shared self-evidences of politics'. Beck frames reflexive governance as a new political theory, based on the critique of 'methodological nationalism' that evolves around the idea of negatively motivated processes of global social integration arising from the handling of risks ('global risk communities'). Against the background of an outline of elements of such a theory, he sketches the dynamics of 'rule-altering politics' linked to it and articulates a plea for 'cosmopolitan realism' as a guiding vision for the self-transformation of the state under conditions of reflexive governance.

In the next chapter, John Grin explores reflexive modernisation as a governance issue. He elaborates on a governance approach with which reflexive modernisation can be promoted in practice – against existing structures of simple modernity that 'fight back'. His argument is based on empirical studies of Dutch agriculture, where he sees sustainable development as a form of reflexive modernisation, focusing on risks and side-effects that concern ecological, animal welfare and human health aspects. He proposes an approach where sustainable development is defined through a combination of broad principles set by the institutions of representative democracy and concrete practices developed by those who are involved locally. To orchestrate diverse efforts at innovation, he proposes the organisation of trial-and-error learning complemented by visions of attainable futures that can serve as a functional equivalent to institutions while existing ones undergo transformation.

Arie Rip introduces a perspective on reflexive governance rooted in a co-evolutionary understanding of societal and technological development. He emphasizes *de facto* governance in the form of cognitive and institutional patterns that are the unintended outcomes of interactions that have dynamics of their own. He argues that steering actors are inside and part of changing *de facto* governance patterns, not outside. For illustration, he refers to regime shifts in science policy. With this insight he outlines a 'modulation' approach that embraces repair work, opening-up of learning spaces, macro-alignment of actors and anticipation-in-action. The latter core aspect is about enabling future-oriented interactions between actors

who constitute each other's selection environment and supporting them to create narratives about unintended consequences, which then shape action. Rip emphasises maintaining diversity – in the form of grey zones and interstices within existing orders or actors who irritate, contest or are mischievous – as an important component of reflexive governance, since this is where the possibility for renewal lies. He concludes his chapter by reflecting on the possibility of strategies that take into account their own, partly unknown effects, which leads him to propose the articulation of ironies rather than strategies to guide attempts at shaping societal development.

Part Two comprises four chapters that introduce governance concepts responding specifically to uncertainty, ambiguity and limited control. In addition to theoretical discussion and programmatic conceptualisation, these chapters also report on practical experience with implementation. They can therefore be taken as empirical instances of reflexive governance, showing that quite radical changes in governance are actually occurring in connection with sustainable development. Moreover, they represent empirical examples in which the concept of reflexive governance can be probed and from which one can learn about the conditions of implementation in practice.

René Kemp and Derk Loorbach introduce the concept of transition management, which has been adopted by Dutch policy makers to work towards sustainability. They start from a discussion of the complex dynamics of change and propose transition management as a reflexive approach to organising the evolutionary processes that give rise to those dynamics. The approach relies on a model that views transitions as a multi-level system change based on interaction between innovations and on a two-pronged strategy that combines vision-constructing exercises with learning through experiments. The establishment of a transition arena for change-oriented stakeholder interaction is at the heart of practical arrangements for transition management. Kemp and Loorbach go on to discuss the concept of transition management with respect to the strategy elements of reflexive governance and with respect to practical transition policies in the Dutch energy sector.

Jan Sendzimir, Piotr Magnuszewski, Peter Balogh and Anna Vári elaborate on the approach of adaptive management and its application to the re-naturalisation of the Tisza River Basin in Hungary. They analyse flooding brought on by hydro-engineering and industrial agriculture as a major second-order problem for which no technical solution has proven feasible. The authors propose adaptive management as a framework for handling re-naturalisation. This builds on the recognition of uncertainty by organising management as a learning cycle that includes assessing what is known, developing policies as hypotheses, implementing management

action as tests of hypotheses and monitoring and evaluating the results. They put special emphasis on the use of models and indicators in the context of reflexive governance.

Jan-Peter Voß, Bernhard Truffer, and Kornelia Konrad introduce sustainability foresight as a method for shaping socio-technical transformation and they document its application in the German utility sector. The method recognises that problem-solving approaches based on prediction and control cannot succeed because of uncertainty about system dynamics, ambiguity of sustainability assessment and fragmentation of the capacity to influence structural change. Instead, the authors turn towards feedback between expectations and action as an entry point for shaping transformation. They describe a three-step procedure that combines explorative scenario construction, mapping of values and modulation of innovation processes as a way to employ foresight as 'self-reflecting prophecy'. They conclude with a discussion of practical experience and lessons for reflexive governance.

Matthias Weber elaborates on an approach and methodology he terms adaptive foresight. He reviews recent developments in foresight methodology and strategic planning and illustrates them with examples from several areas of technology policy. The adaptive foresight approach is characterised by a sequence of steps including innovations system analysis, explorative scenario construction and assessment, and multiple backcasting and portfolio analysis. A key element is the development of a portfolio of real options, including technologies and policies, that are robust under evolving conditions or that can be adapted to them. Weber concludes with a critical discussion of unresolved questions within the framework of reflexive governance.

Part Three focuses on the dimensions of knowledge production and goal formulation and assessment. The three chapters gathered here deal with distinct but complementary issues. They provide an in-depth treatment of the epistemological issues involved in producing knowledge and assessing options regarding sustainable transformation. They also scrutinise practices and methods at the research programme level and interactions at the project level.

Andrew Stirling approaches the subject of reflexive governance with a focus on assessment problems. His chapter takes a specific definition of the terms 'unreflectiveness', 'reflection' and 'reflexivity' as its background. Unreflectiveness refers to conceptions and interventions that are restricted to the most obvious, instrumental attributes of an option. Reflection is when this narrow focus is widened to take account of the full range of attributes and all possible consequences of an option, including unforeseen consequences. Reflexivity is when attention is shifted to include also attributes of

the actors who do the assessment as a constitutive element of appraisal. These attributes may include, for example, disciplinary perspectives, institutional interests, cultural values or economic priorities. Within this framework, Stirling conducts a critical discussion of conventional risk assessment and the uses of the precautionary principle in governance practice that leads him to the formulation of 'grounded perspectivism' as an understanding of the role of science in governance for sustainability that is both reflected and reflexive. He concludes with a discussion of practical strategies for precautionary foresight.

Katy Whitelegg compares research programmes for sustainable development in several European countries. She begins with a description of the general form of such research programmes: they combine different disciplines and types of knowledge, they are oriented towards the creation of social innovation networks and they assign to research the role of an active player in facilitating and defining societal change. Differentiating between general programme features, criteria for selecting projects and learning processes in project administration, she identifies elements of reflexive governance in research policy and highlights the influence of established structures of national research systems.

Céline Loibl moves from the programme to the project level of sustainability research. Her chapter deals with interaction processes in heterogeneous research teams and reflexive strategies of project management. It is based on two monitoring studies of research programmes in Austria, Switzerland and Germany. She emphasises the need to deal reflexively with the different cognitive, cultural and institutional contexts of actors from different domains of academic science and practice and with the challenges that are imposed by the embedding of research processes in changing societal contexts. For this purpose, she proposes elements of strategy for the reflexive governance of transdisciplinary research processes.

In Part Four of the book, attention shifts from knowledge production and assessment to issues of technology development and policy implementation. The four chapters in this section provide in-depth analyses of the introduction of new technologies and institutional arrangements in energy, water, raw material production and agriculture and assess to what extent they represent practical instances of reflexive governance.

Adrian Smith investigates the processes in which radical, grassroots experiments with new technologies can contribute to sustainable system innovations. For this purpose he compares the concept of strategic niche management with rather different niche-based concepts articulated by the Alternative Technology Movement in the 1970s. This leads him to emphasise the problem of conflicting world views in integrated knowledge production, the constraining effect of context conditions on carrying out

experiments and the need for learning in niche developments to be complemented by top-down policy changes if experiments are to lead to system changes.

Bas van Vliet uses the concept of reflexive governance to evaluate two cases in which new sanitation systems were tested for implementation in the Netherlands. He finds that differences in outcomes can be related to the inclusion of social and infrastructural aspects in knowledge production, the extension of experimentation to include social arrangements, the adoption of a broad socio-technical systems perspective in anticipation, the development of goals by users and providers and the organisation of strategy development as an interactive process.

Philipp Spaeth, Harald Rohracher, Matthias Weber and Ines Oehme undertake the evaluation, from a reflexive governance perspective, of a project in Austria supporting socio-technical change in materials production. Basing their analysis on a detailed description of the process derived from a participatory scenario building with stakeholders involved in diverse R&D projects, they identify important prerequisites and pitfalls of reflexive governance in application. These findings highlight the nature of motivational and institutional constraints on stakeholders engaging in participatory governance, the need for coordination and adequate framework conditions in carrying out experiments and the need for institutional backing for initiators and moderators of reflexive governance processes.

Franziska Wolff scrutinises global policies for agrobiodiversity in terms of reflexive governance. She identifies various instances of reflexive strategies in institutional arrangements such as the 'ecosystems approach' under the Convention of Biological Diversity, participatory breeding, farmers' rights in the International Seed Treaty, farmers' field schools, and so on. As a general assessment, however, she concludes that many provisions for reflexive governance lack implementation and have limited effect, which she explains results from conflicting beliefs and adverse constellations of interest and power. Wolff identifies inherent flaws of participatory governance and stresses the need to consider conflict regulation rather than problem-handling as lessons for reflexive governance.

In the concluding chapter, Jan-Peter Voß, René Kemp and Dierk Bauknecht undertake a reassessment of the concept of reflexive governance in the light of the findings and discussion throughout the chapters of the book. They provide a discussion of critical points that have been raised with respect to the concept as formulated in the introduction and revise the concept accordingly. Four issues are addressed in depth: (1) The relationship between reflexive modernisation, reflexive governance and sustainable development is worked out more precisely: sustainable development is posited as a *chiffre* by which reflexive modernisation is politically negotiated.

(2) The concept of reflexive governance is extended by a differentiation of governance levels: shifting boundaries of governance systems and multi-level interaction. (3) Criteria for evaluating reflexive governance are introduced: process-based criteria to monitor the symmetry of interaction. Finally, (4) the focus of reflexive governance on exploration and opening up with respect to complexity, ambiguous goals and multiple options is critically, but constructively, taken up in a typology of different ways to combine it with procedures for exploitation and closing down: balancing reflexive appraisal with action-oriented reduction of complexity.

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Reflections on reflexive governance

16. Reflexive governance: a view on an emerging path

Jan-Peter Voß, René Kemp and Dierk Bauknecht

INTRODUCTION

This concluding chapter is more than a summary of the arguments presented in the preceding chapters. One could say that we take a reflexive approach to the theme of the book. We reconsider the ideas from the Introduction in the light of the ideas it has prompted in the chapters. In this way, we can rework a concept of reflexive governance that incorporates feedback from theoretical as well as more practical areas of application. This feedback promotes learning with respect to the concept of reflexive governance. Experiences that are gathered on the basis of reflexive governance reproduce and modify the conceptual framework and shape further experience – they are an example of 'conceptual structuration', to paraphrase Giddens (1984/1986). This concluding chapter can thus be seen as a 'view on an emerging path' of thinking and practice in societal governance and problem solving.[1]

We proceed by first discussing the relationship between sustainable development and reflexive governance in more depth. Here, the initial hypothesis from the Introduction becomes substantiated by evidence from the chapters. Sustainable development serves as a label under which a fundamental transformation of governance, in the context of reflexive modernisation, is politically negotiated. Seen in this light, sustainable development is indeed more than an empty phrase; it is both a symptom and a catalyst of what Beck (1994) describes as reflexive modernisation.

A second point is a more explicit concern for the quality of the outcome of processes of reflexive governance. Does reflexive governance actually produce better results? This question refers to the need for criteria of procedural quality, since it is not possible to arrive at a solid definition of the 'right' outcome of problem handling for sustainable development. Such criteria can support an assessment of reflexive governance without getting

trapped in the temptation to predefine the results for learning processes and thereby negate the very strength of the approach.

A third point is that we add to the question of the location of reflexive governance: in which types of interaction and at what level of social organisation does reflexive governance take place? In this respect, we introduce different levels as a conceptual extension to reflexive governance. This view acknowledges that the levels at which problems are addressed and the interplay of governance processes across different levels are an important dimension. In this volume, both Beck and Wolff show this aspect with respect to transnational governance as a response to the limits of political organisation in nation states. Other chapters in this volume, like those of Loibl and Whitelegg that discuss knowledge production, show how reflexive governance in research plays a role on both a macro-level of programme management and a micro-level of project management.

As a fourth point, we add a fundamental qualification to the concept of reflexive governance by introducing the efficacy paradox. This concept refers to the contradicting requirements of opening up and closing down in social problem-solving processes (see also Stirling 2005). On the one hand, problem-oriented interactions need to be opened to take account of the interaction of diverse factors, values and interests. This is necessary to produce robust knowledge and strategies. On the other hand, selection of relevant factors, decisions about ambiguous evaluations and convergence of interests are necessary to take decisions and act. The strategy elements of reflexive governance, as presented in the Introduction, address the need to open up various specialised kinds of problem solving to allow for integrated assessment and coordinated strategies. The efficacy paradox draws attention to the fact that effective governance requires these strategy elements to be complemented with appropriate strategies to reduce complexity and achieve stable strategies. The proposed way to deal with these paradoxical requirements is to combine opening up with closing down, for example, by organising problem-handling processes in sequences of opening up and closing down (compare the discussion of exploration and exploitation in March 1991).

At the conclusion of this final chapter, we summarise the concept of reflexive governance and formulate our position on its overall potential for furthering the societal search for sustainable development. As a last step towards the unfolding of the concept of reflexive governance, we outline an agenda for further research and practical experimentation.

REFLEXIVE GOVERNANCE AND SUSTAINABLE DEVELOPMENT

Reflexive governance was presented in the Introduction to this volume as a twofold concept, both a condition of governance in the modern world and a specific strategic orientation that results from this condition. The first meaning refers to the self-confrontation of governance. This can be seen in the increasing devotion of governing capacities to problems which are themselves caused by governing. That is to say, governance to a large extent involves repair work for the unintended consequences of prior attempts at shaping societal development. This meaning of 'self-confrontation' is analogous to the meaning of reflexive modernisation as modernity confronted with itself as introduced by Beck and others (Beck et al. 1994; Beck et al. 2003).

A second meaning refers to new kinds of strategies, processes and institutions which can be observed emerging under this condition of self-confrontation. This has to do partly with the reflection of the condition of self-confrontation by unintended consequences and the development of deliberate responses to it. In the Introduction we undertook a systematic reflection of the sources for reflexivity (self-confrontation) in governance. This resulted in a set of reflexive strategies labelled integrated knowledge production, experimentation and adaptivity of strategies, anticipation of long-term effects, interactive participatory goal formulation and interactive strategy implementation.[2]

In practice, governance arrangements that include these reflexive strategies usually evolve from repeated attempts at grappling with very specific problems rather than from the theoretical recognition of reflexivity (self-confrontation). For example, interactive technology assessment aims at avoiding conflicts between advocates and opponents at a late stage of technology development; transdisciplinary research seeks to cope with the limitations of disciplinary academic science that show up when laboratory science is applied to real world problems; cooperative policy networks are a response to the interference of actor strategies that may spoil policy implementation. From within the social processes in which these new modes of governance evolve it is not always visible that the problems they address are themselves caused by existing governance structures which evoke narrow and myopic problem treatment and unintended repercussions: institutional arrangements of technology development in which development work is dissociated from social needs and contexts of use; self-referential science dynamics supported by the institutional demarcation of knowledge fields and academic peer review; or departmentalised policy making not being able to take account of interaction across policy

areas. If viewed from a broader perspective, however, the emergence of various new modes of governance appears to follow a similar pattern. This becomes articulated by the concept of reflexive governance: governance learning is being shaped by the experience of unintended feedback of its own working (compare with first-order reflexivity in note 2 to this chapter). These experiences lead into adapting cognitive concepts and institutional arrangements so that they transcend the boundaries of closed-up problem solving routines. Conventional governance processes are opened up for interaction with their contexts and develop capacity for mutual adaptation of strategy and context before the damage is done. Social concerns and factors of influence that have hitherto been externalised become incorporated in problem definition and strategies. New principles such as precaution, experimentation, learning, participation and integration reflect the possibility of unintended feedback and error of any rigorous analysis and strategy by translating it into fruitful interaction with dynamic contexts of real world implementation (compare with second-order reflexivity in note 2).

While the concept of reflexivity is seldom referred to in these processes of governance learning, the concept of sustainable development plays an important role. In fact, reference to sustainable development is what governance changes in these various fields of practice have in common. The chapters in this book offer examples from research policy and management (Whitelegg; Loibl), risk assessment (Stirling), regional development (Sendzimir et al.), sectoral planning (Kemp, Loorbach; Voß et al.; Weber), technology development (Smith; van Vliet; Spaeth et al.), and agricultural policy (Grin, Wolff). Sustainable development provides a broader framework and discursive context to the particular problems in each of these problem areas. The systems perspective, together with the integration of diverging social goals and the long-term approach, are outstanding characteristic elements of sustainable development, regardless of the substantial openness of the concept. They provide a general orientation in searching for ways to handle recurrent problems and provide a legitimate reference in pushing for new governance forms. The notion of sustainable development thus serves as a catalyst for the exploration of new forms of governance – and is itself kept alive and becomes materialised by references made to it.

As such, sustainable development can be understood as the *chiffre* under which the structural changes that are sociologically conceptualised as reflexive modernisation become politically negotiated. Sustainable development is an aspect of reflexive modernisation, it works as a change agent, a vehicle and a mediator for governance changes towards reflexive governance. In this respect, sustainable development is not something empty, irrelevant

or without practical value or factual implications as is sometimes claimed. Rather, it is indeed an important driver of societal change.

The notion of sustainable development has 'succeeded' to the extent that it has condensed the problem of the self-undermining side-effects of modernity into a slogan that triggers communication across different domains and levels of social action. Even if the substantial meaning is disputed, the attribute 'sustainable' always works to contextualise particular actions, concepts, strategies and so on within a broader environment. Those who claim to act in a sustainable manner are expected to justify their actions with respect to consequences in society and nature. Calling something 'sustainable' means taking into account possible side-effects – both immediate and long term – and their impact on the viability of society as a whole. As such, it can be seen as a late modern version of the concept of the common good that has now become widened to include the natural conditions of human well-being and therefore encompasses a different time structure. This is a qualitative change in the concept. Concerns for more complex interactions, ignorance, irreversibility and path dependency are introduced to the search for the common good. Sustainability signifies that what we think and do now may enable or restrict thinking and acting in the future. This becomes most visible in the degradation of global ecosystems. But it also refers to the shaping of social structures through, for example, institution building, industrial subsidies or education. In comparison to the common good, the notion of sustainable development thus strengthens a dynamic, historical understanding of society whose values and knowledge undergo change. But this also means that the agent of governance gets displaced from its Archimedean point, outside of the developmental context. Instrumental rationalisation and steering are not applicable under these conditions. In this way, references to sustainability trigger a search for new governance forms that take a learning-oriented approach towards steering.

Sustainable development and reflexive governance clearly make life more complicated and make conflicts more obvious at an early stage. What were once externalities become interdependencies and trade-offs that are explicitly considered and negotiated. The perceptions and interests of actors from other realms of society, which were bracketed out in specialised problem solving, now need to be addressed. Not surprisingly, sustainability is not easy to operationalise into consensual strategies. It has a radical impact on social institutions, practices and processes in which problems are perceived and acted upon. It calls for a fundamental reorientation of governance (see especially the chapters by Beck, Grin, Rip and Stirling, this volume).

By articulating reflexive governance as a phenomenon that is actually happening and by elaborating the rationale behind it, we take part in the

process of governance change occurring under the heading of sustainable development. Reflexive governance can serve as a conceptual underpinning for diverse experiments with new forms of governance for sustainable development. It can contribute to the discussion on institutional sustainability as a possible 'fourth pillar' of sustainable development in addition to ecological, social and economic sustainability (Spangenberg, 2004). As such, reflexive governance could offer a concept by which diverse local and problem-specific processes of governance innovation can be connected with each other. It facilitates the discussion of common underlying problem structures and methodical experiences of tackling them. It could, for example, be interesting to relate the experiences with integrated knowledge production that are made in transdisciplinary research, climate policy making and technology assessment. Reflexive governance provides a common language, a cognitive platform through which reflexive governance innovations can find synergies and develop momentum in transforming established institutions (see Grin, this volume, on the role of such linkages between innovative practices).

POLITICS AND THE QUALITY OF OUTCOMES

The elements of reflexive strategy that were presented in the Introduction refer to particular ways of organising governance processes. However, they do not prescribe any specified results that are to be achieved for sustainable development such as emissions targets or income indices. This is due to the recognition that uncertainty and ambivalence are features of the operationalisation of sustainability. For example, what is the right trade-off between emissions reduction, social equality and economic stability? Reflexive governance therefore asks for open-ended searching and learning.

If the outcome of reflexive governance cannot be defined, how can we then know if it works? One could, for pragmatic reasons, refer to politically defined goals such as the Kyoto targets for reducing greenhouse gas emissions. However, this does not resolve whether current political structures actually produce sustainable targets, or whether, for example, more substantial greenhouse gas reductions might not be necessary, as many scientists argue. To take current political goals, concepts and measures as points of reference for the evaluation of outcomes would 'short circuit' the evaluation of governance, which itself contains particular dynamics of political discourse. The potential of reflexive governance for open-ended learning with respect to goals and targets, would be blocked. What has to be evaluated is the actual working of reflexive governance arrangements, not predefined outcomes.

A concern for evaluation as such is important, however, because reflexive governance arrangements can be misused. As mentioned in many places throughout the chapters of this volume (for example, Rip, Stirling, Smith, Wolff), the reality of reflexive governance, of course, includes opportunistic behaviour, rhetoric and power struggles no less than it includes collective problem handling, dialogue and cooperation.

Therefore care needs to be taken to prevent any particular interests from dominating reflexive governance. For this purpose, one could refer to the collective interest and cooperative orientation of participating actors as a precondition for reflexive governance. In this respect, one could think of procedural settings, selection criteria for participants and the long-term perspective of sustainable development that make it possible for this precondition to be met. This would emphasise the 'rational discourse' dimension (in a Habermasian sense) of reflexive governance. At the same time, however, it would make the process vulnerable. The preconditions of rational discourse are not very widespread in reality, as many critics of Habermas argue, and their creation cannot be taken for granted.

To understand reflexive governance simply in terms of rational argumentation and consensual understanding, however, misses an important dimension of the interaction process. This is the mutual adaptation of actors' knowledge and strategies and the formation of a common understanding of problems, goals and strategies that takes place even when actors contest each other and use arguments merely strategically to gain an advantage in the power game. As long as actors are compelled to articulate and defend their problem analysis, goals and strategies with respect to a common focus such as public acceptance or a political decision to be taken, patterns of argumentation will become connected with each other because no one can afford to ignore relevant points that others bring up. The resulting patterns of strategy will be more robust than if they were dreamed up within the separate worlds of each actor alone. They are tempered in anticipatory interaction, rather than in real-time, possibly irreversible trial and error. Even if reflexive governance helps to articulate conflicts and cleavages, it furthers social learning. Its outcome represents a new shared view on reality even if it contains dissimilar problem definitions, goals and strategies. Actors may commonly refer to this reality and position themselves and others within it. Without interaction, this variety would remain unknown. Thus, in addition to operating through conscious deliberation, the reflexive strategies presented in the Introduction also work as coordination mechanisms behind actors' backs. Arie Rip nicely elaborates a similar dynamic in his treatment of 'controversies as informal technology assessment' (1986).

For mutual adaptation in controversies, however, as well as for consensus-oriented deliberation, it is important that the interaction process be open

to diverse perspectives and that these perspectives be articulated on an equal footing. This is what has to be accomplished by procedural rules and moderation of searching and learning processes in reflexive governance. This is also what can be taken as criteria for process evaluations of reflexive governance.

With respect to the evaluation of outcomes, further work needs to be done on indicators that can measure structural change independently of a predefined direction or end state in which such changes would go. Change indicators would allow the effect of social learning in reflexive governance to be monitored without contradicting the open-endedness of sustainable development. They could refer to problem definitions, actor constellations, interaction practices, strategy options and so on. Indicators are necessary to avoid losing direction during long and ramified projects of transformation. Without such indicators, attempts at system innovation may become stifled after an enthusiastic starting phase because results are not immediately visible. This might happen just as important cognitive and institutional changes begin underneath the surface performance gauged by output indicators. The five strategy requirements of reflexive governance presented in the Introduction to this volume, may serve as a starting point for the development of such institutional change indicators for sustainable development.

Whatever the specific result of any further work on evaluating reflexive governance, it is important that its particular qualities are taken as a reference:

- **Achieving societal ends**: first, reflexive strategies seek to avoid repercussions from unintended effects and second-order problems and thereby contribute more effectively than narrow problem-solving approaches to achieving societal ends. This does not happen by gaining acceptance for predetermined solutions but through the exploration of a broad set of alternatives with respect to a diverse set of criteria.
- **Learning about ends**: second, reflexive strategies provide platforms for interaction that complement conventional political decision making. Interactions are not restricted to institutionalised policy fields, but instead evaluate and reconsider societal ends against the background of diverse concepts and values. Experiments with strategies may yield experiences that lead to a reassessment of needs and interests or to identification of other ways of meeting them.
- **Quality of problem definitions**: third, reflexive strategies increase the quality of problem definitions by actively involving diverse viewpoints – even from actors who have limited capacities to articulate and press for their ideas and perceptions of problems in public discourse. Participatory knowledge production and strategy development and implementation are based on insight into social pluralism and distributed intelligence – an insight that relates fundamentally to the ideal of democracy.

SHIFTING SCALES: MULTI-LEVEL REFLEXIVE GOVERNANCE

In the Introduction, we raised the question of *how* to deal with uncertainty, ambivalence and distributed control in sustainability issues. In the very first chapter, Beck points out the need to explore also *where* such reflexive governance strategies should be located. Beck argues that collective political action is no longer restricted to nation states and the system of international relations between them. Rather, he sees reflexive governance approaches as transgressing former borders and boundaries. This is very much in line with the five strategy elements of reflexive governance that have been explored throughout the book. They are all about bringing into interaction what has formerly been separated – integrating scientific disciplines and practical knowledge through transdisciplinary knowledge production, integrating distributed action strategies and integrating long-term systemic effects into today's action. Transgressing the boundaries of the nation state is just another dimension of integration, which brings nationally-bound political processes into interaction. In this way, factors and effects that come from or go beyond the boundaries of nation states become internalised.

Yet the question of where governance should and could take place goes beyond this. It is not merely about transgressing geographical boundaries to deal with the global problem of sustainable development. Rather, it is about finding the right place and space to tackle specific problems of sustainable development – reaching from global to local approaches. Given that governance in practice is oriented towards specific problems such as the transformation of energy provision or agriculture, spaces for interaction need to be geared towards the problems and cannot be restricted to conventional institutional and geographical boundaries of problem solving. Much like transdisciplinary research projects, which draw upon disciplinary research but need to be reassembled according to the problem they have to deal with, reflexive governance cannot be limited to existing institutional settings, but may need to establish a setting that is appropriate for the relevant problem. In short, the interaction space needs to be congruent with the problem space. This congruency could be introduced as a

sixth strategy element of reflexive governance that covers all three dimensions of problem solving: problem analysis, goal formulation, and strategy development and implementation.

The chapters in this volume have uncovered a number of insights as to the level of social organisation at which reflexive governance is taking place and the creation of problem-specific institutional settings. The chapter by Kemp and Loorbach provides one example of tailor-made problem-solving spaces, namely the transition arena, which they call 'a new institution for interaction' and 'an open and dynamic network in which different perspectives, different expectations and different agendas are confronted, discussed and aligned where possible'. Interestingly, the transition arena is very fluid, changing its size, task and participant profile throughout the transition management process and thereby creating a congruency between the shape of the transition arena and the problem on its agenda. Kemp and Loorbach also introduce a concept that has been referred to in several other chapters. They differentiate between three levels of socio-technical systems: macro-landscape, meso-regimes and micro-niches. Reflexive governance can in principle be located on all of these levels. Smith describes two approaches that have chosen the niche level as the appropriate place to foster system change. Other approaches, such as sustainability foresight, suggested by Voß et al., highlight the need to coordinate niche activities and developments on the regime level.

Looking at the chapters by Loibl and Whitelegg, we find another example of how reflexive governance can be placed on different levels and how these interact. While Loibl analyses reflexive governance *within* research projects, Whitelegg looks at the reflexive governance *of* research programmes. The latter includes both the governance of the programme itself – for example, the learning/adaptability of programmes or participation of stakeholders to define priority areas – and the promotion of reflexive governance within research projects. The chapter by Loibl also points us to the fractal and nested nature of reflexive governance that operate at different levels. This chapter focuses on one of the five reflexive governance strategies set out in the Introduction, namely, integrated knowledge production. Yet while exploring the practice of transdisciplinary knowledge production as an example of a reflexive strategy element in societal governance, it turns out that other reflexive strategy elements are also at work in the governance of the research process itself. Those elements are needed to deal with complexity, heterogeneity and distributed resources in transdisciplinary research processes.

While it is an important insight that reflexive governance can and must be developed on different levels, it is mainly the chapters in the section on strategies for sustainable system transformation that emphasise interactions

between system levels. In their description of the transition management approach, Kemp and Loorbach, for example, describe transitions as a 'cascade of innovations at different levels', all of which may be governed by reflexive governance arrangements. In a similar vein, Voß et al. present their sustainability foresight approach as a macro nexus to connect various innovation processes with broader structural transformations on a sector level.

Shifting governance levels, linking governance levels or creating new governance spaces to grasp relevant viewpoints, factors and resources of specific sustainable development problems as they appear would therefore need to be added as a complementary requirement applying to the other five elements of reflexive strategy.

THE EFFICACY PARADOX OF HANDLING COMPLEXITY

The previous section introduced multiple levels of problem handling as just one more dimension in which reflexive governance requires an opening up of problem-solving processes to integrate relevant factors that could be responsible for unexpected adverse results if they are not incorporated into problem definition, goals and strategies. A review of the various policy and management practices through which reflexive governance becomes implemented, however, also draws attention to an inherent problem connected to the opening up of governance processes for comprehensive problem appraisal and robust strategies: although necessary to respond adequately to the problem of sustainable development, too much complexity, ambivalence and interaction severely reduces action capacities and may block deliberate attempts at shaping societal development.

Appraisal of this situation reveals a dilemma of reflexive governance: the contradicting requirements of opening up and closing down (Stirling, 2005). Opening up is necessary to grasp adequately the factual embedding of decision making and problem solving in systemic contexts. Closing down is necessary to reduce complexity in order to avoid anomy and retain the ability to act – even if it is revealed as illusionary in its modernist form (Rip, this volume). It is a dilemma that is rooted in limited capacities to handle complexity.

The concept of sustainable development would require taking a truly holistic approach to embrace the whole world, but there are immediate restrictions. In our framework of reflexive governance these limitations are effective in all three dimensions of problem handling, but in different ways. In problem analysis, they are linked to cognitive limitations in processing complexity. In goal formulation they are linked to the need of at least

temporarily defined goals for the development of action strategies. In strategy development they are linked to limited resources for the exploitation of possible options. In all three dimensions, opening up in terms of the number and heterogeneity of participating actors decreases the probability of achieving agreement and increases transaction costs.

This situation could be interpreted in such a way that it reveals the futility of sustainable development and reflexive governance and leads back to the fragmented practices of muddling through within the framework of established institutions. Isn't it better to be ignorant of systemic interactions, trade-offs and interfering strategies that cause unintended effects and second-order problems than to be unable to act at all? Reflexive strategies do not eradicate uncertainty, ignorance, ambiguity and interfering activities. Rather, they only bring them to our attention. According to such an interpretation, reflexive governance may not offer anything in terms of practical action.

This line of reasoning, however, takes us back again to where we started in the introductory chapter. It is widely acknowledged that there is a necessity for more than muddling through and there are good reasons why better results can be achieved by applying reflexive strategies. But there is no easy, straightforward way to apply the principle of opening up. Moreover, reflexive strategies include ambivalences. In principle, the underlying dilemma cannot be resolved, but a balanced employment of reflexive strategy elements can help to avoid collateral damage, undesired path dependencies, lock-ins, myopic or biased assessments or collision of actor strategies. By raising awareness of fundamental uncertainties and ambivalences, they suggest a more cautionary approach towards shaping societal development. In so doing, they can reduce the probability of second-order problems but cannot eliminate them.

The issue of the erosion of action capacities as a possible detrimental effect and limit to the opening up of governance processes is important. It qualifies the basic concept of reflexive governance as outlined in the Introduction by stating a meta-requirement to keep the balance between two extremes. Instead of one-dimensionally proposing 'the more opening up the better', it helps us refine our set of reflexive strategies by introducing a counter image of complete fluidity and openness in which any kind of strategic action must suffocate. Reflexive governance thus becomes an 'as-well-as' concept in itself, a concept that entails combining and balancing two or more truths rather than deciding for one of them (compare Beck 1993, p. 9). It is, therefore, not a question of choosing between keeping up action capacity or opening problem handling for contextualisation, but a matter of pursuing both. Against the background of the above discussion, this sounds like a paradox. We believe it is one. It can be called the

'efficacy paradox of complexity'. In order to assure the efficacy of strategies in complex contexts, it is necessary to consider a wide variety of aspects and stay flexible to adapt to unexpected events. At the same time, it is necessary to reduce the number of aspects considered and decide on certain options in order to produce output. This paradox cannot be resolved without losing out on one side or the other. With respect to action strategy, reflexive governance thus implies a dilemma.

We think that it is fruitful to recognise the paradox, not to resolve it, but to work with it as suggested by Ravetz (2003:819). 'Another approach to paradoxes, characteristic of other cultural traditions', Ravetz argues, 'is to accept them and attempt to learn from them about the limitations of one's existing intellectual structures'. In this sense, it can work like the 'ironies' suggested by Rip (this volume).

The efficacy paradox has to be faced in strategies for sustainable development. It could be one of the reasons why we have made so little progress with sustainable development. Opening up of the discussion on future societal development towards a broader set of considerations and wider system boundaries in terms of levels of policy, geographical boundaries and the inclusion of future generations goes hand in hand with increasing difficulties to act. To deal with this paradox, the typology that we develop in the following section may appear as a useful first step. It allows decision makers and analysts to deal with the paradox conceptually.

COMBINING OPENING UP AND CLOSING DOWN IN REFLEXIVE GOVERNANCE

We propose to qualify the concept of reflexive strategies proposed in the Introduction with an explicit requirement to balance the opening up of governance processes for incorporating uncertainty, ambivalence and distributed control with a reciprocal requirement to close down governance processes to enable decision and action. This task of balancing two contradicting requirements to handle fruitfully the efficacy paradox is more of an art than a science. We cannot offer any precise method for diagnosis or a tool kit by which a specific adequate combination of opening up and closing down for each real world governance situation could be determined. Instead, what we can do is sketch out, in a very rough manner, some generic forms in which opening up and closing down can be combined. Our sketch is based on the review of empirical governance practices and theoretical discussions in the literature and the chapters of this book. It may be helpful to consider a spectrum of possibilities when designing governance strategies and institutional arrangements.

First, a differentiated look is needed at what it is that is going to be opened up or closed down. Here, we can refer to the three dimensions of problem solving against the background of which reflexive governance was discussed in the Introduction: problem analysis, goal formulation and strategy implementation. Opening up can occur in all these dimensions or in only one or two of them. For problem analysis, opening up would mean extending the system boundaries and increasing the range and diversity of factors and interactions considered in analysing problem causes, dynamics and effects of interventions. For energy forecasting, for example, this could entail an opening up of economic models to include the strategic behaviour of market actors, political processes that influence regulation, public opinion, resource exploitation and climate change. In the dimension of goal formulation, opening up refers to the revising of given targets by taking into account a broader spectrum of values and facing trade-offs that have to be made. For the energy example, this could mean simply taking into account the established goals of economic efficiency, security of supply and environmental soundness for each policy decision and not letting each ministry follow its own preferred goal. But it could also mean broadening the goal catalogue with values such as aesthetic acceptability and democratic participation in energy provision. In the dimension of strategy implementation finally, opening up refers to a widening of the range of measures and options that are considered and implemented for problem handling. In the energy example this would entail developing and experimenting with a diversity of radically new policy instruments – such as tradeable energy efficiency obligations or participatory technology development – and technologies such as solar electricity import or micro co-generation.

In principle, it is possible that governance processes are opened up in all of these dimensions at once. Problem definitions are called into question, goals are scrutinised and the set of assumed solutions is revised. One possibility to reduce the disruptive effect of opening up on strategic capabilities, however, is to focus sequentially on each of these dimensions, not on all at once. In any case, because of the interdependencies between goals, problem definitions and measures, opening up in one dimension will most likely induce similar processes in other dimensions.

Across all three dimensions of problem solving, an important aspect of opening up refers to the number and heterogeneity of actors involved in problem analysis, goal formulation or strategy development/and/implementation. Eventually, opening up must be linked in one way or the other to extended participation, since knowledge about different problem aspects and values as well as resources for making measures and options work are distributed among different actors. Ultimately, it is the diversity of world views and problem perceptions held by different actors that is the

key trigger for opening up governance processes. At the same time, however, it is also the key trigger for controversy and misunderstanding, which makes governance difficult and seemingly ineffective.

In the following paragraphs, we describe schematically different combinations of opening up and closing down. In doing this, we refer to problem analysis, goal formulation, strategy development/and/implementation and actor participation as the four aspects in which opening up and closing down can take place. In principle, there are very many different ways of combining opening up and closing down in governance and problem handling. One could therefore develop a highly differentiated typology. Here, we restrict ourselves to the presentation of four types (see Figure 16.1). Two of them are the extreme types of totally closed and totally open governance processes: 'problem solving with blinkers' and 'erosion of strategic capabilities'. These serve to delimit the spectrum of possibilities. The other two types are combinations in which a phase of opening up is followed by a phase of closing down.

In one of the types, 'sequential opening and closing', the complexity that has been built up through widening system boundaries, considering diverse values and exploring a range of alternative measures and options is pragmatically reduced again into one coherent framework of problem definition, goals and options for problem-handling. The strategy resulting from this framework can be expected to be more robust because a variety of perspectives has been explored and a context-oriented and situational adaptation of the problem-handling framework has taken place. Nevertheless, the selection and priority setting that has taken place in closing down the governance process towards one consistent strategy is still vulnerable to unexpected side-effects. Only probing the strategy under real-world conditions can disclose all its effects and hint at requirements for further revising.

The other type of opening up and closing down, 'exploring experiments', differs in that a variety of problem-handling frameworks rather than a single framework is developed into a portfolio of strategy experiments. In this way, closing down does not have to end up with one 'best possible strategy'. Instead, the uncertainty, ambivalence and diversity of options experienced in the first phase of opening up can be translated into a set of alternative frameworks of problem definition, goals and options. It is not possible to decide *a priori* which one of these frameworks is better adapted to sustainable development. Instead, they induce variation and offer experience from which society can learn what sustainable development is. The unintended side-effects from each experiment can be compared with each other. If one strategy appears impractical or too risky, others can be followed and further developed.

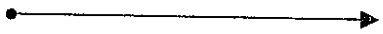
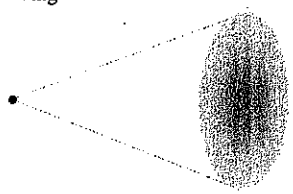
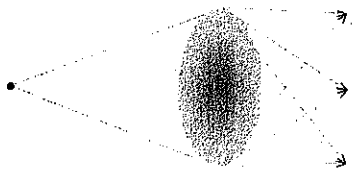
Type	Graphical Illustration	Description
Problem solving with blinkers	No opening 	No opening takes place. Problem-solving is pursued in the framework of given problem definitions, goals, an options with restrictive participation. Unintended consequences are likely to cause second order problems.
Erosion of strategic capabilities	No closing 	Governance process is opened-up in all dimensions by participation of a large number of heterogeneous actors. Uncertainty about problem dynamics, ambivalence about sustainability goals and diversity of options erode the capacity for collective action.
Sequential opening and closing	Sequential closing 	Governance process is opened-up (in one or more dimensions); diverse perspectives are explored in interaction. In a second phase selection and priority setting leads into a new strategy for problem handling. Adapted strategy can be probed and further revised.
Exploring experiments	Subsidiary/experimental closing 	Governance process is opened-up (in one or more dimensions); diverse perspectives are explored in interaction. A set of strategies is developed according to alternative selection criteria and priorities for closing-down. Experiments with different strategies support learning.

Figure 16.1 Types of combining opening-up and closing-down in governance

This brief overview of different combinations of opening up and closing down in governance illustrates the efficacy paradox and indicates a direction in which ways can be found to cope with it.

A FEW FINAL WORDS

Having arrived at the end of the book, perhaps it is good to state what we hope to have achieved. First and foremost, we hope we have generated an interest in the very idea of reflexive governance, realising that this is only a first step. Second, we hope we have shown that reflexive governance represents a radical innovation with respect to dominant 'modernist' regimes of governance and that it needs to be taken up by theorists. And third, we hope we have shown that reflexive governance is 'for real' – that it already exists in various forms.

In the Introduction we introduced five strategies which can be derived from the reflexive governance perspective (integrated knowledge production, experimentation and adaptivity of strategies, anticipation of long-term effects, interactive participatory goal formulation and interactive strategy implementation). In this concluding chapter we added the congruency of governance and problem space as a sixth strategy element. We suggest that these six strategies are central elements of a conceptual repertoire which can further the development of practices of reflexive governance. Their application injects second-order reflexivity into governance processes, leading actors to reconsider their embedding in wider system contexts and review the problem definitions, goals, options and strategies coming out of it. In this way, governance gets prepared to deal with the first-order reflexivity of modernisation, the spiralling up of problems and problem solving as a result of unexpected side-effects.

The different chapters have demonstrated that existing governance systems already include elements of reflexivity that go beyond the confrontation of social groupings with unintended consequences. There are indeed many instances, in diverse areas of practice, of new governance approaches based on the reflection and anticipation of unintended consequences, in which the handling of uncertainty, ambivalence and distributed control plays a central role. In the terminology proposed at the beginning of this chapter, one could say that there is broad evidence for the emergence of second-order reflexivity on top of the first-order reflexivity of societal development. As a fourth and final point, we hope that we have been able to show how these quite fundamental changes in society are linked to the concept of sustainable development, which plays an important role as a catalyst of social discourse and change.

An unexpected outcome of this book is the suggestion of thinking about different combinations of opening up and closing down in governance processes, which we believe is a useful scheme for thinking about the efficacy paradox and handling it in a practical way. The efficacy paradox is an intricate problem for sustainable development. In simple terms, it means that to be able to act you must reduce complexity, which, however, easily leads to the neglect of long-term system effects. On the other hand, consideration of all possible effects reduces the capacity to act. There is a clear tension and strategic dilemma. The paradox must somehow be dealt with. The different ways to combine opening up with closing down present central elements of a conceptual repertoire that helps to do this. Further research on indicators for procedural quality and for the monitoring of institutional changes towards reflexive governance is needed. This book is a first outline of a new theoretical perspective that may look rather 'impressionistic'. It may even fail to impress. Yet we believe the concepts and arguments advanced here take the discussion of reflexive modernisation firmly into the realm of governance, something we felt was unquestionably needed. Furthermore, they throw light on quite fundamental implications of the concept of sustainable development, when that concept is translated into requirements for governance: considering the long-term systemic effects of short-term, specialised solutions proves to have disruptive potential for modernist problem-solving routines. In this way, sustainable development may open the way for fundamental innovations in society and governance. Reflexive governance could be such an innovation, one that provides a conceptual framework within which dispersed innovations in governance can link up with each other and gain momentum. With this bold claim we offer the book to readers. We hope that further steps will follow and that by means of such steps, 'we make the path by walking'.

NOTES

1. As such, however, reflexive governance is naturally embedded in a broad context of governance, management, planning and operation studies and various innovative practices linked to them. Reflexive governance bundles things in a different way while focusing on some aspects and leaving out others.
2. Stirling (this volume) introduces a variation of this understanding of reflexivity. He reserves the term reflexivity for a cognitive 'recursive loop, in which it is recognised that representations are contingent on a multiplicity of subjective perspectives, and that these subjective perspectives are themselves reconstituted by processes of representation'. Reflexivity thus refers to cognitive processes that turn attention towards themselves. In this understanding, reflexivity is always a deliberate intentional effort. A 'reflexive system of governance therefore involves explicit recognition that policy appraisals are contingent and constructed, including by commitments to the interventions that they ostensibly inform'. Although this is fruitful terminology with respect to the cognitive dimension of governance, it does not connect easily to the occupation of modern development with itself, which appears in the repairing of the undesired side-effects of its own working. This aspect is strong in the concept of reflexive modernisation. Environmental protection and technology assessment are examples of societal governance that is oriented towards its own results without concern for the link between objective problems and subjective approaches to problem solving. This 'material' reflexivity of governance can be observed even when it is not cognitively reconstructed by the actors who conduct environmental protection or technology assessment. As for the concept of reflexive governance, we further use a notion of reflexivity that includes the unintentional – and even unreflected – self-confrontation of social action. To avoid confusion, however, it is advisable to introduce a clear differentiation between unintended reflexivity as a condition of governance – being confronted with side-effects – and its cognitive reflection and corresponding adaptation of problem-handling practices as new governance approaches that cope with side-effects by incorporating uncertainty, ambiguity and distributed control. The first form of unintended reflexivity can be labelled first-order reflexivity; the second form of reflected reflexivity can be labelled second-order reflexivity.

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