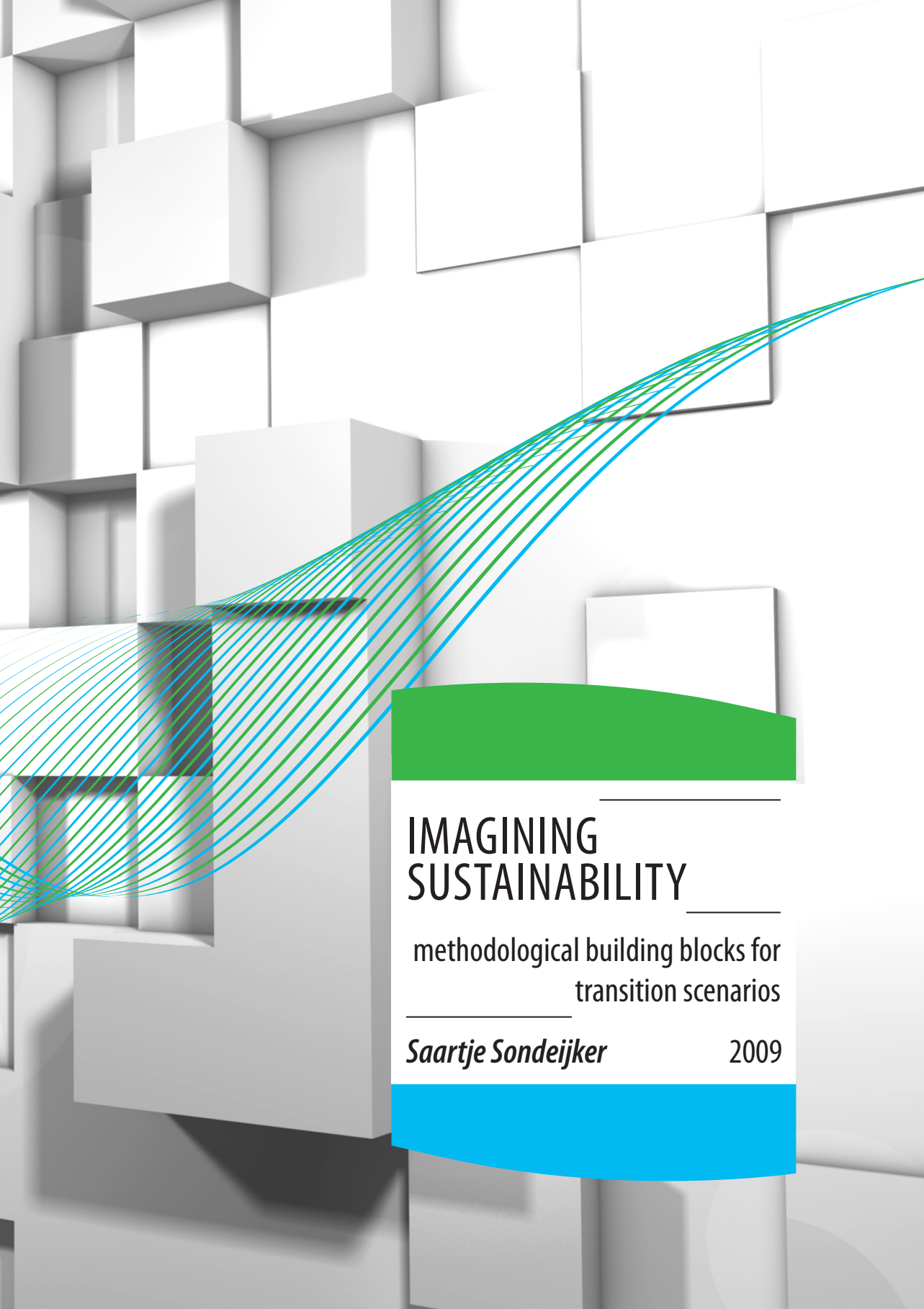

IMAGINING SUSTAINABILITY

methodological building blocks for transition scenarios

Saartje Sondeijker 2009

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Preface

During my scientific career at DRIFT I have many times spoken and written the words: "with transition scenarios the future is not that hard to imagine". From a scientific point of view, we were fortunate to succeed in supporting this statement by providing insight into the journey towards long-term sustainability and by deducing associated strategies for approaching it. With regard to my own personal development throughout this research, however, I have to admit that the future was uncertain for a long time and far from imaginable. In that sense it resembled a true transition. I started working at DRIFT in the beginning of 2005, basically dived into different fields of literature to pinpoint the added value and motives for conducting this research. Although the foundation for my research was laid in this period and I developed my research skills and transition knowledge enormously, it still remained a research that had only progressed in the undercurrent, as the ideas around the development of transition scenarios were in a very premature stage and practical achievements were still to be realised. Major uncertainties accompanied the actual take-off of this research which, from a practical point of view, aimed to pave the first steps onto the road of structural renewal in the conventional scenario world. For me it was a period dominated by risk, wherein the chances for failure of this research seemed to outweigh the chances for success. The so-called 'momentum' remained imperceptible for a long time since the case studies, necessary for successfully finishing this research, seemed to lag behind. In the long run, the anticipation of my research environment together with the connection to other niche developments in the fields of transitions and future thinking, created a momentum for take-off, based on which this research could accelerate and eventually stabilize into a consistent and solid method for transition scenarios. In the end, I am proud that my strength of mind and determination overruled my fear of failure. This enabled me to finish this research with such amazing accomplishments. I believe my period at DRIFT marks my personal development as well as sets out the direction of my aspired future career. Obviously, I have met many people along the way to whom I am truly thankful because they supported me, guided me and stood by me during desperate periods.

In general, I was very lucky to land in an interdisciplinary scientific environment wherein the possibility arose to cooperate with people from various backgrounds. Not only with colleagues within 'the walls' of DRIFT but also with pioneers from different universities linked to the KSI network. This experience was not only thought-provoking but also made me bluntly aware of the fact that perceiving a research subject from different perspectives contributes to richer and more general research findings. Furthermore, both my supervisors offered me the space, time, resources and opportunity to develop a whole new and innovative perspective on future thinking in accordance with transition thinking. Based on their trust and patience I managed to develop a scenario method which puts transition scenarios on the map and sets the first steps on the road from niche to mainstream. Before all this, I had not been that familiar with future-thinking or transitions, but during the past four years I have developed a true fascination for issues regarding long-term

sustainability. I even internalized some of the principles in my own way of living. Overall, I have experienced this period as motivating, inspiring and enlightening.

Although I am very grateful to a lot of people who contributed to this research as published in this book, there are three people I want to thank especially. First, my promoter, Professor Jan Rotmans. You gave me the opportunity to start my scientific career at DRIFT and develop myself as a researcher. Your blind confidence in me with regard to enhancing a rather unexplored area of scientific research made me feel responsible and motivated me to do my very best. You had trust in me from the very first to the very end, even at times when I became unsure about my own capabilities as a researcher. Your constructive criticism has always been a true motivation and eye-opener, especially during the final year when I started writing this book. This kept me going and even made it a satisfying and joyful period. Your perspective on science has been inspiring and taught me a lot about the rationale of combining theory and practice. Secondly, I am truly grateful to my promoter, Professor Jac Geurts. Initially you were involved in this research because you were fascinated by the subject and therefore acted as a guide from a distance. However, gradually your role became more prominent and in the end turned out to be decisive for the successful completion of this research. Your devotion to this research was unconditional and I cannot thank you enough for that. Hence, without your belief in me, your emotional support and your conviction that I could bring this research to a good end, I would not even be writing this preface to start with. I want to thank you for the time you invested in me, the patience you had with me and the opportunities you offered me to finish this thesis. For the future, I hope we can honour and continue the tradition of home visits which have always been insightful, motivating and inspiring, besides expressing a true welcome and offering beautiful surroundings to catch up at a more personal level. In the third place, I want to show my appreciation to TNO, and to Doctor Arnold Tukker and Doctor Rob Weterings specifically, who enabled this research to be carried out.

Finally, I want to show my appreciation to my family and friends for their support and belief in me, especially my mom, dad, sister and partner Bart who helped me keep things in perspective and who kept pointing out the positive aspects of this research period in relation to my personal development. Furthermore, they taught me that taking a pause from work is not by definition a bad thing but can help you free your mind and enables you to reflect, contemplate and develop new perspectives on reality. They showed me that there is more in life than work (although I enjoyed it fully) and that a certain balance between work and leisure needs to be preserved. For now, a period of leisure begins while new career challenges already linger in the near future.

Saartje Sondeijker
Rotterdam, summer 2009

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CHAPTER 1

Introduction and research aims

1.1. Times of sustainability

One thing about sustainability is univocally clear: moving towards sustainability entails a major leap, a long-term continuous process of structural change during which a system of society fundamentally changes (Rotmans, 2005). This axiom puts forward that transitions are necessary in dealing effectively with persistent societal problems. Transitions are processes characterized by recurring patterns of societal change in culture, structure, and practices.[1] Based on well-founded literature reviews (Gallopin et al., 1997; Raskin et al., 2002; Greeuw et al., 2000, cited in Berkhout and Hertin, 2002; Mannermaa, 2000; Millett, 2003), it is revealed that *new scenario methods are needed to envision such transition processes*. They are necessary in order to inspire and support long-term - and sustainability-oriented short-term action. In taking this statement as a starting point, this book must first and foremost be read as a *methodological exploration* of how we can envision the 'scope of the sustainable' for a societal system going through a process of transitional change, also referred to as ´transition scenarios´. Subsequently, but without serving the core focus, this book explores how we should envision future sustainability in such a way that it provides levers for informed short-term action.

We broaden the scale to a more global level for a moment to address the societal and scientific relevance of this research. While the concept of sustainable development has stimulated considerable debate on specific interpretations, it is clear that inherent in the notion is a concern for the long-range future over at least several generations (Gallopin, Hammond, Raskin and Swart, 1997). Our complex society deals with long-term persistent problems that threaten life on the planet. These problems are deeply rooted in our structures and institutions and there are no tailor-made solutions available for them (Dirven, Rotmans and Verkaik, 2002). The existing lack of possibilities for steering sustainability in relation to the rapidly changing societal environment forces us to structurally reorientate our thoughts and actions (Rotmans, Loorbach and Van der Brugge, 2005). Projections of trends may be legitimate over the short term, but not as time horizons expand from months and years to decades and generations (Gallopin et al., 1997). What seem to be promising or optimal choices in the short term might turn out to be sub-optimal or even destructive in the long term (Van Asselt, Rotmans and Rothman, 2005). In this respect, academics as well as managers in the field of transitions claim that methods are desperately needed to provide an imaginative framework for looking one or two generation ahead, enlightening and inspiring us with examples and ideas of how transitional change towards a more sustainable society can be encouraged (Gallopin et

1. Culture is referred to as the cognitive, discursive, normative and ideological aspects of functioning involved in the sense-making (following Geertz' (1973) interpretation of culture roughly) of practices. Structure is referred to as the formal, physical, legal and economical aspects of functioning restricting and enabling practices. Practices are referred to as the routines, habits, formalisms, procedures and protocols by which actors, which can be individuals, organisations, companies, etc., maintain the functioning of the societal system.

al., 1997; Raskin et al., 2002; Greeuw et al., 2000, cited in Berkhout and Hertin, 2002; Mannermaa, 2000; Millett, 2003). Phrased differently, short-term actions need to correspond with long-term sustainability, and new scenario methods are needed to help us guide the way. Not just visions that linger in the future, but scenarios that provide future stories as well as pathways from which short-term action can be inferred. Not just any kind of scenarios but transition scenarios, a distinctive type of scenario which is specifically developed with the expectancy to describe accurately the dynamics and complexity of sustainability transitions, e.g. in terms of trend breaks and discontinuities (Rotmans, Kemp and Van Asselt, 2001, cited in Berkhout, 2005; Rotmans, 2005; Wiek, Binder and Scholz, 2006). In this book, transition scenarios are defined as participatory explorations of possible long-term development trajectories that incorporate a structural systems change towards a desired, sustainable future state of the system (Sondeijker, Geurts, Rotmans and Tukker, 2006).

The current drawback of transition scenarios, however, is that although several fine attempts have already been made in the recent past to develop them, e.g. the VISIONS project (Van Asselt et al., 2005), the Energy Research Centre of the Netherlands (ECN) (Bruggink, 2005), the COOL project (Van de Kerkhof, 2004), the backcasting-experiments of Quist (2007) or as portrayed in the book *Great Transitions* (Raskin, Banuri, Gallopin, Gutman, Hammond, Kates, and Swart, 2002), these transition scenarios are still perceived as niches within the scenario world, because they lack a clear conceptual foundation and a solid method for development. Most importantly, practitioners experience that this prevents transition scenarios to accurately reflect theoretical claims concerning the pattern of transformative change in practice, therefore lacking levers to stimulate long-term oriented sustainability in short-term actions (Bruun, Hukkinen and Eklund, 2002; Marien, 2002; Brooks, 1986: 326; cited in Van Notten, 2005; Gallopin et al., 1997; Raskin et al., 2002). Additionally, it prevents transition scenarios from being developed at a large scale and in a consistent manner, put forward by the scarcity of and variety in transition scenarios already developed. With respect to the former, what is most problematic in our view is that some of these theoretical claims have already been made with regard to existing scenario practices (Gallopin et al., 1997; Raskin et al., 2002; Berkhout, 2005). However, this is not a guarantee for accurate translation into scenario practice (Van Notten, 2005). A comparative study of scenarios developed in the 1990s concluded that many scenarios have a business-as-usual character and assume that current conditions will persist for decades (Greeuw et al., 2000). This criticism is common. Bruun et al., (2002) argue that the overwhelming majority of scenarios can be characterized as conventional and trend based. Brooks (1986, p. 326 cited in Van Notten, 2005) argues that the problem is not that analysts have been unaware of the shortcomings of e.g. surprise free thinking, but rather that they lack usable methods to deal with it. These claims can be strengthened further by elaborating on this from a historical perspective.

It is the conviction of Raskin et al., (2002) that the first wave of sustainability activity, in progress since the Earth Summit of 1992, is insufficient to alter alarming global developments and onset so-called transition processes. Noble sentiments of sustainability have not yet been matched by sufficient policy commitments. The vision of sustainability has been a virtual reality superimposed on the real world. The broad goals express a powerful ethos for a more sustainable world. This is the stirring but intangible music of sustainability. Also needed are the lyrics and the dance - specific conditions and targets to concretize the goals and system innovations triggering new development directions to achieve them. A new wave must begin to transcend the palliatives and reforms that until now may have muted the symptoms of unsustainability, but which have not been able to cure the disease. According to Raskin et al., (2002) a new sustainability paradigm should challenge both the viability and desirability of conventional values, economic and institutional structures and social arrangements. It is claimed that new scientific methods and ways of thinking, acting and being are urgently needed (Bruun, Hukkinen and Eklund, 2002; Marien, 2002; Brooks, 1986: 326; cited in Van Notten, 2005; Gallopin et al., 1997; Raskin et al., 2002). Hence, the added value and aim of this book is to *explore and develop a concept and method for transition scenarios*, necessary to enable their potential to mature, in terms of quality and quantity. This is a means to an end: in essence, the ultimate goal for bringing sustainability to the real world is to foster transition processes by learning from transition scenarios. That is, describing promising journeys of transformative change towards sustainability, which can subsequently fuel the emergence of the will and force for gradually bending the curve of development toward a comprehensive set of sustainability targets.

An additional reason addresses the need for new scenario methods in the context of sustainability transitions. It is argued by several experts in the field of transitions (Kasemir, Jäger, Jaeger and Gardner, 2003; Rotmans, Kemp and Van Asselt, 2001, cited in Berkhout, 2005; Rotmans, 2005; Wiek, Binder and Scholz, 2006; Van Asselt et al., 2005) that scenario development is a method that is, in potential, well suited to explore transitions towards sustainability. The basis of such scenario development lies in surfacing weak signals that herald changes in society, anticipating trend breaks and identifying dynamic and complex patterns of change. It requires a unique combination of trends and events to initiate the onset of transitions, e.g. subsidies, network support, technology innovation, experiments and paradigm shift. Scenario development, by creatively envisioning such combinations, is one of the few methods that offer the opportunity to prepare us for transitions. However, within practical transition processes the use of these methods is still rather limited. This is because the scenario world is still dominated by the more conventional scenarios, which have proved to be useful in mid-term strategic (re) orientation, e.g. in the business community. In this context, writing and using scenario methods has become accepted and documented. With 'conventional scenarios' we refer

in this book to first and second generation scenarios (See Chapter 2) which have been functional in policy making since 1940 and which are still the basis of (ongoing) third generation scenarios which emerged in 1992 as a reaction to the alarming attention for global sustainability. These scenarios, however, have the aim to predict the future based on a linear understanding of processes of change. The axiom is that this is simply an inappropriate representation of reality and thus misleading rather than enlightening. Hence, this type of future exploration is becoming more and more problematic these days. Since the initiation of the sustainability wave in 1992, practitioners experience that these scenarios lack the capability to reflect accurately on the increasing complexity in the context of long-term sustainability transitions (WCED, 1987; Raskin et al., 2002; Inayatullah, 2002). This is because sustainability suggests that prospects for disruption, discontinuities, surprises and shocks are increasingly in evidence. Accordingly, there is nowadays a strong emphasis on and belief in the contribution of foresight activities to shaping rather than predicting and controlling the future. Subsequently, the claim is made that within third generation scenarios new and better approaches need to be developed that can merge in with this new perspective on foresight. Therefore, in contributing to the enhancement of third generation scenarios, experts in the field of transitions propose that adjustments in prevailing scenario methods are necessary when used for fostering transition processes (Rotmans, 2005; Elzen, Geels and Green, 2004; Berkhout, Hertin and Jordan, 2002; Albert, 2008; Elzen and Hofman, 2007; Verbong and Geels, 2008).

This study faces this challenge by going through and documenting a process of learning-by-doing and doing-by-learning with the optimism and confidence that we can contribute to a grounded method for transition scenarios. This seems rather instrumental in the sense that when the method enables the development of relevant transition scenarios, sustainability is automatically reached. However, we do realize that society can never completely be controlled in any way and that transition processes are a civilization offensive and a battle. On the other hand, since society can be influenced, we do aim to discover new ways to accelerate processes of transitional change towards sustainability. The method that we present, TRANSCE (TRANsition SCEnarios), builds on existing scenario methods but adds new elements. Through this integration it provides a new concept for scientific research and a method for scenario practice. TRANSCE is presented in this book as a new type of scenario development. It offers a generic method to create and visualize desirable and inspiring images of sustainable future systems accompanied by guiding pathways of structural change. With this method we aspire to combine the best of several worlds and to develop scenarios that possess and balance multiple features: long-term and short-term, realistic and desirable, process and content and explorative and normative.

But how do we get there? First of all, we aim to explore more precisely what should be understood by the term 'transition scenarios' in the context of transition processes. It is a means to develop a first characterization of this type of scenario development. Subsequently, we address the necessary improvements of transition scenarios by comparing them to conventional scenarios. Based on this we offer a set of distinct content and process criteria for the development of transition scenarios, as well as a practical method, which we have labelled 'TRANSCE'. The method comprises a logical and iterative flow of essential design and discussion activities associated by techniques to stimulate and focus these activities. These steps provide material for and add up to a number of narratives about systems that are going through a process of transformative change towards sustainability. The design objective of TRANSCE does not lie, as the more mainstream scenario methods do, in being plausible or realistic. Instead it lies in trying to inform and inspire sustainability-oriented short-term action by generating a sense of urgency. The process of development, fuelling a mindset change, is therefore more important than the realism or feasibility of the actual scenarios that result. This ambition of influencing short-term action has to be a modest one, as the audience reached by a process of scenario development will naturally be limited in size and location, whilst not being the only ones in society trying to defy their fate. Furthermore, in processes of complex change there will always emerge surprising determinants of change, e.g. unanticipated influences, external costs and resource problems that complicate the road towards sustainability. We do, however, claim to have taken the first scientific and methodological steps towards a new practical method of scenario development that can reach many different audiences. It is applicable to a wide set of societal contexts and content areas. It can accommodate many different groups, organizations, stakeholders, experts and agencies. It generates ideas for relevant sustainable action and develops the networks needed to implement these actions.

In the following section we elaborate on the various research strands within which this study is embedded.

1.2. Foresight and transition science

Society has contemplated its future for centuries as commented on by classical works such as Thomas More's *Utopia* (1516), Edward Bellamy's *Looking Backward: 2000-1887* (1887) and Aldous Huxley's *Brave New World* (1932). Also Sprengler, Rousseau, Nostradamus and Marx are historians associated with this search for the future. In the last century, the field of future studies has become very diverse and fragmented. Terms like foresight, futurology, futures research, prospective analysis and future studies refer to the research

of future-oriented issues. The distinctions between the terms are often ambiguous; therefore we do not express a preference for one term over another, partly because we have no interest in joining the semantic debate. For the purposes of consistency in our research, we use the term 'foresight' to refer to the "serious" (i.e using scientific methods and criteria and/or insights from scientific research) study of the future. Foresight can be defined as: the process of developing a range of views of possible ways in which the future could develop, and understanding these sufficiently well to be able to decide what decisions can be taken today to create the best possible tomorrow (Horton, 1999).

Foresight as *a field* originated in the early 20th century, intertwined with the birth of systems theory in science, and with the idea of national economic and political planning. The emergence of foresight as *a scientific discipline*, however, occurred after World War II. Differing approaches arose in Western Europe (French spatial planning at DATAR), in Eastern Europe, in the post-colonial developing countries, and in the United States of America (US Military strategic planning at the RAND Corporation) (Bell, 1997, Masini, 1993). Early signs of this scientific interest in the future can be traced back to H.G. Wells' article in Nature (1684). According to first-generation futurists like Herman Kahn, Olaf Helmer, Bertrand de Jouvenel, Dennis Gabor, Oliver Markley, Burt Nanus, and Wendell Bell, foresight emerged in the mid 1960s when General Electric and Royal Dutch/Shell introduced foresight techniques to their corporate planning procedures (Bell, 1997). Herman Kahn's work at RAND and the Hudson Institute (Kahn, 1961; Kahn, 1962; Kahn, 1973; Kahn and Wiener, 1967; Aligicia, 2004) arguably laid an important foundation for modern study of futures-oriented issues. As the history of foresight methods will be discussed in Chapter 2, we only discuss here the paradigm shift that has proved to be the reason why we now believe new methods for scenario development are necessary.

The discussion on the intersection of population growth, resource availability and use, economic growth, quality of life, and environmental sustainability — referred to as the "global problematique" — came to broad public attention with the publication of *Limits to Growth*, a study sponsored by the Club of Rome (Meadows, Meadows, Randers, Behrens, 1972). This international dialogue became institutionalized in the World Futures Studies Federation (WFSF), founded in 1967. Since then, principles and morals like sustainability and globalization have started to receive considerably more attention in future explorations. In the context of foresight, sustainability has proved to be a strong normative frame of reference to develop and discuss collectively new knowledge that can serve as a future orientation. Consequently, the need for improvements in the more conventional foresight approaches became apparent (See Section 1.1.). The experience of scenario practitioners was that the accuracy of projections should no longer have priority. Rather, future explorations should aim to provide an imaginative systematic framework to draw out, challenge and refine knowledge about the future (Raskin et al., 2002).

In this respect, two recent developments in which this research embeds itself and which it builds on are worth mentioning. First, a new, more agile and resilience focused approach of foresight is currently arising. An approach in which searching for and anticipating emerging trends, tipping points and weak signals are considered vital intelligence tools to prosper in an ever more complex future. This approach is relevant for this research because it emphasizes the relation between complexity and future development. It aims to make complex societal problems understandable in order to speculate about their possible future development. Only by anticipating on the likely future unravelling of current complex and dynamic patterns of change, does it become possible to disentangle some of the secrets and discontinuities of the future. Several cognitive skills are important here: (1) Trend assessment: the competency to understand trend directions, weak signals and wildcards, assess their likely impact and effect on one another and respond in a timely and appropriate manner (2) Pattern recognition: the ability to see patterns between conjectural developments, structural developments and events rather than considering them separately (3) System perspective: the capability to envision the entire system rather than the isolated components (4) Anticipation: to anticipate patterns of change, novel situations and short and long term consequences over time (5) Instinct and logic: to rely on a combination of instinct and logic rather than purely rational analysis (www.wikipedia.org/foresight).

Secondly, *adaptive foresight* is currently being developed at the crossroads of foresight and adaptive strategic planning. It is 'adaptive' with respect to the need for making foresight an iterative monitoring and learning process to adjust scenarios, underlying conditions, goals and system innovations at different levels to actual developments in reality. This research tries to build on this notion by embedding the development of transition scenarios in transition management (TM). TM is a systemic approach, postulated as a new governance model which is concerned with steering and coordinating large-scale system innovations towards greater sustainability (Rotmans et al., 2001; Loorbach, 2007). It aims to do this by creating micro-level initiatives that will structurally transform currently dominant institutions through a process of scaling up (Rotmans, 2003). From that perspective, transition scenarios foster an overarching direction and focus for initiating these micro-level initiatives. Moreover, they provide a long-term perspective as an orientation for short-term action. To clarify this last notion more specifically, we refer to Chapter 3. Adaptive foresight stresses that forward-looking exercises should, besides anticipating on future developments, also deliver insights into possible strategies and system innovations for collective and individual actors on how to 'change course' and direction. They should at least enable to think 'out of the box' with the purpose of developing new initiatives that can scale up and set a new direction for more sustainable change (Eriksson and Weber, 2008). This is without doubt relevant for this specific research because we address the question how we should envision future

sustainability in such a way that it inspires, supports and provides levers for informed long-term and sustainability-oriented short-term action.

Another relatively young discipline that is of interest with regard to this research topic is that of Sustainability Science (Kates, Clark, Corell, Hall, Jaeger, Lowe, McCarthy, Schellnhuber, Bolin, Dickson, Faucheux, Gallopin, Grubler, Huntley, Jäger, Jodha, kasperson, Mabogunje, Matson, Mooney, Moore, O'Riordan and Svedin, 2001; Kasemir et al., 2003; Clark, Crutzen and Schellnhuber, 2005). Stemming from the field of science and technology, sustainability science integrates those developments within scientific disciplines that deal with sustainability issues. This work is increasingly done in cooperation with stakeholders and practitioners. Without being identical to foresight, sustainability science proceeds along parallel lines of analysis, action, participation, policy and monitoring in an adaptive real-world experiment. To be trustworthy, knowledge must be rooted in scientific rigor. To be trusted, it must reflect social understanding (Raskin et al., 2002). Sustainability science mainly refers to the field of global environmental and sustainability research but also reflects a development in science towards more multi- and interdisciplinary research related to complex societal issues. With the goal of integrating practical and scientific knowledge, it redefines the role of research, researchers and stakeholders at an abstract level. This is relevant for transition research, since the ambitions behind both approaches are similar: scientific and societal impact based on an active and participatory role of researchers and stakeholders. The grounds and motivation behind participatory methods in policy research such as foresight and sustainability science are that the knowledge generated can be translated into practical solutions. This is assumed to be made possible during the development process. The knowledge generated can become internalized, which enhances the chances for its actual use in practice. The participatory axiom behind transition research in general and TRANSCE in particular is that the knowledge creation regarding desirable future systems will lead to new insights into the nature of the problems and the underlying causal mechanisms. This in turn will offer participants energy, freedom and space to come up with new directions for solutions to persistent problems. These insights form the prelude to a new way of thinking, which provides the basis for alignment, enrolment and mobilization of collective action necessary to initiate and maintain sustainable system innovations (Rotmans et al., 2001, cited in Berkhout, 2005; Rotmans, 2005). In short, it is a means to develop rich and inspiring knowledge about sustainable futures as well as to convey its underlying agenda for action.

A new paradigm for transition science is arising. Transition science gradually established itself as a multi -, inter- and transdisciplinary approach towards analysing, describing and explaining transitions and system innovations. It entails elements of post-normal science, integrated assessment, complex systems science and sustainability science. Al-

though it relies on the same notions as sustainability science with regard to its research qualities (i.e. multi- and interdisciplinary research in relation to complex societal issues, dealing with sustainability issues as a normative framework, the input of knowledge and expertise of non-scientists), transition science holds the assumption that sustainability can only be reached through a process of structural systems change. Based on this understanding, transition science does not refer to the field of global environmental development, but instead deals with sustainability issues for *societal systems* like energy, mobility, care, spatial planning and construction. Two aspects of transition science are particularly relevant for this research. (1) Social learning, referring to developing, in interaction with others, another viewpoint of reality (Rotmans, 2005). This is supposed to be crucial for the development of transition scenarios because neither the desirable future state of a system nor the pathways that guide actions towards this are unequivocally known a priori. The distinguishing feature of the development process of transition scenarios is that they are common searching and learning processes, where participants jointly try to find shared notions on future sustainability and associated pathways. (2) Complexity and uncertainty, referring to the fact that patterns of transitional change have various determinants which repeatedly and reciprocally influence each other and therefore cannot be studied in isolation. Co-evolution is the result, meaning that several determinants of transitional change can reinforce each other and jointly lead to an irreversible change in a system. In the midst of this there are uncertain developments in the form of surprises, weak signals and discontinuities which are in fact expressions of the complexity (Van Notten, 2005). Unravelling and structuring complexity and uncertainty are supposed to be important elements for transition scenarios since they are used for triggering a structural systems change towards sustainability.

1.3. Focus of the book

The research described in this book aims at representing the dynamics and complexity of a transition process in scenario development. This research is primarily conducted at the crossroads of foresight and transition science. It is argued that the methods used in foresight and transition science have hardly been reflected on (Dammers, 2000; Ester, Geurts and Vermeulen, 1997; Van der Staal and Van Vught, 1987), especially as instruments for envisioning and informing processes of societal change towards sustainability. The use of scenario methods in processes of transformative change is rather limited. One reason lies in the fact that transition experts experience that prevailing scenario methods seem less suited to explore such radical and societal changes. Several of these methods, such as trend-extrapolation, delphi-exercises, cross-impact analysis, simulation, prospective methods and technological forecasting models (Khakee, 1999), have proved to be

particularly appropriate for exploring relatively stable patterns of development (Elzen, Geels, Hofman and Green, 2004), assuming that dominant elements of a system do not develop in a discontinuous way and actors do not change preferences. Furthermore, literature about first and second generation scenarios (See Chapter 2) reveals that little attention is paid to the actions of actors such as strategic moves, anticipating weak signals, forming of coalitions and social-learning processes, all these being especially relevant within transition processes (Schoemaker, 1993; Ringland, 2002; Khakee, 1999).

These shortcomings in existing scenario methods are recognized and various recent studies have sought to remedy them in the light of the sustainability challenge. An example is the VISIONS project as mentioned in the first section, making a valuable contribution to scenario methods in the light of transitions towards sustainability. The VISIONS project served as an experimental garden in which process designs, approaches, methods and tools for envisioning the future could be created and tried out (Rotmans, Van Asselt, Anastasi, Greeuw, Mellors, Peters, Rothman and Rijkens, 2000). This project contributes to a better understanding of the interrelationship of various socio-economic, environmental and institutional processes. Another example is the COOL project, which had the objective to develop strategic notions on how to achieve drastic reductions in greenhouse gas emissions in light of future sustainability in the Netherlands, embedded in a European and global context by using a participatory approach (Van de Kerkhof, 2004).

Purpose of this study is to build on these and similar findings in order to let these initiatives evolve beyond the experimental phase and to provide a methodological basis for a more solid and consistent large-scale scenario practice in a transition context. Accordingly, in developing a method for transition scenarios, we heavily relied on knowledge that was already out there. We chose to focus primarily on *methodological aspects* of scenario efforts related to foresight and transition science. This in order to gain insight into prevailing practices on which we could build as well as to address shortcomings with regard to envisioning transition processes. By 'methodological aspects' we refer to characteristics of scenarios which are reflected in the underlying method for development: the aim, the process design and the analytical content of the scenarios. Our reasoning behind focusing on and heavily relying on methods already out there instead of starting from scratch, coincides with existing scenario literature (Bruun, Hukkinen and Eklund, 2002; Marien, 2002; Brooks, 1986: 326; cited in Van Notten, 2005; Gallopin et al., 1997; Raskin et al., 2002). Herein, it is addressed that scenario methods need improvements in the light of sustainability and transition processes e.g. in terms of integration, system level, use of discontinuities etc. Simultaneously, many practitioners today argue that a balance of existing scenario methods is desirable and that efforts should be made to establish better links between them (Greeuw, Van Asselt, Grosskurth, Storms, Rijkens, Rothman, and Rotmans, 2000, cited in Berkhout and Hertin, 2002). This argument is

common. Mannermaa (2000) argues that we need new methods for understanding our world deeply enough to make well-argued scenarios of the future. In line with this reasoning, the next great challenge in Millett's (2003) opinion is to stimulate synthesis in existing definitions and methods of scenarios into a new composite approach. He believes that conventional scenario methods are ready to evolve to the next level of development. Scenario methods have been practiced for more than 30 years with many marginal improvements but no radical revision. Millett (2003) argues that the next generation of scenarios should not only develop new methods but also combine previous methods and actually blend them into a more comprehensive methodology. This is at the core of this book.

In conclusion, we chose as the centrepiece of our research the development of a scenario method which is used for envisioning the complexity and dynamics of transition processes. In ensuring that this scenario method theoretically as well as practically satisfies this aim, we explored in view of this the necessary distinctive process and content criteria underlying the method, which together form the concept of transition scenarios.

1.4. Framework of the book

1.4.1. Research objective

The research described in the current thesis seeks to contribute to the establishment of a scientific and methodological basis for the concept of transition scenarios, in the context of sustainability science and foresight in general and transition theory in particular. By doing so, we aim to help emerge long-term transition processes with perspectives on structural change processes towards sustainability. These perspectives offer an overall framework along which short-term actions can be set out. Also, the process of scenario development aims to generate a change in the mindset of participants involved. In line with these objectives the following basic question guides this research:

What characterizes transition scenarios and which method can be exercised to develop such scenarios?

This central question can be specified in several sub-questions:

Exploratory Research

1. What type of scenarios seems to be necessary in transition processes?
2. What is the state-of-the-art in scenario methods and how can transition scenarios be positioned herein?
3. What seem to be promising qualities and shortcomings of conventional scenario methods when used in transition processes?
4. To what extent is there a need for transition scenarios and a new method to develop them?

Theoretical Framework

5. What are necessary content and process criteria for transition scenarios?
6. What functions can transition scenarios fulfil in transition management processes?

Empirical Research

7. Which method can be applied to develop transition scenarios that fit the criteria?
8. Has TRANSCE achieved an adequate and promising level of validity, robustness and utility to support further improvement of the method in the future?

The questions are visualized in a scheme (See Figure 1.1), explaining the interaction between the questions and presenting the line of research. The remaining sections elaborate on this in more depth. The set-up of this research is outlined by elaborating on the research methodology and the research design. In doing so, it is addressed how we aim to answer the research questions presented in this thesis and what scientific research phases of enhancement are consecutively followed.

1.4.2. Research methodology

Our ultimate goal is to develop a method for transition scenarios. Like in most scientific research projects, the steps taken that eventually lead to this goal are not sequential but characterized by iteration between theory and practice (Bell and Newby, 1977, cited in Giddens 1993, 679). The research presented in this book has been a parallel process along two tracks: (1) An analytical and deductive process of theory development leading to a *concept for transition scenarios* and (2) a more inductive and empirical process from which insights emerged that contributed to the *method for transition scenarios.*

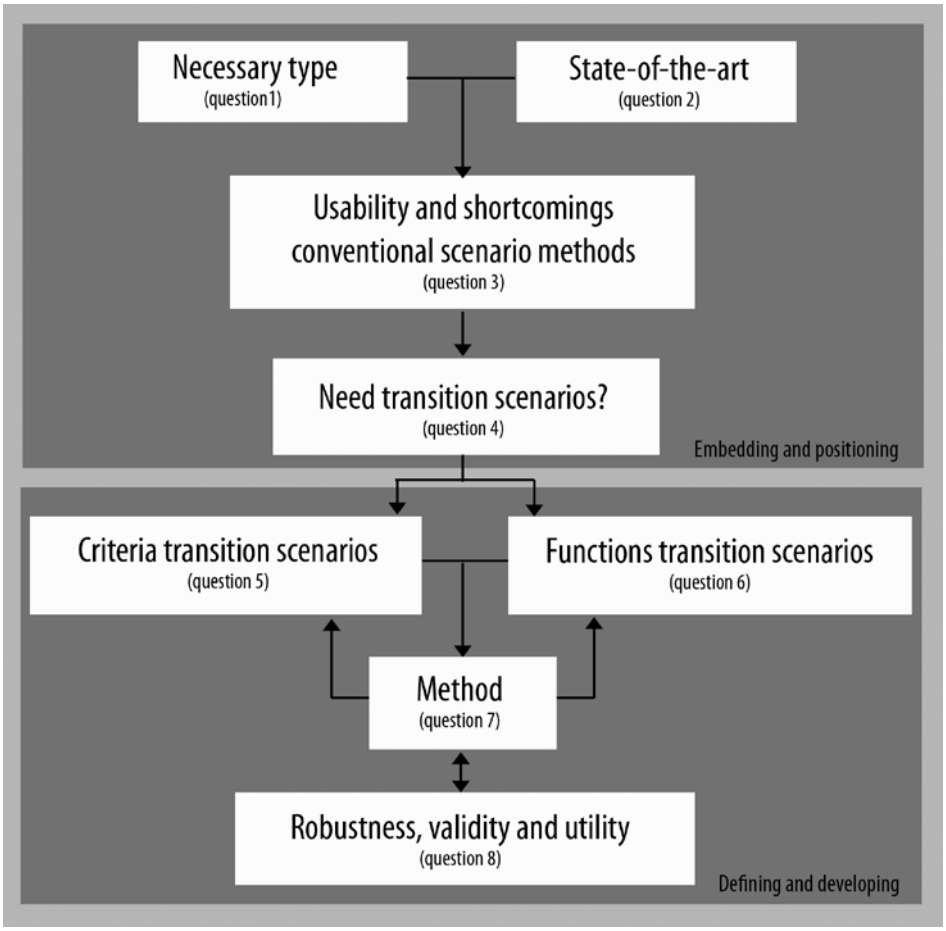

FIGURE 1.1 - *Interaction between research questions presenting the line of research.*

The method was partly derived from theory before it was exposed to empirical testing. Also, our empirical case studies led to adjustments in and refinement of the theoretical concept of transition scenarios.

This research can be divided into three different parts: an explorative part, a theoretical part and an empirical part. At the beginning of this research, several sources in the literature had already addressed the need for new scientific methods in the light of sustainability goals (Gallopin et al., 1997; Raskin et al., 2002; Greeuw et al., 2000, cited in Berkhout and Hertin, 2002; Mannermaa, 2000; Millett, 2003). However, to our knowledge there has been no scientific investigation into what transition scenarios are and how they can be developed. In addition, we conclude that we face the challenge of developing a distinctive type of scenario which was, at the start of this research, far

from comprehensible with regard to its specific meaning, function and application. Accordingly, we argue that a theoretical basis for transition scenarios is necessary and more significant for this research than trying to formulate a hypothesis with a view to falsification. Consequently, the first steps in the research have an *explorative character*, aiming to develop theoretical notions around the concept of transition scenarios rather than to test ones. These notions arose from the first four questions of this research (See Figure 1.1). A comparative literature review was conducted on conventional scenario development and the dynamics and complexity of transitions. Since our aim was to enhance third generation scenarios, the literature review focused on conventional scenario methods still effective in this generation. Moreover, we did not aim to judge the output and use of third generation scenarios. Instead our focus was on comparing whether and how transition dynamics and the advancing of transition processes are addressed in conventional scenario methods, opposed to how transition literature reveals that the dynamics and complexity underlying transition processes can and should be addressed in scenario methods. It provided insight into the aspects of contemporary scenario methods that we could build on, in terms of integration and synthesis, and into the shortcomings that asked for adjustments and innovations. As a result, transition scenarios were characterized as a distinctive type of scenario development, grounded in as well as opposed to conventional scenarios. The ultimate aim of this explorative phase was to distil a plan for the development of a conceptual and methodological basis for transition scenarios.

This provided the basis for the *theoretical part* of the research (See Figure 1.1: research questions 5, 6 and 7), which directed us to the establishment of a scientific and methodological basis for the concept of transition scenarios. In this phase we defined transition scenarios more accurately, after which we translated the distinctiveness of transition scenarios, in terms of required improvements in conventional scenario methods, into a first rudimentary concept for transition scenarios. The concept exists of content- and process criteria which underlie the eventual method that was developed and which depict desirable outcomes of a development process for transition scenarios. The former are related to the characteristics of the contents of the actual transition scenarios. The latter can be seen as intended cognitive and/or behavioural changes resulting from social learning and consensus seeking (without the hope and guarantee that this will succeed) throughout the scenario development process. Put differently, by progressing through the development process, engaged participants gain (and collectively develop) new insights into the nature of problems and their underlying patterns. They acquire and internalize ordering mechanisms to deal with and anticipate the dynamics and complexity inherent in transition processes. As it would be a loss of all the obtained knowledge and energy not to try and put these learning experiences into practice, we subsequently

made an effort to investigate if the development process of transition scenarios, from the long-term orientation that they offer, can provide a function in inspiring, informing and stimulating short-term actions. Accordingly, we considered if transition scenarios can have a function in transition management (TM). Hence, literature about the cyclical transition management framework was revised. It was explored how the development process of transition scenarios could be embedded in this framework, enabling the downscaling of strategic transition scenarios into operational and short-term innovations and experiments. After this theoretical phase, the time had come to actually start developing transition scenarios in practice.

This is where the *empirical part* came in (See Figure 1.1: research question 8). Besides using and putting together all the knowledge gained throughout the explorative and theoretical part, we used additional empirical insights from a case study to develop further the initial concept of transition scenarios into a consistent classification of criteria and construct a prototype that could function as a method for the development of transition scenarios. We subsequently tested, evaluated and adjusted this concept and method in several case studies. The following section will explain these case studies and their roles in relation to the main research question in more detail.

Overall, the aim of this research was not to invent the ultimate scenario method or develop the ultimate transition scenarios. As both concepts were more or less non-existent in the beginning of this research, our ambition instead was more based on discovering and had an explorative nature.

1.4.3. Research design

Within this section, the research methods underlying the research methodology will be explicated (See Figure 1.2). As mentioned in the foregoing section, the explorative and theoretical part of this study builds on comparative literature reviews, leading to an initial theoretical concept of transition scenarios and a first rudimentary design of a method for development. The empirical part builds on case studies, in which various practical experiences lead to the further development and repetitive refinement of the concept and the method for transition scenarios. The foregoing section explained in-depth what the literature reviews include; on what specific literature we relied, for what purpose it was used and to what outcomes it led. This section deals with the case studies involved in the empirical part of this research.

Case studies are an important method in social science research. In general, a case study is used to illustrate, validate or explore theoretical concepts and hypotheses. In

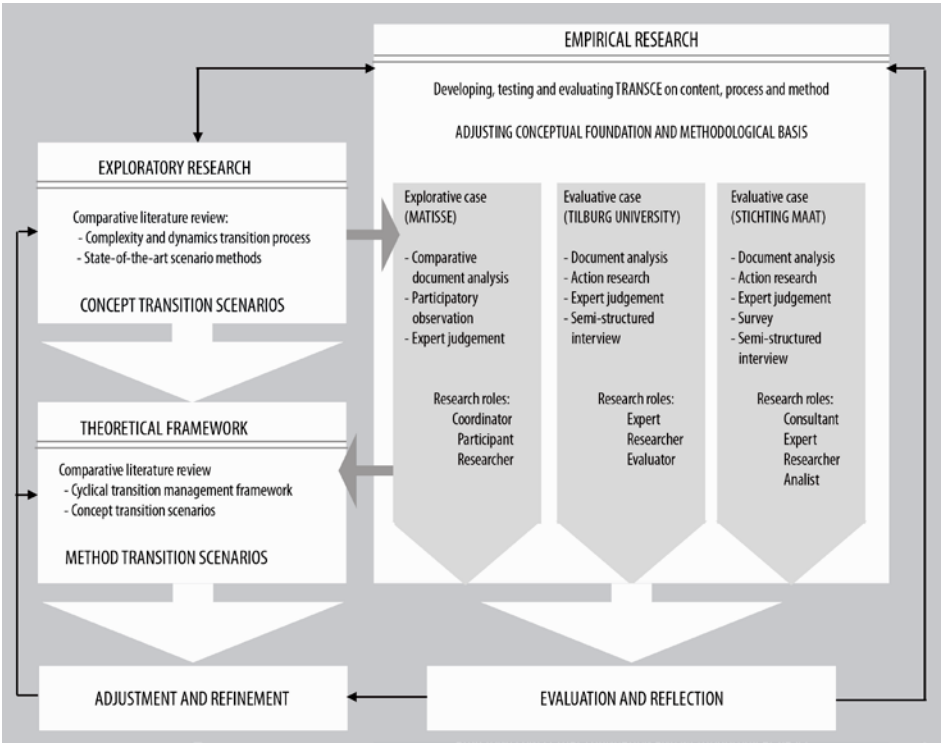

FIGURE 1.2 - *Research methods underlying the research methodology.*

social sciences, case studies are predominantly qualitative: they are used to describe, understand and explain certain phenomena (Yin, 1984). In the context of transition studies, however, case studies can never only be seen as such. Case studies are also the place where research findings can be transferred to practice and where new insights for theory are found. Case studies, or in general applied projects, are therefore an essential environment for transition researchers to be active in. Accordingly, Flyvbjerg (2001; 2006) argues that a case study can provide a fertile soil for serving the process of theory development. The case studies within this research serve exactly that purpose. Central in the case studies is the repetitive testing, refinement and empirical validation of the method for transition scenarios. The first rudimentary version of the method was developed 'on paper'. The concept of transition scenarios, which originated based on the exploratory and theoretical part of this research, has laid the foundation for this and was leading for its design. The concept of transition scenarios is, amongst other things, used as a point of reference for evaluating the method, since it addresses the required innovations of transition scenarios. In doing so, it ensures the enhancement of the method based on practicing the theoretical claimed novelties.

This book reports on three consecutive case studies that all had the aim to develop transition scenarios and thereby support the further development of the concept and method underlying TRANSCE.

The first case study had an explorative function. As mentioned before, at the start of this case study we did not have a fully-fledged concept and method yet and we used the empirical insights together with our initial theoretical concept of transition scenarios to 'complete' a first consistent version of the concept and method underlying TRANSCE. The approach could be marked as learning-by-doing and doing-by-learning. The MATISSE case was used to pursue this goal. This case study offered the right context for this first explorative phase of the research, since the central aim of the case itself was to search for, explore and develop tools and methods that could assist long-term sustainable policy making.

The latter two case studies had an evaluative function in terms of fine-tuning, the second still having an experimental character, however, while the third was more systemic. At the start of the second case study we had, in principal, a consistent method that we could implement and test. However, it was the first time TRANSCE was going to be practised and we took into account the possibility that implementation could lead to surprising outcomes. Hence, we chose a case study with a context in which we could test TRANSCE while reducing the consequences of potential failure. In this respect we used master students at the University of Tilburg who were already familiar with scenario development. For their studies, they followed the course 'The Strategy Process' in which one of the aims was to gain theoretical and practical experience in future thinking. Our goal in this and subsequent case studies was much more fixed than in the preceding one. From now on the application and evaluation of each subsequent case study was meant to adjust and refine the method based on a comparison between the theoretical concept of transition scenarios and the outcomes of the method. In particular, each iteration was meant to increase the added value of the method in practice in terms of the resulting transition scenarios as well as of the learning experiences of the participants engaged in the development process. In addition, empirical findings did not only lead us to adjust the method but also pointed out the shortcomings in our concept (See Chapters 6 and 7). By the time we had arrived at the third and final case study, we felt the method was valid and ripe enough to be tested in a real policy context with genuine societal and long-term ambitions in the light of sustainability. We aimed at the development of transition scenarios with/ for a client organization with the ambition to learn more about the implications of transition processes and to use transition scenarios as a means to discern short-term policy. We ended up developing transition scenarios with Stichting MAAT. After this case study we shortly discussed the need for a fourth case study. However, since we experienced that with each subsequent iteration the lessons learned were less fundamental and contributed only marginally to adjustments in the

concept and method inherent in TRANSCE, we decided to summarize our study relying on three case studies. All the more since we had been able within these three case studies to test TRANSCE in a variety of contexts in terms of participants, time frame, sectors, domains etc. which for that reason contributed to its generic value. In addition, since TRANSCE is a method which takes about half a year to carry out, there was not much time left within our research to practice TRANSCE for a fourth time.

The cases were dependent on one another. The lessons learned and the suggested refinements for concept and method that resulted after each case study, were a starting point for the following case study. In the beginning of this research we had a general idea about the relation between the case studies and their individual aims in terms of their contribution to answering our main research question (See Section 1.4.), but this general outline was adjusted and refined as the research proceeded. This can be traced back in Chapters 5, 6 and 7.

These case studies had different roles - developing versus testing – and so, the character of the research conducted within the cases developed accordingly. The first case study was dominated by participatory observation, while the latter two case studies were dominated by action research. Our cases were clearly 'participative'. Dissatisfied with sociological research that seemed increasingly detached from the subject of study, and even from society itself, and driven by the ambition to change society for the better based on scientific insights, researchers have been engaging more and more in participatory research processes (Zuber-Skerrit, 1991:2; as quoted in (Masters, 1995)). While many scientific disciplines (such as policy sciences) often shy away from normative approaches, transition research makes this ambition explicit (Greenwood and Levin, 1998). Based on the assumption that any type of research related to society can never be fully objective, transition research is explicit about its aims, and ensures that the research process itself is as structured and transparent as possible. The *degree of participation* by the researcher varies with the aim of the case study. In the first case study our aim was to learn how a transition scenario could be developed and we observed sessions within the MATISSE case. We had some preliminary theoretical ideas about what the eventual transition scenarios should look like and we fed the process with these pre-conceptualized notions. However, our primary goal was to be as open and accurate as possible in our data gathering process, influencing the development process ongoing in the case study as little as possible. Therefore, our role in this case study was that of participant observer, instead of dominating or determining the development process. In the two case studies that followed the orientation was different, more comparable to action research. Action research is also participatory by nature, but the researcher is more actively involved. The case studies provided a setting in which TRANSCE could actually be applied and experimented with. After initiating the two case studies ourselves, we used the generic

steps inherent in TRANSCE to determine the course of the development process. We subsequently prepared and organized the workshops that were part of this development process. The approach here was thus more influential, structured and focused. The intention was to evaluate if the method that we designed actually approached our theoretical concept of transition scenarios. If not, what parts of the method we should adjust or refine.

Elaborating on action research from a more societal perspective, we can say it redefines the role of researcher into facilitator and educator (Greenwood and Levin, 1998). Scientific knowledge and practical experience are linked to help practitioners deal with imminent problems and to contribute in general to the improvement of society in practice. This coincides with the main purpose of transition scenarios. Action research thereby involves a criticism of conventional academic practices and methods which first and foremost try to study social phenomena without trying to influence and adjust them. Within this study, action research was a means for translating meaningful information and learning experiences evolving from the interaction between transition researchers and practitioners into new theoretical ideas and generic knowledge regarding the concept and method of transition scenarios. This reflexive component set this research apart from action research, in which theory development in itself is not a goal. TRANSCE was initially based on a theoretical idea but it really developed in operational case studies. Deduction and induction were parallel tracks in this study, leading to a gradually emerging generic method. For example: theoretically it seemed necessary to formulate different types of uncertainties to guide more anticipative thinking. The answers as to how this could be initiated in discussions or translated into concrete techniques were primarily based on practical experience and systematic reflection hereupon.

To sum up, this research embraces theoretical and fundamental as well as applied and participatory research approaches. The iteration between the two led to the emergence of a coherent concept and method. It implies that this research is transdisciplinary. The presented concept and method are heavily influenced by and co-produced with societal actors in real-life policy-making processes. It is interdisciplinary in the sense that integration of insights from different theoretical scientific fields (complexity, scenarios and sustainability) contributed to a coherent new theoretical concept and method. The following subsection will introduce the case studies used in this thesis more in depth.

1.4.4. Case studies

This thesis deals with three different case studies: MATISSE (Chapter 5), University of Tilburg (Chapter 6) and Stichting MAAT (Chapter 7). They are used in response to re-

search sub questions 5, 7 and 8, each serving a different goal. This is because a variety of data evolving from the development process had to be to be evaluated in order to test and refine the concept and method underlying TRANSCE adequately: [1] *Content*: the contents of the resulting transition scenarios, [2] *Process*: the cognitive and behavioural changes resulting from the involvement in the development process, [3] *Method*: the contribution of the generic steps in TRANSCE to the eventual transition scenarios. Since we anticipated that not every case study would provide us with sufficient time and resources to evaluate all three forms of data, we had to make a selection. As for complementing one another, the premise was that each case study should at least account for one of the three evaluations, leading overall to an entire evaluation of TRANSCE.

Each case study will be addressed separately, first explaining the aim of the project, then describing how we as researchers used this context as a case study for scientific research aims (See Figure 1.2). The case studies are described below based on how we intentionally tried to evaluate the outcomes. Contextual and practical circumstances along the way sometimes forced us to alter our intentions slightly. These alterations can be traced back in Chapters 5, 6 and 7 respectively.

The first case study was the MATISSE case, running from 2005 till 2008. It aimed to achieve a step-wise advance in the science and application of Integrated Sustainability Assessment (ISA) of EU policies. In order to reach this objective, one of the core activities of the MATISSE case was to improve the methods and tools available for conducting ISA. In this regard, narrative transition scenarios were developed for Europe as a whole in the year 2030. The MATISSE case was partly format-driven, meaning that certain conditions had to be met with regard to the form and structure of the transition scenarios (e.g. scope, subject matters, grounding, time frame). In terms of our roles, our actions did not go further than researcher, coordinator, participant and analist. With regard to this thesis, the case study provided the opportunity to participate in the workshops in which the transition scenarios were developed. It offered the possibility to learn from the knowledge of the participants involved and from the resulting transition scenarios. Together with our own initial theoretical concept, a first consistent classification of relevant content criteria for transition scenarios and a methodological format for TRANSCE were deduced. This case focused primarily on the content of the transition scenarios.. The basic research methods used were document analysis, participatory observation and expert judgements. The participants in the workshops came from various backgrounds (sustainability, models, scenarios, environment) and were all experts in the field of transitions. Throughout the development process they took part in developing, commenting on and validating the transition scenarios. Knowledge and expectations of how the transition scenarios should evolve and what elements should be included were not only shared during the workshops but also in a more bilateral setting (with us) via

e-mail and telephone conferences. In conclusion, this case study was explorative and inductive since we used empirical data and practical experiences to feed the (partly) existing theoretical concept and method of transition scenarios. We constructed a first version of TRANSCE that seemed mature enough to test in subsequent case studies.

The second case study involved a hundred and twenty-five master students with a background in organizational science, who were following the course 'The Strategy Process' at the University of Tilburg. The focus of this course is that of applied science, as its ambition is to illustrate the practical relevance of strategic process management tools, like scenario development. Within the course, groups of students are formed, consisting of five students each. Each group is linked to an existing organization (e.g. Coca Cola, Philips, Nike, Océ etc.) and has to help this "client" deal with short-term problems in view of long-term transformative and sustainability issues (Further elaborated in Chapter 6). The students take on the role of consultant and have to develop relevant strategy processes for the problems at hand within these organizations. These strategy processes are built up around 6 different assignments, one of them being the development of transition scenarios based on the method of TRANSCE. This case study forced us to adapt the development process of TRANSCE in correspondence with the structure of the course given at the university (Further elaborated in Chapter 6). Despite these restricting circumstances, we had a lot of freedom to experiment with the method, since the tutors as well as the students invited and treated us as experts in the field of transition scenarios. It enabled us to apply TRANSCE in line with our scientific and methodological research interest. Our roles were mainly teacher/expert, evaluator and (action) researcher. With regard to this thesis, this course provided us with data of a hundred and twenty-five students who had experienced working with TRANSCE and altogether delivered twenty-three different sets of transition scenarios. The volume of transition scenarios developed and the opportunity to compare the outcomes fostered a consistent and valid evaluation of TRANSCE on content and method. Evaluating TRANSCE based on the process was not very valuable in this respect, since the students had been working independently on the transition scenarios, not engaged in a facilitated development process. In order to be able to evaluate and grade the resulting transition scenarios adequately, we started off by thoroughly exploring the subject of the sustainability issues dealt with together with the business models of the client organizations. This was done based on document analysis. The transition scenarios were subsequently evaluated based on expert judgements of ourselves and other transition experts. The contribution of the method to the eventual transition scenarios was evaluated based on ex-post semi-structured group interviews with the students. All learning experiences were used to adjust and refine the theoretical concept and method of transition scenarios. We ended up with a second version of TRANSCE that could be tested in a subsequent case study.

The third case study was carried out with Stichting MAAT in the region of Nijmegen. This is the most comprehensive case study of this thesis with regard to possibilities for testing and evaluating TRANSCE. Stichting MAAT is a niche-based network organisation, active in fields of care, housing and well-being, with the aim of linking and coaching short-term innovative and regional programmes in projects for long-term structural change. They were already familiar with several of these initiatives, but the long-term orientation to which these initiatives should jointly contribute was ambiguous. Transition scenarios were developed to inform and inspire the reciprocal strengthening of those short-term actions in view of long-term perspectives of transformative change. Because Stichting MAAT presupposes that a transition is necessary in the region of Nijmegen, there was a mutual interest to explore and visualize this societal change process using TRANSCE. This was a demand-driven case study in which we were fortunate to be able to experiment freely with the method and build on lessons from previous case studies in which the expected added value of techniques and process facilitation in support of TRANSCE was revealed. Within this case study we took on the roles of researcher, facilitator, expert, analist and consultant. Document analysis and ex-ante semi-structured interviews with the participants engaged in the development process were used to get acquainted with the subject matter and provide a rough first demarcation of the system that we wanted to study. The workshops were prepared, organized and facilitated following the generic steps of TRANSCE. We synthesized and structured the data emanating from each workshop accordingly. With regard to this thesis, the case enabled us to test and evaluate TRANSCE based on content, process and method. Firstly, with regard to the content, the intention was to evaluate the resulting transition scenarios based on expert judgements, this time not only through the eyes of transition experts but also by the participants involved. These ranged from scientists to consultants to managers and directors with backgrounds in health care, construction, psychology, architecture and spatial planning. The main reason for doing this was to decide on the quality of the transitions scenarios based on the contrast between theoretical and practical viewpoints. Moreover, only the participants involved had the ability to judge whether these transition scenarios were structurally different from the situation in the current system, and therefore 'transition worthy'. We did not have a pre-selected method for distilling these perspectives; these discussions originated during the workshops and interviews. Secondly, with regard to the process, the intention was to distil changes in cognitive and behavioural skills of the participants engaged, by using ex-ante and ex-post semi-structured interviews. When participants answered questions differently before and after, it indicated a change in perception, which pointed out their learning experiences. We are aware of the fact that besides the workshops, other factors during this time-span could have had an influence on these perceived changes. Even more so, because the workshops may have stimulated the participants to look for or participate in related projects, documents and initiatives.

It is difficult, and almost certainly impossible, to isolate the learning experiences during the workshops from related experiences outside the workshops. Since their knowledge and experience with transition processes was fairly limited beforehand, we presume that a considerable amount of the changes we perceived were at least initiated through their involvement in this case. Thirdly, the contribution of the method to the eventual scenarios was evaluated based on a survey. All these learning experiences were employed to adjust and refine the theoretical concept and method of transition scenarios. We ended up with a third and 'final' version of TRANSCE, which is presented in Chapter 4 of this book. This case study was illustrative in the sense that it led to narrative transition scenarios that support the concept of transition scenarios and show the analytical and methodological value of TRANSCE.

The final section outlines the structure of this thesis.

1.5. Structure of the book

As already mentioned before, very little was known about transition scenarios at the start of this research. Therefore, this book has an explorative character. The structure of this book is set up to work logically towards a theoretical concept of transition scenarios, followed by a method for developing them. A schematic overview of this is given in Figure 1.3. In practice, these two lines of development have been running more parallel and iterative. Concept and method have been explored and developed in coherence. Knowledge concerning the concept of transition scenarios fed the development of the method, while testing and evaluating the method empirically led to new insights with regard to the concept of transition scenarios.

Chapter 1 addressed the need for a new type of scenarios which we have come to call 'transition scenarios'. The remaining chapters of this book aim to get hold of what transition scenarios actually are and how we can develop them. We do not want to be disrespectful to scenario methods already out there but we do, however, see shortcomings in contemporary scenario methods with regard to describing structural changes towards sustainability. Therefore, the basis for this research lies in using knowledge about contemporary scenario methods and integrating it with knowledge about transition dynamics, which subsequently evolving into a new concept and method. Chapter 2 starts off with a description of various historically relevant scenario development efforts. By this we hoped to get a clear idea of what is already out there and what can be of use for the method that we want to develop. In large part, we relate to methodological aspects of these efforts. In trying to ground transition scenarios in methods already

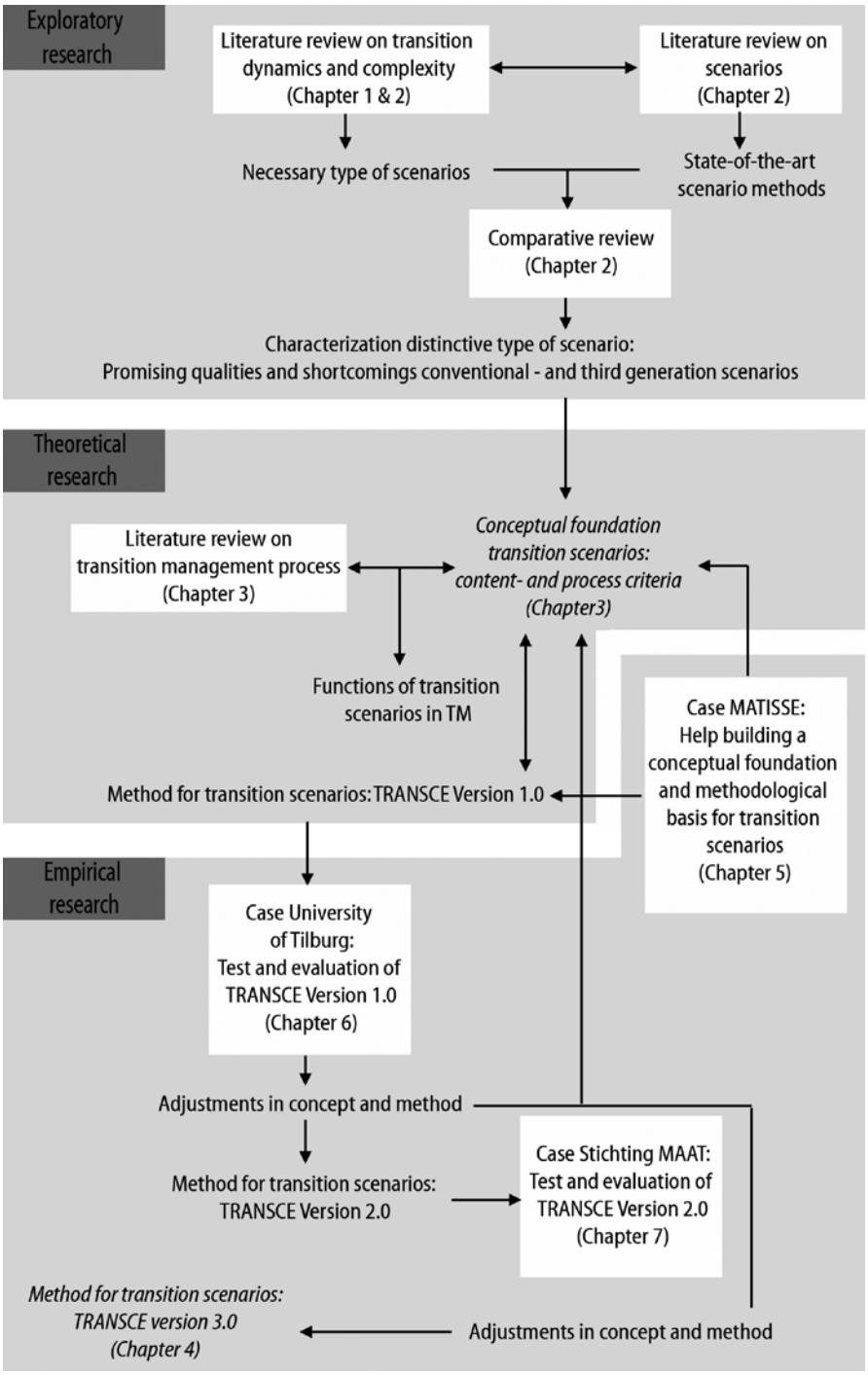

FIGURE 1.3 - *The steps of the research. The type of research that was conducted is presented in boxes. The output of each step is denoted in captions between the boxes. The italic sentences capture the eventual output of this thesis.*

out there as well as depict required novelties, a literature review on the dynamics and complexity of transitions is compared with a typology of the methods that are put forward by this historical overview. As a result, a new type of scenario is characterized and an agenda for its subsequent conceptual and methodological development is set. In doing so, this chapter demonstrates the scientific and methodological relevance of this research. These insights form the theoretical basis for developing the concept and method of transition scenarios. From this point onwards, iteration between theory and practice is central in this research and executed along parallel lines. The eventual result is captured in Chapter 3 (the concept) and Chapter 4 (the method). These two chapters are a synthesis of the entire thesis in the sense that we try to bring all the theoretical and empirical knowledge gathered from Chapters 1, 2, 5, 6 and 7 together in a 'final' concept and method for the development of transition scenarios.

Chapters 5, 6 and 7 each elaborate on a case study and describe empirical lessons concerning the exploration and development of the concept and method underlying TRANSCE and its subsequent theoretical enhancement. Chapter 5 consists of an explorative case study which was set up with the goal to develop a first empirically underpinned and consistent concept and method for the development of transition scenarios. We end this chapter with a first classification of relevant content criteria for transition scenarios (process criteria are empirically underpinned in Chapter 7) together with a first rudimentary version for a method. This chapter subsequently acts as a guiding principle for the empirical research described in Chapters 6 and 7 in which we try to evaluate, refine and validate the developed concept and method based on empirical insights from different settings. In Chapter 8, we conclude by summarising and reflecting on our research as well as by offering issues for further research.

In general, this book offers two new cornerstones for the field of transitions: a theoretical basis for the concept of transition scenarios and a method for its development (TRANSCE). The theoretical basis was inspired by and based upon literature review in combination with empirical underpinning. The method originated from practical experiences, although its starting points were theoretical notions around the concept of transition scenarios.

CHAPTER 2

About Scenario development and Transitions

2.1. Introduction

Throughout their 50-year history, scenario methods have been applied in an increasing number of sectors and disciplines (Ringland, 1998; Kleiner, 1996; De Geus, 1997). Today, numerous communities of scenario practitioners have developed, each focusing on different types of scenario methods (Marien, 2002). Scenario methods have evolved, becoming very diverse, fragmented and widespread. However, the popularity of scenario methods has waxed and waned (Van Steenbergen, 2003). Looking back to developments over the past 30 years, one clear lesson can be learned from projections made in the 1970s during the oil crisis: finite or dogmatic predictions regarding the Earth's future are unreliable and can be politically counterproductive (UN-DPCSD, 1997). As a result, during the last decade the crucial role of uncertainty has been increasingly recognized (Rotmans and Van Asselt, 2001). This has led to the understanding that scenario methods can not be a deterministic scientific activity (Greeuw et al., 2000). *The type of scenario method* used at a certain time is strongly linked to *the nature of the societal developments* that have to be dealt with at that point in time (Schoemaker, 1993). This is because scenarios are more and more used to influence the course of developments pro-actively. This implies that the nature or desired nature of societal developments in specific time periods is reflected in the requirements of scenario methods. With regard to transition scenarios, a scenario method has to envision development patterns that intentionally break with currently ongoing unsustainable development patterns.

A claim is made in the previous chapter that current and available scenario methods cannot live up to the new requirements our "sustainability-seeking" society poses. Each generation understands its historic moment as unique, and its future as teeming with novel perils and opportunities. History is an unfolding story of change and emergence. In our time, the coordinates through which the historical trajectory moves - time and space - seem transformed. The broad contours of historical change confirm a long process of increasing complexity, accelerating change and expanding scale (Raskin et al., 2002). This will have an impact on our societal structures and policies, on the ways we as researchers and citizens comprehend the world around us and, in the deepest sense, on our values and the ways we understand the concepts of change, development and progress. There is a crying need for sustainable development, which is a must by natural law. However, one should notice that the ideal of sustainable development only provides boundary conditions. It is not possible to deduce the characteristics of a 'good' society from the presuppositions of sustainable development. Therefore, sustainable development can become reality in several different ways (Rotmans and Van Asselt, 2001). One thing about sustainability is univocally clear, however. Moving towards sustainability asks for a transition, a major leap and a long-term continuous process of transformative change during which a system of society fundamentally changes. New

scenario methods are needed to make well-argued decisions for anticipating various pathways to future sustainability. This book faces this challenge within the emerging paradigm of third generation scenarios. This paradigm positions itself against conventional scenario methods by anticipating the non-linear, complex, dynamic, systemic and holistic nature of societal systems (Mannermaa, 2000); Raskin et al., 2002; Kasemir et al., 2003; Marien, 2002; Brooks, 1986: 326; cited in Van Notten). In describing the state-of-the-art of scenario methods in the following section, in terms of the waves of popularity and its causes that can be distinguished over time, more of this third generation will be elucidated.

2.2. Three generations of scenario methods

Our motivation in describing the state-of-the-art is threefold, although it is not meant as a comprehensive overview. First of all, we want to illustrate that since the beginning of future research there has been a relation between the methods used and the perceptions on and the experienced nature of society. Secondly, we want to address the relevance of this research by verifying the shortcomings of contemporary scenario methods in the light of the existing and ongoing societal dynamics. Thirdly, foresight is vulnerable to fragmentation, and therefore for reinventing the wheel. This overview provides a methodological thesaurus which we can build on, draw from and in which the method for transition scenarios can be embedded.

Research on the future has heterogeneous traditions and strands, including scenario planning, "La prospective" and strategic management. It did not develop in a linear way and has been influenced by a number of professional groups – the RAND Corporation, Stanford Research Institute (now called SRI International), Shell, SEMA Metra Consulting Group, and many others (Van der Heijden, 2005). The intellectual history of futures research is complex but basic stages can be recapitulated (Schoemaker, 1993; Slaughter, 2005). In its broadest sense, scenario thinking is as old as prospective storytelling. As a tool for future thinking, its formal roots trace back half a century, to early systems thinking in the 1940s and the use of computer simulation in the Manhattan project. In 1942, atomic physicists such as Lawrence, Oppenheimer, Teller and Compton were unsure whether a full-scale explosion of the atomic bomb might literally ignite the skies (Davis, 1968, cited in Schoemaker, 1993). Computer simulations were used to estimate probabilities of the atmosphere and the planet catching fire. The subsequent flourishing of scenarios seems to reflect three relatively independent research strands. First, the development of computers enabled simulated solutions for otherwise intractable problems. Second, game theory (von Neumann and Morgenstern, 1947, cited in Schoemaker,

1993) provided a stimulating theoretical structure for the study of social interaction and conflict (Shubik, 1964, cited in Schoemaker, 1993). Third, the post-war defence needs of the USA required war games in which humans and machines interacted. The RAND Corporation played a central role in bringing these strands together for military purposes (Kahn and Mann, 1957, cited in Schoemaker, 1993). Kahn and Wiener (1967), who were part of the RAND Corporation, explored possible consequences of nuclear proliferation, defining scenarios as "hypothetical sequences of events constructed with the purpose of focusing attention on causal processes and decision points". Herman Kahn coined the term 'scenario' when he introduced his technique of 'future-now thinking'. His famous book *The Year 2000* combined detailed analysis with the use of the imagination to produce a report that people living in the future might have written (Berkhout et al., 2002; Van Notten, 2005). Kahn reasoned that imagination had always been central to the contemplation of the future, and that scenarios were a way of stimulating and disciplining imaginative thinking (Van Notten, 2005).

2.2.1. First generation of scenarios

Influenced by Kahn and Wiener, the first generation of scenarios can be traced back to the 1950s and 1960s, when Western countries faced uninterrupted economic growth, structural transformation of the economy accompanied by rapid urbanization and a strong consensus to develop the welfare state. A major focus in these scenarios was technological and economic forecasting, using hard quantitative methods, i.e. trend extrapolation, growth models, cross-impact analysis, simulation and technological forecasting models, leading to feasible and relatively surprise-free futures (Khakee, 1999). Scenarios were statistical predictions (Schoemaker, 1993; Slaughter, 2005) whereby probability distributions of possible future outcomes were estimated to improve the quality of decision-making (Ringland, 2002). The break in the economic growth trend following the oil crisis in 1973, came as a shock and resulted in a loss of faith in trend extrapolations and other economic and technological forecasting approaches which dominated the planning practice at that time (Khakee, 1999). Also, due to the lack of integration between scientific knowledge and intuitive knowledge (Khakee, 1999), long-term forecasting had increasingly become discredited because predictions often proved to be incorrect (Berkhout et al., 2002). Scenarios tended either to overestimate the potential of modern technology and the pace of change (Kahn and Wiener, 1967) or to underestimate the role of technology and adaptive behaviour of people, organizations and societies (Cole, Freeman, Jahoda and Pavitt, 1973; Meadows et al., 1972). These studies also overstated the reliability of their predictions. Burmeister, Neef, Albert and Glockner (2002) argue that the limits of prediction and calculation strongly influenced following generations of futures research. In these early years of foresight, scenario

development was perceived as an art rather than a science. Scenario development is not rooted in academic discipline. Writers of scenarios within this first (and second) generation consisted mainly of planners, economists, technicians and engineers. Examples of writers include multinationals, local governments, private organizations like Shell (Shell International, 2003) and DaimlerChrysler (Ringland, 2002), parties in the public sector such as the World Bank and the United Nations Environmental Programme (UNEP, 2002). Activities at a continental level include the European Commission's Institute for Prospective Technological Studies and such European Union programmes as EForsee and the COST European Network for Foresight Methodology. It was only many years later that the academic community became increasingly active in futures research. The work of the Global Scenario Group, the Intergovernmental panel on Climate Change (IPCC), Netwerk Toekomst Verkenningen (NTV) and Raad voor Ruimtelijk-, Milieu- en Natuuronderzoek (RMNO) are examples of ongoing scenario work in a largely academic context.

2.2.2. Second generation of scenarios

The 1970s saw a second wave of interest in scenario planning, especially in corporate strategic planning. The traumatic effect of the "oil crisis" in 1973 drew attention to the possibility of major unexpected changes in the international economic system (Godet, 1987). These new conditions reinforced a shift from forecasting approaches to exploratory and prospective approaches that uncovered mechanisms for potential discontinuities (Berkhout et al., 2002). These more recent approaches recognize that the future cannot be extrapolated through data and relationships from the past. Change in social and economic systems is often 'directional', path-dependent or 'locked in', novelty and surprise are inescapable features (Dosi, 1984; Nelson and Winter, 1982; North, 1990).

In the early 1970s, Ian Wilson at GE, Pierre Wack at Shell and Peter Schwarz at SRI International redefined scenarios as descriptions of future conditions rather than accounts of how events would unfold. From then on, scenarios offered a set of distinct alternative futures, including economic, environmental and socio-cultural phenomena, to emphasize that the environment was uncertain and could evolve in totally different ways (Millett, 2003; Coates, Farooque, Klavans, Lapid, Linstone, Pistorius and Porter, 2001). Scenarios are not mere end state descriptions, but they highlight dynamic and mutual interactions. They aim to reflect a variety of viewpoints so as to cover a broad range of future possibilities (Wack, 1985a, b). Note that scenarios, in this sense, do not focus on single line forecasting nor on fully estimating probability distributions, but rather on the structuring and better understanding of future uncertainties. This treatment of uncertainty is quite different from more traditional methods which usually present one model, with uncertainty nested within (De Geus, 1988). The scenario methods popularized by GE, Shell and SRI International emphasize creativity and imagination.

The practitioners of this method assert that a discontinuous future cannot be reliably forecasted, but can be imagined and "lived in" as a means of learning from it. Following this development, a shift can be seen from building scenarios for best estimates to using them for measures of dispersion (Ringland, 2002). Despite the fact that both streams of scenarios were meant for strategic planning in corporations, no evaluation is available of how the results of the scenarios influenced decision-making. Generally, few efforts are made to link scenarios to policy making by means of specific strategies (Millett, 2003). This problematic relationship between long-term scenarios and short-term action has since then defined the agenda in the following years.

2.2.3. Third generation of scenarios

After the Brundtland Report (WCED, 1987) and the Earth Summit in 1992, a third wave of global scenarios was launched in the context of the sustainability challenge. This wave is ongoing and in progress. It is recognized that the 'jump' to a more sustainable world demands a structural and societal change, a transition. It has been claimed before that conventional scenario methods, active in first and second generation scenario methods, cannot live up to the challenge of visualizing, informing and anticipating these dynamic processes of transformative change. Third generation scenario development emphasizes that new methods for future thinking are required. Several suggestions for ideal scenario methods have already been recommended. It is recognized by Raskin et al., (2002) for instance that scenarios pursued in sustainability science should be conducted at all scale levels using a systemic approach. They should be comprehensive, participatory and anticipative as well as adaptive. Useful scenarios must stress integration, recognize uncertainty, appreciate irreducible normative aspects, and engage the public in discourse on sustainable development (Raskin et al., 2002). The Earth Summit in 1992 also marked the recognition that environmental, social, and economic concerns are closely connected and must be pursued jointly. Developments in the field of information and communication technology (ICT) have had a major impact here. ICT provided the establishment of efficient communication platforms for futures research across disciplines, actors and networks (Gerybadze, 1994).

With the initiation of third generation scenarios and the urgency felt for accelerating long-term sustainability, scenario experts assume that in the upcoming years future studies will evolve through fundamental changes in several areas (Schoemaker, 1993; Khakee, 1999; Ringland, 2002; Raskin et al., 2002; Berkhout et al., 2002; Millet, 2003). The belief is that long-term, complex and uncertain processes in society are no longer seen as an inescapable fact-of-life, to be understood in retrospect rather than be controlled pro-actively. Decision makers are not detached and clinical observers of change (Bruggink, 2005), they are capable of co-shaping their futures and of acting reflexively in

response to new knowledge about what the future may hold. Based on this conviction, the first factor shaping the future of the scenario field is the move from single point forecasting (accurate and precise predictions) to scenario planning (alternative futures) to foresight (institutional capacity building) to creating a future-oriented and learning society. With the increased rapidity of change as well as epistemological debates about the nature of knowing, living with uncertain futures instead of creating a certain world has become far more important. Associated models favour participatory, interactive knowledge and transcendent-based associations. This new perspective is concerned with using the future to create people that are reflexive of how current policy decisions impact future generations and how the conscious and unconscious image of the future guides the organization. Basically, this perspective is oriented towards action learning, seeking to question the future and asking questions of preferred, probable and possible futures at all levels. In this light, the process of development becomes more important than the actual outcome (Inayatullah, 1990, 2002). The second factor shaping the future is the move from reductionism to acknowledging complexity, which implies taking into account that there are many factors, known as well as unknown, that explain transformative change. Complexity also assumes that novelties may emerge in our scenario studies. Our findings must therefore be open-ended and ready to be discarded if new or multiple paradigms provide more elegant, informative and explanatory insights. Moreover, complexity includes emergence, that is, the new can emerge from the old. This helps to account for wildcards. Favoured methods used in accepting complexity in future studies are environmental futures scanning processes and incorporating insights that come from arenas outside official power – not just political power but official formulations of what is normal, what is sane, what is conventional or acceptable reality (Schoemaker, 1993; Khakee, 1999). In the third place, there will be a return to long-term research. Macro thinking and explaining the big picture remains the elusive grail of futures studies. While some argue in favour of the new story, others believe that traditional worldviews – critically modernized – already offer the big picture of who we are, where we are going and what is important in the long-term. The central feature of macro thinking is that there are general grand patterns of social change. This is in contrast with the overly simplistic focus on individual events at the expense of the broader context in which they occur. Following the great French historian Braudel (1972, 1977, 1980) it is argued that an investigation of the interaction between events, conjectural and structural processes, past and present, might shed light on future developments in society. Although uncertainties prevent a comprehensive understanding of these patterns, making prediction impossible, we speculate that a partial understanding of such patterns is sometimes sufficient to anticipate future developments (Ringland, 2002; Raskin et al., 2002; Berkhout et al., 2002; Millet, 2003). Finally, scenario development will become more and more concerned with moral and idealized futures. This means that

scenarios of the future cannot be idealized pictures of the future without taking into account who are the losers of any particular future as well as who is privileged to create particular futures. This move in futures studies is, however, not a done deal.

The historical development of methods of futures research shows a shift from mainly predicting the future to mainly exploring and anticipating the future. It does not mean, however, that predictive methods are no longer being used. Both types of methods can complement each other and are often seen in combination (Masini, 2001; Bouwman and Van der Duin, 2003). In trying to synthesise all the foregoing information while drawing some conclusions for this study, we elaborate on a subject already touched upon in Chapter 1. It seems that the *proposed* innovations for scenario methods propagated in the third generation, meet the necessary standards, meaning that scenario methods can in fact cope with sustainability issues. However, it is experienced that *in practice* there has not been remarkable progress since. Structures of power and habits of mind change slowly. Many actual scenario development efforts are still narrowly focused, and effective scenario methods for more integrated approaches to transition processes are still lacking (Gallopin et al., 1997). Schwartz (1995) states that many long-term scenario studies, uncertainties and surprises are not taken into account. The inclusion is important, however, since history shows us that historical trends are characterized by strong fluctuations rather than smooth curves, often triggered by unexpected events (Rotmans, 1998). Most recent scenario studies go beyond trend scenarios, but cannot be adequately characterized as dynamic or pioneering, because quite often the anticipated changes are merely incremental (Greeuw et al., 2000; Ringland, 1998). Action is needed to develop appropriate methodologies (Raskin et al., 2002). Sustainability is the key issue in third generation scenarios and the literature reveals that there is still a lot of work to be done to codify the scenario methods that have relevance for transformative change towards sustainability (Gallopin et al., 1997; Raskin et al., 2002). This research will try to find an answer to the question how structural change processes towards sustainability can be captured in scenarios. Thus, the theoretical efforts that have already been made in the third generation show great potential but need further practical development. This research will address this challenge by developing a method for transition scenarios.

A necessary preparatory step is to explore what characterizes transition processes and how these can be envisioned. The following section explores the nature of a structural change process inherent in a transition. Based on this, Section 2.4. will address distinctive requirements for a method that is meant to develop transition scenarios. In Section 2.5., we will compare these requirements with methods already used in third generation scenarios. This prevents the wheel from being re-invented in constructing a method for transition scenarios and shows appreciation for scenario methods developed in the past.

2.3. Nature of structural change processes within transitions

We should derive the requirements of what we call 'transition scenarios' from the *nature of the transformative change process* in a transition. Transformative change is characterized by a fundamental and irreversible change in the culture, structure and practices of a system. In transition scenarios, sustainability should be approached as a guiding notion to enable the search for multiple, desirable long-term future stories, not as a blueprint or fixed goal that can be known upfront (Voss, Kemp and Bauknecht, 2006; Rammel, Hinterberger and Bechthold, 2004). Although the content of transition scenarios is based on imagination and desirability, the future images and pathways are constructed along theoretical guidelines that give insight into and provide levers for envisioning the nature and pattern of transformative change processes in a transition. With regard to these guidelines, the transition approach offers several transition concepts. We will now turn to these concepts.

Three transition concepts exist - multi-phase, multi-level and multi-pattern – that each try to understand, analyse and explain different aspects of the complexity and dynamics underlying transformative change. These concepts are used as equipment to order and structure the mechanisms underlying a transition. They unravel how transition processes come about and how they proceed. Based on Figure 2.1 we will now clarify the purposes of the several concepts and explain how they are useful for constructing transition scenarios.

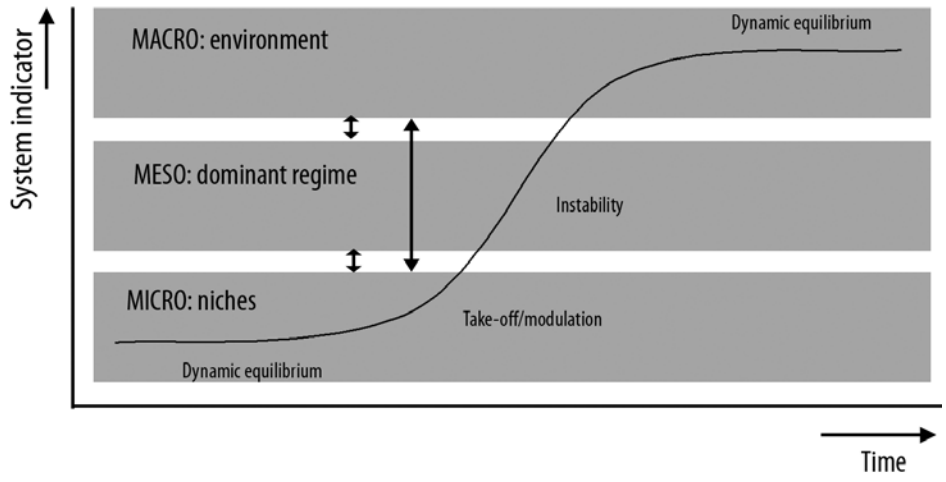

FIGURE 2.1 - *Transition concepts: multi-phase, multi-level and multi-pattern.*

The multi-phase concept is used for describing and explaining the coherence of societal transformative changes (Rotmans, 2005; UN, 1997). The aim is to identify different development stages of a societal transition and provide information about generic patterns that mark future transition pathways. The concept is primarily used as a descriptive ordering framework for the direction, pace and magnitude of a transition, describing the phases of change. Furthermore, it is used as an explanatory framework to better understand the different dynamics underlying the various phases with a view to gaining insight into how these dynamics can be influenced. Several specific features of the multi-phase concept are relevant to capture in transition scenarios: (1) a transition is an unpredictable and non-linear process of transformative change. It entails a shift from one dynamic equilibrium to another, with alternating periods of slow and fast dynamics. The slow dynamics are characterized by perceived stability of the system, as there is apparently little change, but on closer examination a constant stream of minor mutations is taking place. The fast dynamics are characterized by instability of the system. (2) A transition is a normative change process. A complex system constantly evolves and unfolds over time between multiple attractors. An attractor is a preferred steady system's state, a state of equilibrium, explaining the long-term behaviour of a complex system.

The multi-level concept explains the dynamics of transitions as the interactions between three different functional scale levels: the macro, meso and the micro level (See Figure 2.1). It unravels the dynamics of transitions at a certain time by introducing discrete scale levels with different dynamics. In terms of its explanatory character, it explains the origin of a transition, where and how it arises. It basically provides a snapshot in time of the transition at the various scale levels. It shows that a transition does not start in one place but at different locations at different scale levels. There are various specific features of the multi-level concept that are relevant to capture in transition scenarios: (1) a transition, at each point in time during its change process, can be depicted as interactions between three different functional scale levels, each with their own pace of change. The macro level is characterized by slow changes (conjectural trends), the meso level is characterized by moderate changes (structural developments), and the micro level is characterized by fast changes (events). (2) A transition only takes place when modulation occurs. Modulation means that conjectural trends, structural developments and events strengthen each other in one and the same direction. Only when these opposing dynamics modulate, a scaling-up effect and thus a spiral effect can emerge as a necessary condition for achieving a transition.

The multi-pattern concept builds on the multi-level concept by adding the dimension of time. It describes the nature of the dynamics of transitions in terms of transformative change patterns that result in irreversible changes in the system. The S-curve in Figure

2.1 is a manifestation of such a pattern and involves a fundamental change in the nature or functioning of a system, in terms of structure, culture and practices. The S-curve arises out of a complex interplay between a dominant (or 'incumbent') regime and a set of competing niches. Several transition patterns can be distinguished, showing that both competitive and symbiotic relationships between niche and regime are possible (Geels and Schot, 2007; Richmond, 1994; De Haan, 2006; De Haan and Rotmans, 2009)**.** There are various specific features of the multi-pattern concept that are relevant to capture in transition scenarios: (1) a successful transition is characterized by a point-of-no-return. This point indicates an irreversible change in the nature or functioning of a system, accompanied by radical novelty in the structure, culture and practices of this system. A successful transition, however, is more the exception than the rule. Most transitions fail, leading to other manifestations of the system, most of the time comparable to or even worse than the initial situation. (2) The climate for a transformative change to accelerate is caused by tensions that arise between the regime on the one hand and the environment and niches that surround the regime on the other. With regard to the environment, top-down pressure of the macro level leads to the question if the regime is aligned or mis-aligned with its environment. With regard to the niches, learning processes with regard to innovations, new practices, behaviour and the forming of actor networks, produce bottom-up pressure by creating deviant options to the existing regime, threatening its viability. (3) A transformative change is visualized by two mechanisms: *build-up* of niches and *break-down* of the dominant regime (4) Environment, regime and niche have different roles throughout the transition process. Niches form the undercurrent from which innovations arise that follow on the currents of the environment. Ongoing anticipation and alignment of niches with the environment, make the mismatch of the regime with its environment explicit. The regime often acts in the early period of a transition as an inhibiting factor, showing much resistance to transformative change and innovation, as existing institutions, networks, and organizations want to maintain the status quo. Later on, a regime can act as an unleashing factor, supporting and anchoring the niche developments in structural system changes. The environment is perceived as an underlying but powerful current that inexorably changes the context of opportunities, challenges and problems faced by regime and niches. It forms gradients that channel certain pathways.

The three concepts identify the pattern of transformative change. They function as guidelines for developing transition scenarios, pinpointing how transformative change can be envisioned. The axiom is that if these concepts characterize the nature of transformative change, the requirements for transition scenarios can be inferred from them, setting transition scenarios apart as a distinctive type of scenario development. The challenge for this study lies in merging the relevant features of the different concepts

and capturing them in one single narrative. Every individual feature explains no more than just a fraction of the total complexity and dynamics. Integrating and blending the features is necessary for delineating the nature of the structural change process typical for a transition. The conclusion is that the structural change process of a transition fuels the need for new scenario methods. The intention is to provide transition scenarios with a solid, analytical foundation.

2.4. Transition scenarios: a distinctive type of scenario development

As a synthesis of the foregoing, this section aims to describe the distinctive characteristics of transition scenarios more in depth based on analytical and process-related aspects. Ideals for transition scenarios are herewith identified.

2.4.1. Ideal analytical characteristics

Transition scenarios should ideally describe a non-linear and capricious process, which means that the transition scenarios can come across as surprising and confronting. In the narratives, uncertainties and weak signals should be anticipated and the stimulation of different niche-based innovations is intended to nurture sustainable alternatives to existing practices. As niches scale up into forceful and influencing patterns of development, they should break with the 'old' and set a new direction for change. This may prelude the long-term path towards a fundamental change in a societal system. Existing cultures, structures and practices should be reallocated and replaced by more sustainable ones. Transition scenarios should clarify that institutions, roles and functions are finite when not willing or able to adjust to a changing environment. Transition scenarios should visualize a societal system that entails no remembrance of the past, as the narratives have only weak ties to what is perceived as straightforward in present time. Transition scenarios should be confusing and releasing at the same time. They describe a world in which current problems and limitations are no longer under discussion or the order of the day. Overall, they should present and portray a paradigm shift as they try to describe a desirable and promising societal system.

Based on what is said here, the conclusion is drawn that transition scenarios are explorative and normative at the same time. Herein, transition scenarios distinguish themselves from the majority of scenarios. Berkhout and Hertin (2002) give us reason to believe that explorative and normative approaches act under different assumptions and therefore cannot be used in combination when developing a scenario (See Chapter 3). However, a transition process departs from current persistent problems and it is therefore necessary to explore how these barriers to transformative change can be overcome

and how they can subsequently be oriented towards a more sustainable course of development. Also, a transition scenario needs to explore the drivers of change that already exist in society and that will be ongoing in the future. This should be done in order to scrutinize how these can be influenced or anticipated in guiding future sustainability. In short, transition scenarios map a possibility space for the possible pathways of structural change within the boundaries of long-term sustainability.

2.4.2. Ideal process-related characteristics

Besides the more analytical qualities, transition scenarios distinguish themselves also in terms of process characteristics. Transition scenarios aim to describe a societal system that is enviable and hopeful, but seems hard to reach in light of the current persistent problems. As long as the ambition of sustainability seems not too far out of reach for the participants engaged in the development process, the strength of transition scenarios should lie in their potential to inspire and imagine. Thinking in terms of 'what can be' instead of 'what is', creates energy, freedom and space in thoughts and actions. The nature of problems and their underlying causal mechanisms should ideally be perceived differently in light of sustainability goals, which in turn creates new directions for solutions to persistent problems. These insights should form the prelude to a new way of thinking, serving as the basis for alignment, enrolment and mobilization of collective action necessary to initiate and maintain sustainable system innovations in practice (Kemp and Rotmans, 2001, cited in Berkhout, 2005; Rotmans, 2005).

Until now, most scenario applications have a strong orientation towards content aspects of a scenario (Berkhout and Hertin, 2002; Van der Heijden, 2005; Schwartz, 2005; Ringland, 2002). We conclude that transition scenarios also (and perhaps even more dominantly) provide a process function. The transition approach presupposes that short-term actions should be carried out in the light of long-term aspirations of sustainability, visualized in transition scenarios. However, developments anticipated in the long run linger in the future and are not perceived as urgent to deal with now. On the contrary, organizations, actors and institutions are confronted every day with problems and influences that seem vital to deal with on the short-term. To prevent what seem to be promising or optimal choices in the short run from turning out to be suboptimal or even destructive in the long run, transition scenarios ideally aim to initiate a process of reframing (See Chapter 3). This change in mindset should lead participants to acquire a more long-term oriented framework for thinking, seeing and acting. We realize that a scenario method in itself can hardly establish this attitude. It requires a civilization with less short-term egoism in which 'people of good will' are willing to realize their short-term goals by balancing these with long-term aspirations.

In this section we identified transition scenarios as a distinctive type of scenario development and described how transformative change should ideally be visualized and used for purposes of process learning. The following section uses a typology of scenario methods to position transition scenarios. On the one hand, the exercise identifies promising qualities of scenario methods practiced in third generation scenarios which can be captured in the construction of a method for transition scenarios. On the other hand, it reveals shortcomings of existing third generation scenarios. This analysis reveals the novel and essential character of transition scenarios. As we will see, some innovative requirements of transition scenarios can be fulfilled by creatively combining methods that are already out there, whereas other requirements need methods to be developed from scratch.

2.5. An agenda for the construction of a concept and method

The scenario typology of Van Notten (2005) gives an impression of the various scenario methods that are being practiced in third generation scenarios. The typology of Van Notten (2005) is adequate in doing this, because it captures the widely differing understandings of contemporary scenario practice. This in contrast to most scenario and foresight typologies, i.e. Amara (1981), Masini (1993), Mannermaa (1986), Inayatullah (1990), Tapio and Hietanen (2002), Bradfield, Wright, Burt, Cairns and Van der Heijden, (2005), Bishop, Hines and Collins (2007), that focus on particular aspects of scenario development and do not sufficiently capture the diversity and flexibility in contemporary scenario methods. Also, the typology of Van Notten was brought into play to explore the use of discontinuities within contemporary scenario methods. He came to the conclusion that, in practice, discontinuities are hardly ever used within contemporary scenario methods to anticipate future sustainability. As we intend to explore how the pattern of transformative change can be initiated through the use of discontinuities, it reveals the necessity of innovations in third generation scenario methods.

The typology of Van Notten gives an overview of current scenario practice based on a comparative review of approximately 100 studies carried out since 1985 (Van Notten, 2005). The studies were conducted in a variety of contexts, including businesses such as the British Airways and KPMG; "inter-company" cooperative efforts such as the Dutch Management Association (NIVE) and the World Business Council for Sustainable Development (WBCSD); governmental organizations such as the Rotterdam port authority; broad-based participatory efforts such as those in South Africa and Colombia; and academic settings such as the Intergovernmental Panel on Climate Change (IPCC) and the VISIONS project. The studies covered a variety of topics, including transport, telecom, nutrition, gender equality, labour market, climate change and leadership. The

scenarios were plotted on a scenario cartwheel, distinguishing various analytical characteristics of scenarios. Eventually, it resulted in a typology which proceeds from three main characteristics comprising central aspects of scenario development: the goal of scenario development, the process design and the scenario content. Each of those three characteristics can be divided into three sub dimensions, and each sub dimension in its turn consists of a continuum with two poles, revealing the diversity in contemporary scenario methods (See Figure 2.2). For a more in-depth description of the scenario typology of Van Notten we refer to his book *Writing on the Wall*.

	Function	Process				Content
GOAL	Inclusion of norms	Explorative				Normative
	Subject	Area/Issue				Institution
	Input	Qualitative				Quantitative
PROCESS DESIGN	Method	Participatory				Model
	Group composition	Inclusive				Exclusive
	Temporal nature	Chain				Snapshot
CONTENT	Factors	Heterogen.				Homogen.
	Interaction	Integrated				Isolated

FIGURE 2.2 - *Transition scenarios positioned in the scenario typology of Van Notten (2005). The shaded boxes visualize the dimensions relevant for transition scenarios.*

We will use this typology in this section both to ground transition scenarios in third generation scenario methods, and to set them apart from these methods. *The shaded boxes in the figure represent what transition scenarios should stand for and how they can be characterized in light of existing third generation scenario methods.* These characteristics were all deduced from interpretations brought forward in Sections 2.3. and 2.4. The transition scenarios are not positioned within this typology with the purpose of

exhaustively analyzing these scenarios in light of third generation scenario methods. Two objectives for doing this exercise stand out and will therefore be dealt with in this section: [1] obtaining an even richer image of what transition scenarios entail by describing more than just the features brought forward in relation to the complex and dynamic nature of transitions [2] exploring the promising qualities and shortcomings of third generation scenario methods in light of the development of transition scenarios. An agenda is set for the construction of a method for transition scenarios, by specifying (a) which methodological aspects from third generation scenarios can simply be re-used (b) which aspects need to be creatively combined and (c) which aspects need to be developed from scratch.

2.5.1. Promising qualities of third generation scenarios: an ideal typical definition

Based on Figure 2.2, we will walk through the dimensions of the typology from top to bottom, while explaining how transition scenarios are ideally allocated for each dimension.

With regard to the dimension 'function', transition scenarios have a process goal as well as a content goal. The process of development is important for linking once unknown people in networks of structural change by challenging mental models and prevailing mindsets, learning to recognize and anticipate patterns of structural change and creating awareness and understanding for future sustainability. The content of transition scenarios should function as a means to this end as it designates levers for short-term action from a long-term perspective, in terms of identifying signs of emerging trends like weak signals and selecting niches that have the potential to grow and scale up.

With regard to the dimension 'inclusion of norms', both sides of the spectrum should be essential. Normativity is contentious since all scenarios are arguably normative, in so far as they consist of the interpretations, values and interests of those involved in the scenario exercise. Transition scenarios should also be normative because they describe preferable, inspiring futures under the notion of long-term sustainability. They should be characterized as explorative, indicating that the pathway towards a sustainable future can be characterized as an uncertain one, in need of a reflexive process of searching, learning and experimenting. As transition patterns have multiple (often conflicting) determinants such as behaviour, culture, technology, economy, institutions, environment and policy, the pathways towards a sustainable system state cannot be treated as an objective fact but need to be thought of as being emergent and only partially knowable. Transition scenarios should be seen as a set of only partially viewable alternatives that describe a "possibility space" (Gallopin et al., 1997). With regard to the dimension 'sub-

ject', transition scenarios should be issue-based, area-based and institution-based at the same time. Transition scenarios take *societal questions* as subject of study and therefore *different spheres of interest* (i.e. several sectors) are addressed in combination. Finally, because a scenario development effort is initiated most of the time through a group of people which experience problems in dealing with some ongoing practical issues within their network, the transition scenarios are developed for a particular *geographical region*. The case study described in Chapter 7 is an example of this kind.

With regard to the dimension 'input', transition scenarios should ideally be defined as qualitative. Qualitative input is appropriate in the analysis of uncertain and complex situations, when relevant information cannot be (entirely) quantified. With regard to the dimension 'method', it is a participatory approach that preferably prevails, since models, on the contrary, can only cope with information that resides within restricted intervals. Anticipatively dealing with and processing trend breaks and radical changes has not fallen within their scope as yet. A participatory approach suits the generation of a broad range of ideas, forthcoming from various backgrounds and expertise of participants involved. A participatory setting enables the convergence of these various perceptions, leading to new insights into the nature of any problem and the underlying causal mechanisms. This is a necessary condition for realizing a transition. With regard to the dimension 'group composition', transition scenarios are ideally developed by means of inclusive groups. Various directives exist for attracting persons with specific character traits in the development process. For an in-depth description of these traits, we refer to the book by Loorbach (2007) named *Transition Management*. We suffice here by mentioning that transition scenarios need to be developed by what Schwarz (1991) and Van der Heijden (1996) call 'remarkable people' or 'unconventional thinkers', and what we call 'frontrunners' (Rotmans, 2005; Loorbach, 2007). Their role is to conceive novel and derogatory ideas relative to prevailing dominant cultures, structures and practices. The frontrunners that participate ideally have differing but complementary characters and positions. With regard to the latter, niche-players and change-inclined regime-players are present, which we will further elaborate on in Chapter 3.

Arriving at the bottom three, transition scenarios should be the ultimate chain scenarios. They identify different related phases in time and causally unravel how transformative change comes about. About the dimension 'factors' we can also be brief. Transition scenarios should ultimately be indicated as heterogeneous, since they should have a societal nature. It implies that issues and developments regarding socio-cultural, economic and environmental factors are included. Regarding the last dimension 'interaction', transition scenarios should score high on integration instead of isolation. Transition scenarios unify in a trans- and interdisciplinary manner the action and reaction patterns of different geographical scales.

The analysis demonstrates that contemporary scenario methods are still the basis for the development of transition scenarios and can be allocated as such. The following subsection makes clear why innovations in existing scenario methods and new scenario methods are also necessary for the development of transition scenarios.

2.5.2. Shortcomings of third generation scenarios: the need for new scenario methods

When carefully reading and scrutinizing the previous sections, it becomes clear that the ideal typical characteristics of transition scenarios cannot all be univocally allocated to the typology. In this respect, the goal of scenario development in relation to its dimensions 'function', 'normativity' and 'subject', need to receive attention. New creative combinations in already existing scenario methods are required here, making transition scenarios in some cases a hybrid scenario method. There are also required features of transition scenarios that could not be allocated to the typology, simply because they were not represented, but which are significant for envisioning the nature and underlying pattern of transformative change in the eventual transition scenarios. A comparative review between Sections 2.3., 2.4. and 2.5. reveal the lack of the following dimensions in the typology of Van Notten:

1. Scope: explaining the systemic nature of transition scenarios
2. Complexity: emphasizing the multi-layered character of transition scenarios
3. Linearity: illuminating that transitions are non-linear processes
4. Time-scale: bringing forward the long-term process of transitions.

Here lies the potential for innovations in existing scenario methods and for the development of new methods.

This section has set an agenda for the following chapters and provides guidelines along which a concept and method for transition scenarios can be developed. It codified the need for new scenario methods that have relevance for transformative change towards sustainability.

2.6. Conclusions: what can we accomplish?

Theory and practice of scenario development have evolved over the last decades. From being primarily trend-based, attention has shifted towards approaches that include complexity, uncertainty and normativity. On the one hand, transition scenarios are characterized in this chapter as a scenario approach that fits within accepted theory and practice of contemporary scenario development. On the other hand, transition scenarios are set apart from these more conventional approaches. It rises to the challenge that third generation scenarios face by integrating pre-existing methodological

scenario efforts with new ones required in the context of transitions and sustainability. This forms the foundation based on which in following chapters a new type of scenario method will be developed.

In this chapter we have descriptively characterized transition scenarios more specifically. It has been made clear that transition scenarios have a set of distinctive and innovative features through their explicit focus on transformative change. Herewith, transition scenarios are set apart from conventional scenario methods and contribute to the enhancement of third generation scenarios. Because of the explicit role of transformative change patterns in scenario processes, these can be treated prescriptively instead of purely analytically. The following chapter builds on the findings presented in this chapter and develops them further into a comprehensive conceptual foundation for transition scenarios. Based on the insights that have been revealed throughout this chapter, we want to conclude by providing a definition for transition scenarios that integrates all the information gathered. Transition scenarios are defined as: participatory explorations of possible long-term development trajectories that incorporate a structural systems change towards a desired, sustainable future state of the system.

PART TWO

Theoretical

CHAPTER 3

Towards a concept of transition scenarios

3.1. Introduction

The foregoing chapter clarified that transition scenarios are a distinctive type of scenario. We came to the conclusion that their methodological basis still lies in scenario methods already out there but that some novel elements are also required, especially with regard to describing the nature of structural change in transitions. In the current chapter we use these insights and elaborate on them further in order to develop a conceptual foundation for transition scenarios. The suggested requirements of transition scenarios are theoretically deepened within related disciplines and empirically enhanced.

This chapter integrates the theoretical assumptions from Chapter 2 with empirical lessons from Chapters 5, 6 and 7. It should be perceived as a product of this entire study: a conceptual foundation for transition scenarios which offers guiding principles for constructing the eventual method. The concept identifies criteria which jointly characterize desired outcomes of a development process for transition scenarios. Throughout this thesis, the concept is used as a frame of reference for evaluation, ensuring the practical implementation of the theoretically claimed novelties in the transition scenario method.

Additionally, in the second half of the chapter we touch upon the subject of transition management. We illuminate how transition scenarios can be functional for transition management and vice versa. The subject of governance is definitely not at the core of this book. Since we can extract lessons from this analysis for constructing a method for transition scenarios, the subject is well worth discussing.

3.2. Criteria for a method to design transition scenarios

The criteria for a method to design transition scenarios can be divided into content and process criteria and are defined in Chapter 1 (Section 1.4.). The former are related to the characteristics of the content of the actual transition scenarios. In Chapter 2 we explained that the added value of these various content criteria in the eventual transition scenarios lies in their integration. This integration is vital for describing how the causal pattern of transformative change can come about over time in terms of the multi-level, multi-phase and multi-pattern interactions. In this respect, we will not only sum up the criteria but also reflect (where this is desirable and appropriate) on ways that will contribute to their integration. The process criteria can be seen as action- or actor-oriented changes in cognition and behaviour of participants due to engagement in the development process. The following subsections will first discuss the content criteria of transition scenarios, after which we will turn to the process criteria.

3.2.1. Content criteria

In describing and envisioning the complexity and dynamics of a transition, several criteria are important to take into account. The transition scenarios need to have a long-term time span, need to be developed at a societal systems level, need to have a utopian character while preserving a realistic feel, need to be explorative as well as normative and need to delineate the pattern underlying the structural change process in time. These criteria will be explained below simultaneously with their materialization in transition scenarios.

1. Long-term time span

This first criterion is rather straightforward as transitions are supposed to take quite some time, at least one generation (25 – 50 years). The World Business Council for Sustainable Development therefore defines this as 'long-term' (WBCSD, 1998 (103 ch2). Translating this into criteria for transition scenarios, it means that the narratives need to have a long-term time span. Along with this, the perceived temper of a transition according to different timeframes is relevant. Over a timeframe of say 30 years, the story of a transition must seem to take place along gradual lines. Acknowledging the transition process in its total time span, one perceives a gradually continuous process of change leading to the transformation of a system or sub-system (Rotmans et al., 2001). But when zooming in and taking a much shorter timeframe, e.g. 2 years, the transition scenarios must show a process that moves by fits and starts, in which small shocks and huge waves alternate with and influence each other (Rotmans, 2003).

2. Societal system level

In order to understand the workable mechanisms of the complex pattern underlying a transformative change process, linear and mechanistic thinking must give way to non-linear and organic thinking, more commonly referred to as integrated systems thinking — a way of thinking where the primacy and complexity of the whole system is acknowledged. We refer here to *integrated* systems thinking, because we want to emphasize that emergent properties such as discontinuities, which are sometimes fundamental in creating the climate for structural change, cannot be recognized, anticipated and directed from one scale level. Transition processes unfold at a variety of scale levels simultaneously, and there is no single privileged point of view for their analysis. The conviction is that a complex, adaptive system is recognized by the integrity and interaction of its parts, accordingly, transitions need to be analysed from the perspective of the entire system (Rotmans, 2005). When we translate these notions into criteria for transition scenarios, it first and foremost means that it is essential to formulate the transformative change process at a systems level. To get a grip on what this system entails, one should

first demarcate the scope of the system that is required or forced to go through a transition. With 'scope of the system' we mean those sectors or parts of sectors that jointly contribute to a societal function (De Haan and Rotmans, 2009). This societal function should be disentangled by identifying the necessary future conditions of a system that enable its sustainable and societal functioning. Subsequently, it should be derived from this societal functioning which region or interrelated patchwork of sectors can or should play a role in realizing these conditions. However, managing the future means that there is no definitive formulation and no conclusively 'best' solution for future sustainability and, furthermore, that the problem is constantly shifting. Nevertheless, one cannot even begin to purposefully shape the future without certain starting conditions or goals and ambitions. As we know from "Alice in Wonderland": If you do not know where you are going, it does not matter what road you choose. It implies that it is difficult to pinpoint certain future conditions, since the best one can do is make vague guesses, without any underlying reasoning of relevance. A valuable aid in defining the scope of the system is a stern focus on what we call a societal 'transition challenge'. Persistent problems on the short term are translated into sustainable conditions and ambitions in the long term. It stimulates a future-oriented mindset while ensuring closeness to the problems at hand in defining future sustainable conditions, without wandering off to unrealistic and unfeasible challenges in light of the current functioning of the system and its potential to change structurally. The context for deliberation is more or less the same but more positive and future oriented instead of driven by the negative. The accent is shifted from problem solving to goal seeking and from negative problems on the short term to positive ambitions on the long term which in turn stimulates a sense of urgency for tackling the problems at hand and a process of reframing (Sondeijker et al., 2006).

3. Utopian and realistic character

The transition scenarios need to have a 'utopian' character. They need to explore the borders of the unimaginable. For a definition of 'utopian' we refer to a statement of Alcamo (2001). He clarifies that scenarios must be creative in the sense that they are low in probability but high in consequence. This is adequate since the accuracy of projections within transition scenarios no longer has priority (Raskin et al., 2002). Our reason for stating that transition scenarios need to have a 'utopian' character originates from the assumption that it is almost impossible to achieve long-term sustainable change from within existing institutions (Loorbach, 2007). Sustainability is increasingly cited as desired ends that one, it is hoped, approaches indefinitely even if one can never achieve them completely (Mitroff and Kilmann, 1978; Mitroff and Linstone, 1993). When striving for a societal transition, we inherently strive for a fundamental change in a system's structure, practices and culture. If transition scenarios result in optimization strategies we failed in realizing the structural change that we believe is necessary for reaching

future sustainability. It implies that the future stories in transition scenarios need to be deviant from our prevailing perception of reality, impossible to reach when only using optimization strategies. However, when scenarios reach so far into the future, potential hazards arise. People experience difficulty in thinking so far ahead. It is almost impossible for them to tide over 25 years in their imagination while maintaining a sense of feasibility. For assessing desirable futures in terms of their potential realism and bringing about commitment for short-term action, the currently perceived reality of actors needs to be captured. Consequently, the pathways which lead to the future stories need to be based on informed imagination (Sondeijker et al., 2006). We acknowledge that finding a balance between the two is crucial and difficult to realize at the same time. In the worst case, transition scenarios can become too utopian, failing to connect to current issues, or too traditional, failing to imagine fundamental renewal in the state of a system. When we want to translate this to criteria for transition scenarios, it helps to operationalize 'utopian' in the context of transformative change. According to the systems perspective, a transition scenario should strive to visualize a new attractor, embodied in a system which has a fundamentally different culture, and fundamentally different structures and practices. These culture, structures and practices should subsequently be able to enable the system better to adapt to its environment and reach a state of equilibrium.

4. Explorative and normative character

The transition scenarios need to be as open as possible in exploring desirable pathways towards the future in order to build in a reflexive attitude towards future complexity and uncertainties. It means that "the future" cannot be treated as an objective truth but needs to be thought of as being emergent and only knowable to a certain degree. The focus is on learning-by-doing and doing-by-learning while exploring interrelationships between long-term processes and weak signals. It is important to prevent striving for a single scenario which is most likely to correspond to our expectations (Gallopin et al., 1997; Fink, Siebe and Kuhle, 2004). The acknowledgement of a multiplicity of transition scenarios is presented in this book as a strategy to map out the nature and types of uncertainty in order to anticipate them, to avoid a premature lock-in by keeping options open, and to create space and ambition for new directions in solutions. Because transitions inherently strive for sustainability, the explorative notion is guided by a normative framework of sustainability. By being explorative and normative at the same time, transition scenarios distinguish themselves from the majority of scenarios. Berkhout and Hertin (2002) give us reason to believe that explorative and normative approaches act under different assumptions and therefore cannot be used in combination when developing a scenario. First of all, a normative approach is based on subjectivity, expressing preferences and adding a positive or negative connotation to a scenario. An explorative scenario on the other hand needs to be as objective as possible in order

to map a possibility space and inform decisions of the present. As mentioned before in Chapter 2, transition scenarios combine these two approaches in that they map a possibility space (explorative approach) within the boundaries of and with the ambition to realize long-term sustainability (normative approach). Hence, we contest the assumption of Berkhout and Hertin (2002) by presupposing that the future is not only a continuation of past relationships and dynamics but can also be shaped in a preferred direction by human choice and action.

5. Delineating the transformative change process in time: integrating the transition concepts

Chapter 2 emphasized that three concepts jointly unravel the dynamic interplay underlying the transformative change process in a transition scenario: the multi-level concept, the multi-pattern concept and the multi-phase concept. The first addresses the developments ongoing in the environment of a system which create the right climate for change and are the starting point for initiating a structural change. The second describes the actors and activities that anticipate these developments as a means to ensure scaling up and modulation, resulting in a destabilization of the prevailing system and its subsequent break-down. The third distinguishes between the different paces of change throughout a structural change process. Their integrated use will be clarified below in light of creating the pathways inherent in transition scenarios.

Multi-level concept

In the previous section we touched upon the subject of 'discontinuities' as important aspects in the environment that can drive transformative change. In the context of scenario development, discontinuities are defined as temporary or permanent, sometimes unexpected, breaks in a dominant condition in society caused by the interaction of events and long-term processes (Van Notten, 2005). Van Steenbergen (1996) emphasizes their role in shaping the world. Drucker (1968) adds to this by stating that discontinuities are not the prominent trends of today but rather the shapers of tomorrow's society and that they are different from what most of us still perceive as 'today'. They are mostly hidden from view, meaning that signs of future change are to be found in speculating on potential discontinuity rather than in focusing on relevant present-day factors (Van Steenbergen, 1996, Petersen, 1999). Such 'signs of future change' are referred to in scenario literature as 'weak signals' (Ansoff, 1982; Van Steenbergen, 1996; Petersen, 1999). Ansoff (1982) argues that weak signals cannot easily be connected to current trends, or slow changing developments, but that they can be seen as first symptoms of change and therefore need to be taken into account. Weak signals have an overly simplistic focus on individual events at the expense of the broader context in which they occur. Within transition literature (Rotmans, 2005) weak signals and discontinuities are

perceived as internal and external changes that create the right climate for structural change. Within transition scenarios, they are approached as means and starting point for inducing and directing structural change towards sustainability. Ultimately, they are a means to accelerate synchronization (Elzen and Hofman, 2007; Elzen, Geels and Green, 2004). They have resources available to create tensions between the dominant regime and its environment, resulting in disequilibria, and forcing it to adapt or change. It is argued that an investigation of the interaction between them in relation to ongoing structural processes at the level of the dominant regime is necessary (Braudel, 1972, 1977, 1980).

When translating this discussion into implications for transition scenarios, we have to be more specific about the relation between weak signals and discontinuities in driving structural change. A weak signal is a concept to explore and direct discontinuities. Molitor (1998) explains this further by claiming that of every change, and thus also discontinuities, traces can be found in terms of events, often in an early stage. Weak signals can be seen as these first symptoms and indications of an impending change (Mendonça, Cunha, Kaivo-oja and Ruff, 2004; Ansoff, 1982). For that matter, they are sometimes referred to as 'early warnings' (Harremoës, Gee, MacGavin, Stirling, Keys, Wynne and Guedez Vaz, 2002). Anticipating these early warnings provides the opportunity to influence the direction of future change. In theory, the overwhelming part of scenarios is in fact developed to identify discontinuities and help to prepare for surprising change (Davis, 1998). Practice proves to be different, however (Moyer, 1996; Ringland, 1998; Achebe, Heyden, Magadza and Okeyo, 1990; Svedin and Aniansson, 1987; UNEP, 2002; Rotmans et al., 2000; Kieken, 2002; Streets and Glantz, 2000). For the development of transition scenarios it is important that insight is gained into today's events that may seem unimportant from a current perspective and seem to exist in isolation, but which are extremely important when perceived from the perspective of the future, desirable state of the system. These weak signals should subsequently be scrutinized and considered in the context of long-term processes, especially uncertain developments of which the direction can still be influenced in a more sustainable direction. This leads to the possibility of imagining and spelling out various interactions between weak signals and uncertain developments, resulting in a characterization of several discontinuities that create the right climate for structural change.

Before we move on to explaining the multi-pattern concept in relation to this climate for structural change, we will first go more into depth with regard to the specific types of discontinuity that reside in scenario literature, because they are not all suitable to or capable of influencing structural change. When describing a transition scenario it is important to take into account that a transformative change is carried forward by just those uncertainties and surprises that have the ability to create tensions which threaten

the viability of the regime structure, because this structure is not resilient enough to adapt to the environment. These kinds of tensions mainly arise out of uncertainties and surprises that fall outside the expected range of changes probable from a current perspective. We can identify two types of uncertainties and one type of surprises, relevant in the context of transition scenarios. Based on the work of Van Asselt (2000) we can appoint two types of uncertainties: [1] *reducible ignorance,* consisting of developments that we do not observe, nor theoretically imagine at this point of time, but probably in the future, and [2] *indeterminacy,* consisting of developments of which we understand the principles and laws, but which can never fully be predicted. With respect to 'surprises', we can identify *imaginable surprises that are improbable*, meaning that the event, process or outcome is not known or expected (Schneider, Turner and Morehouse Garringa, 1998). When developing transition scenarios, it is recommended to categorize the different types of developments ongoing in the environment, classifying weak signals and the various types of discontinuities mentioned above. It can be verified in advance if the various discontinuities that participants want to consider and use in the transition scenarios to initiate a structural change process, can be classified under one of the categories.

We end this section with a final note that distinguishes the use of weak signals and discontinuities within transition scenarios from the more conventional scenario methods. The approach towards weak signals and discontinuities in transition scenarios, positions them almost opposite contemporary scenario methods. The latter often *reduce* uncertainties and envision stories *within the boundaries* of their predicted consequences (e.g. Schwarz, 1996; Ringland, 1998; Van der Heijden, 1996). It does not leave room for the cultivation of system innovations that break with current paradigms, alter the direction of uncertain developments and stimulate a structural change in society. Our conviction is that weak signals, although mostly hidden from view, are drivers of change. They are the undercurrent which might become mainstream. The axiom is that their anticipation is crucial for influencing desired directions of development beyond the scope of what certain developments 'predict' and for preventing undesirable ones to evolve.

Multi-pattern concept

In the section, one condition for transformative change has already been settled on: the conditions in the environment that enable the right climate for structural change to occur. The next step is to portray how actors anticipate the environment of a system as a means to actually initiate the necessary transformative change process. In this respect, the transition theory teaches us that a transformative change primarily unfolds through the contribution of two related mechanisms: *build-up* of bottom-up activities at the micro level which aim to *break down* the prevailing regime at the meso level. A

transition scenario is supposed to describe niches that anticipate weak signals, scale up into niche-regimes, attack and demolish the dominant regime based on the discontinuities that result, and subsequently set a new direction for change which leads to the desirable, future state of the system. Translating this into criteria for transition scenarios, the following activities must be carried out. [1] Selecting and considering actor groups and associated niche-based system innovations at a micro level which [a] anticipate and connect to the weak signals that are expected to create, in time, the right climate for structural change, and simultaneously [b] foster relevant processes of build-up and break-down leading to the desired future state of the system. [2] Linking the system innovations that can strengthen each other in one and the same direction, thereby creating a strategy which enables a process of scaling up and influences the direction of uncertain developments.

Multi-phase concept

This final criteria with regard to describing the structural change process in a transition scenario, relates to framing the structural change process as outlined above into four alternating phases in which the nature and speed of change differ. The following four phases are distinguished. [1] In the predevelopment phase, there is very little visible change on the societal system level but there is a lot of experimentation. In this phase the climate for structural change is explored and various niches are initiated accordingly. However, no fruitful linkages have resulted between them. [2] In the take-off phase, the process of structural change gets under way and the state of the system begins to shift as it picks up momentum. Here, the anticipative capacity of the niches in influencing the direction of uncertain developments becomes visible. Niches start scaling up and together with the resulting discontinuities the dominant regime is more and more destabilized. This is when the point of no return is reached. [3] In the acceleration phase, the actual structural changes process unfolds. Processes of build-up and break-down become visible and culture, structure and practices change. [4] In the stabilization phase, the speed of societal change decreases and a new dynamic equilibrium is reached. The future and sustainable state of the system becomes perceptible. (Rotmans, Kemp, Van Asselt, Geels, Verbong and Molendijk, 2000).

6. Consistent and coherent

Finally the storylines need to be consistent and coherent. Consistent means that the elements of the transition scenarios build progressively on one another and are not contradictory. Coherent means that all the parts of the transition scenarios coincide and form an integrated whole.

When these criteria have been considered, all ingredients necessary to portray the complexity and dynamics associated with a transformative change process are present. It depends on the imagination of the participants engaged how this information unfolds into a narrative that explains a transformative change. However, theoretically speaking, an ideal transition follows a certain generic path. The structure of this path should be perceived as the ordering mechanism that holds several stern implications in relation to the way the narratives outlined within the transition scenarios are ordered. While at this point in time various paths and patterns or sequences of patterns exist for the way transformative changes can unfold over time, the transition scenarios developed within the case studies mainly focus on one particular path. This is called the 'empowerment path' dominated by bottom-up dynamics (De Haan and Rotmans, 2009; Geels and Schot, 2007; Van der Brugge, 2009). The reason for focusing on this particular path is twofold. First of all, transition scenarios aim to have a role in transition management (See Section 3.3.). They have the intention to inspire and inform short-term niche activities within a long-term orientation of sustainability. It is therefore important for transition scenarios to provide examples of niches which can take over the dominant regime and set the direction for a more sustainable future system. The empowerment path is the only path of transformative change which focuses on this kind of bottom-up dynamics by which niches have the potential to transform a regime structurally. The second one is the overly practical reason that by the time the case studies started, the different paths and patterns had not yet been developed.

3.2.2. Process criteria

As an introduction to the process criteria that we are about to describe, we want to make explicit that each of the process criteria stems from the content criteria. The latter stimulate a certain perspective on the way the past, the present, the future and the change in-between is perceived and approached. Throughout the development process, certain discussion subjects will be more feasible than others. As the development process unfolds, it becomes more penetrated and ingrained with these perspectives on change. Because of their passionate involvement in the development process, it is likely that participants engaged will gradually internalize them. This is exactly what we refer to as 'process criteria'. Each content criterion has its share in the evolvement of the process criteria that we will be discussing. Where appropriate, we will mention the relations between them explicitly.

1. Stimulating reflectivity

Contrary to other complex systems, complex adaptive systems have the tendency to stagnate and fail to adapt to external and internal change. Change is never-ending and

even an apparently stagnant society is bubbling away underneath. Failure to adapt can eventually lead towards the thresholds of crises, where change will boil over. Sustainable courses of development are hardly ever the logical outcome of such crises. They are too complex and too uncertain to come about accidentally. To mitigate such problems while enhancing the chance for a sustainable future, transition scenarios should have a function in encouraging processes of searching, learning and experimenting (Hjorth and Bagheri, 2006). Transition scenarios should increase the pace of reflectivity in order to understand better how societal change can be influenced. Only then can we respond in an anticipative way instead of being overwhelmed by unexpected crises and changes in the environment. Transition scenarios are a valuable means of enabling reflectivity as they map out the nature and types of uncertainty and surprises, keep options open and create space and ambition for new directions in solutions (Sondeijker et al, 2006). In this sense, transition scenarios provoke participants to continuously search for and explore sustainable courses of development, reflect on chosen experiments or selected niche-based innovations in terms of their expected consequences in time and contribution to structural change and future sustainability.

2. Reframing

For the majority of people, the most typical mental anchor is the past and usually they do not adjust their thinking very far from this starting point (Gilovich, 1981). Gilovich proceeds by mentioning that the past may be a highly misleading guide to the future, especially after major discontinuities have occurred. Loorbach (2007) takes this reasoning a step further by stating that, in the case of transformative changes, hanging on to and trusting sustainable or unsustainable structures, cultures and practices that exist in the past or present, can even impede structural change and a more sustainable course of developments. Transition scenarios should stimulate what we call 'reflexivity' and 'reframing'. These are closely related concepts. The former means that participants reflect on and question their presuppositions. The latter builds on this and entails that participants shift the anchor or basis from which they view or actively anticipate the future (Berkhout et al., 2002). If we interpret this in the context of transition scenarios, it means that participants start thinking and acting in terms of what they have come to believe is necessary for approaching a desirable future state of the system, i.e. pursuing short-term actions within a long-term orientation of sustainability, being sensible for weak signals, experimenting with deviant innovations. Two content criteria fuel this mindset: the utopian character and the transition challenge. The intended benefit of these content criteria is that they stretch people's thinking. Our presumption is that transition scenarios should on the one hand reduce overconfidence (Lichtenstein, Fischhof and Philips, 1982) by making available to the mind futures not yet considered (Koriat, Lichtenstein and Fischhof, 1980) and challenge those presumed likely (Mason and Mitroff,

1981). It gives participants the opportunity to imagine desirable and wished-for futures without being blocked by shortcomings and drawbacks of current structures. This can be an incentive for people to expand their reasoning beyond current paradigms and gain energy to think of radical solutions and innovative directions for structural change. Thinking so far ahead makes people bluntly aware of the gap between the current state of the system and the one they think should be realized and strived for in the future. This can consequently result in reflexivity and reframing.

3. Social learning and a new common knowledge base

As clarified in the preceding section, transition processes strive for a structural change at a *systems level*, so transition scenarios outline narratives at a system level. This provides a coordinating approach within which niche-based activities at a smaller scale can be carried out, while acknowledging sustainability at the level of the whole system. For participants engaged in the development process of transition scenarios, it means that, sooner or later, a common knowledge base and agenda for action has to result (Rotmans, 2005). The social learning process initiated through the participatory development process provides the conditions for this. Social learning is about developing interactions with others who have an alternative perspective on reality and jointly create another (or a new common) viewpoint on reality (Leeuwis, 2003; Social Learning Group, 2001). As participants are confronted with each others' views and perceptions, they are influenced to gradually adjust their worldview based on what they come to acknowledge from others. This influence is reciprocal and differing perceptions become more similar over time, eventually resulting in a new, solid and common knowledge base to which everyone can relate. For social learning, it is crucial to gain insight into the perceptions of others who are learning at the same time. Only then are they able to search together and develop a common agenda for reform action (Rotmans, 2005).

4. Linking and mobilizing frontrunners in projects of change

This criterion builds on what we mentioned above, in the sense that social learning processes are a necessary condition for linking and mobilizing frontrunners in projects of change. Frontrunners are facilitated during the development process in visualizing sustainable futures and pathways by explicating and sharing their miscellaneous and often conflicting insights about future directions and ambitions. The frontrunners that participate ideally have differing but complementary characters and positions. With regard to the latter, niche-players and change-inclined regime-players are present. Niche-players are keen on stimulating new perspectives and ideas, while regime-players have the power, money and network to support these ideas and sustain them. With regard to the former, it is desirable to have people present who have a fresh and transverse perspective, who can think outside the box, who are personally driven to structurally

change society and are embedded in a large influential network (Loorbach, 2007). The trajectory of developing transition scenarios is a means of linking once unknown frontrunners in projects that anticipate structural change. The development trajectory is a means of starting such a committed network since it is meant to make frontrunners enthusiastic about transitional change towards sustainability, to make them aware of the fact that sustainability does not have to be a lingering future object but can actually be realized, to provide them with insights and levers of how to induce sustainability and finally, to pass on some common goals and agendas which they can engage in.

5. Internalizing the transition framework for thinking, seeing and acting

Being engaged in the development process, people gradually come to acquire a common language and discourse for thinking, seeing and acting. The language is the systems language - in which actors can relate individual perspectives and interests to a collective level - and the transition language - in which actors become acquainted with the transition speak, i.e. niche, regime, synchronization, system, structural change, arenas, frontrunners, scaling up and so forth and so on (Loorbach, 2007). The shared discourse relates to the assumptions underlying complex problems, enabling a deeper understanding of the dynamics and complexity in the environment, i.e. understanding that a complex issue can be understood by using a complex systems perspective, that complex problems have certain dynamics, that problems which are perceived as complex and persistent are urgent and that structural change is a specific type of change, characterized by a certain nature and pattern (Rotmans, 2003; Kemp and Loorbach, 2003). Intentionally, the language and discourse are translated into actions. Ultimately, participants start to use the knowledge underlying the discourse for recognizing and anticipating weak signals by initiating niche-based innovations.

The criteria of transition scenarios have been outlined, resulting in a more in-depth image of transition scenarios. We will now turn to the subject of transition management and explain possible functions of transition scenarios in facilitating transition management and vice versa.

3.3. Functions and lessons regarding Transition Management

Transitions are important in relation to sustainable development as they can open the door to radical improvements in societal performance (Meadowcroft, 2005). Although transitions cannot be controlled in any absolute sense, they can be influenced through intentional intervention. Transition management is a deliberate attempt to bring about long-term structural change at the systems level (Rotmans, 2005). It requires the encour-

agement of a coalescence of seemingly unrelated bottom-up initiatives that follow on diverse global trends (Raskin et al., 2002). "Seemingly unrelated" because these diverse niche-based innovations take place on different societal domains, each domain having its own pace of change. Rapid movements characterize economic developments while cultural developments can be recognized by relatively slow movements. The reinforcement of these seemingly unrelated innovations into a joint project for structural change is a prerequisite for a transition to happen (Rotmans, 2005). This mechanism is time-dependent and only occurs when developments in different domains synchronize in one and the same direction. A purpose of transition management is to cultivate the right incentives for synchronization to happen. This is also called goal-oriented modulation (Kemp and Loorbach, 2003; Meadowcroft, 2005).

This section aims to illustrate that transition scenarios have an added value in practically realizing synchronization. Transition management and transition scenarios are both concepts that are relatively new and are therefore continuously changing and evolving in order to fulfil their intended purpose more properly and smoothly. The claim is that transition management can realize synchronization better by embedding transition scenarios in transition management activities. The remainder of this chapter is used to demonstrate and clarify this statement. As a preparatory step, several subject matters need to be explained. First, we will point out why it is relevant for the line of reasoning in this book to discuss the embedding of transition scenarios in transition management. Second, the existing challenges of transition management in terms of realizing synchronization are discussed. Third, we will explain the cyclical transition management framework (TM-Cycle) in which transition scenarios, as claimed in this section, are ideally embedded. Fourth, the functions of transition scenarios within the TM-Cycle are described, outlining how the ambitions of transition management can be achieved more accurately. Finally, the lessons learned for developing a method for transition scenarios will be outlined.

3.3.1. The relevance of discussing transition scenarios in relation to transition management

This subject of discussing the functionality of transition scenarios in transition management is not at the core of this book. We can give several reasons, however, why it is appropriate and fitting to touch upon this subject within the line of reasoning set out for this book. First of all, scenarios are in general criticized for the fact that they have limited influence in decision-making, since they fail to connect to current practices (Ringland, 1998; Eden and Ackerman, 1998; Van der Heijden, 2005; Wiek et al., 2006). Also common is the criticism that they portray beautiful outlooks of the future, but that these are too vague or seem, in the eyes of practitioners, too far out of reach to actually

ground in short-term strategies (Schwarz, 2005; Van Notten, 2005; Van Steenbergen, 1996; Lindblom and Woodhouse, 1993; DeLeon, 1999). Transition scenarios have to guard themselves against this pitfall (Albert, 2009). Embedding transition scenarios in transition management, permits that transition scenarios become part of a trajectory. This trajectory guarantees that the transition scenarios are sustained, operationalized and systemically anchored in short-term actions. The functionality between transition scenarios and transition management is thus not one-directional but reciprocal instead. By addressing this subject, we hope to extract lessons for the construction of a method for transition scenarios. In the final section of this chapter we will revert to this topic.

3.3.2. Challenges for transition management in realizing synchronization

In order to cultivate the right incentives for synchronization to happen, the transition management perspective has the ambition to integrate long-term governance activities into the realm of short-term policy making. These long-term governance activities consist of visions: qualitative, inspiring, challenging and imaginative conditions of the future that define a structurally different and more sustainable state of the system. It is problematic for transition management that the way in which these visions are generally meant to delineate short-term policy, is often more neglected or implicit than systematically structured. Visions are not explicitly institutionalized in regular policy making. This is, however, a necessary condition for successful governance for sustainable development (Loorbach, 2007). *The claim is made in this chapter that transition management is able to achieve this ambition, but that the right methods (i.e. transition scenarios) had, until now, not yet been developed.* Due to lack of fitting and appropriate instruments, long-term visions have tried to fulfil the task of transition scenarios within transition management. One can speculate if visions provide a comprehensive and detailed enough foundation from which short-term strategies can be extracted that jointly result in goal-oriented modulation. Visions merely provide insight into the future state of a system, while synchronization strategies focus on initiating, from the present onwards, a certain direction and pathway for future change at a systems level. Information concerning the pattern underlying the transformative change process in time at the level of a system is therefore necessary.

3.3.3. The transition management framework and the TM-Cycle

Before we can clarify the role of transition scenarios in transition management, it is significant to make the transition management framework comprehensible. This framework distinguishes different types of governance activities at different levels (strategic, tactical and operational). The use of the term 'level' is merely meant to provide a

structure for analysis rather than to suggest any hierarchical relationship. The processes ongoing at the different levels of the transition management framework are linked. First and foremost, the transition management framework provides a heuristic approach for translating activities at a strategic level into tactical and operational performances (Kemp and Loorbach, 2003). For future visions to materialize in short-term strategies, they should be downscaled from the strategic level, through the tactical level, to the operational level. Here lies the challenge for successful transition management and the potential for more appropriate instruments. Below, an explanation is given of the governance activities at the different levels of the transition management framework, followed by an explanation of the systemic instruments used at each level to make these governance activities applicable.

The strategic level is characterized by processes of envisioning, norm setting and collective goal formulation. These activities are carried out with the purpose of generating ideas about a societal system and making the conditions under which it functions more sustainable. These activities have a long-term time span and the context in which actors at this level operate is in terms of a whole system. At the tactical level, steering activities are inferred from the processes ongoing at the strategic level. These resemble actions (negotiations, planning and control, financial support, programming and such) and institutions (such as rules and regulations, organizations and networks, routines and infrastructures), which are often driven by an interest in maintaining or overthrowing the existing dominant regime of a societal system in order to become more sustainable. These have a mid-term time span. The context in which actors at this level operate is in terms of sub-systems of a societal system. These can be sectors or themes for instance. At the operational level, actions are selected that support the steering activities at the tactical level. They resemble short-term projects and experiments of individuals and organizations that have an innovative potential. It is at this level that actors explore new types of solutions and create innovations (new technologies, new rules, new organizations, new services and so on), which sometimes fail, are sometimes taken up by a regime and sometimes help to transform a regime. Operational transition management focuses on synchronization and scaling up. It tries to align and connect innovative activities and practices in such a way that they develop into institutionalized regime-structures and shed light on possibilities for inducing the desired changes in culture, structure and practices at a systems level (Loorbach, 2007).

The transition management cycle (TM-Cycle) integrates and structures the different clusters of activities at the different levels and actively tries to influence and guide them towards sustainability by using specific process and analytical tools. These tools are called systemic instruments and are represented in the cycle in Figure 3.1, the TM-Cycle.

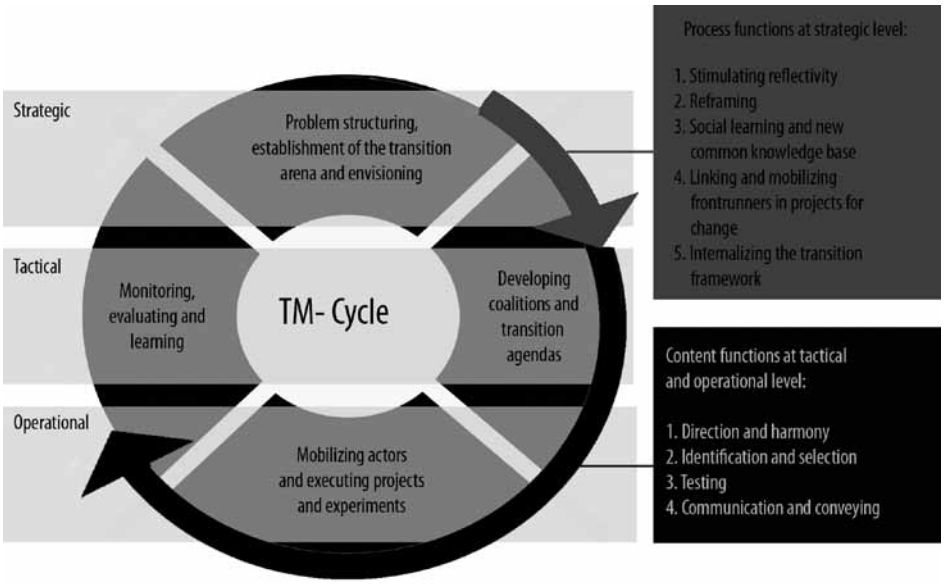

FIGURE 3.1 - *The TM-Cycle with process and content functions of transition scenarios.*

Figure 3.1 is represented at this point as a visual guidance in [1] explaining the different systemic instruments of the TM-Cycle and their interrelations [2] positioning and embedding the development of transition scenarios as a systemic instrument within the TM-Cycle (the grey arrow) [3] depicting what the added value and functions of transition scenarios in transition management are (the black arrow). Before we turn to the discussion of the latter, the following subsection more closely comments on the different systemic instruments of the TM-Cycle.

3.3.4. The systemic instruments of the TM-Cycle

The activity cluster with which the transition management process starts off is located at the strategic level and comprises problem structuring and envisioning. A key element in transition management is *problem-structuring*, which leads to a comprehensive viewpoint on a given problem at the system level. The understanding of a present-day complex system with symptoms of unsustainability is the basis for developing *sustainability visions*. These visions are different from transition scenarios. They do not portray a fully-fledged narrative of a future system but merely an enumeration of sustainable circumstances, nor do they inform us how the process of transformative change at a systems level can initiate, accelerate and subsequently proceeds; transition scenarios do both.

Within the activity cluster at the tactical level, existing regimes are confronted with these newly emerging visions. Their conservatism and rigidity is verified and the visions illustrate that existing regimes fail to deliver the societal benefit they used to deliver. To make these reservations more explicit, the broad visions are further translated into increasingly tangible, possible and favourable alternatives. Hence, specified goals, concrete actions and new ideas emerge within *self-formed coalitions*. Transition images and transition paths are the instruments that capture these goals, actions and ideas. Transition images consist of several interrelated images of the future that collectively fit within the overall vision. These images make a vision concrete for different domains at a sub-system level. Transition paths are routes to a transition image via intermediate objectives, which, as they come closer, can be formulated more quantitatively. Within transition paths, the interests, motives and policy of the various actors involved come out into the open, and there will be negotiations about investments, and individual plans and strategies will be fine-tuned. Transition paths function as a means to integrate and adjust individual *transition agendas* and ambitions.

The activity cluster at the operational level aims to learn from the development of the transition agenda to create, connect, integrate and accelerate communities and societal niches for innovation that hold shared beliefs and ambitions. Simultaneously, to develop *transition experiments* which lead to the best possible input in terms of new insights, knowledge or options for the transition agenda. Transition experiments fit in a particular transition path, have by definition a poor fit with aspects of present society and contribute to system innovations that can challenge the existing system (Van den Bosch and Taanman 2006).

The different activity clusters described are followed by an *evaluation phase*, in which activities and their effects in the different phases and the interaction between them is reflected upon. This evaluation is used to stimulate synchronization and further refinement of the transition management activities at all levels. It may thus lead to adjustment of the developed instruments at the different levels as they are evaluated to see whether they have been achieved. Once this is done, a new transition management cycle starts (Kemp and Loorbach, 2003).

The following subsection positions transition scenarios within the TM-Cycle. The functions and added value of embedding transition scenarios in the TM-Cycle will be explained. The focus of our discussion will be on the added value with respect to deducing systemic instruments at the tactical- and operational level from the strategic level. At a meta level, our attempt is to illustrate the added value of transition scenarios in the TM-Cycle relative to future visions and transition paths that are already part of the TM-Cycle.

3.3.5. Functions of transition scenarios in the TM-Cycle

The development of transition scenarios could be carried out in between the process of visioning and the development of transition images and paths (the grey arrow in Figure 3.1). Transition scenarios merge in at the strategic level because they envision a *societal* system over a *long-term* time span at a *systems level*. The added value of transition scenarios in relation to the challenge transition management currently faces lies in their potential to extend future visions with a structured and analytical approach for identifying the pattern of transformative change in time at a systems level. Transition scenarios thereby smoothen the process of downscaling future visions at the strategic level into transition images and paths at the tactical level. Otherwise, it would be an endless task to infer goals and strategies for specific actors at the level of a sub-system (transition images and paths), when only notions of future sustainability at the level of a system (future visions) are represented. It implies that there are infinite possibilities to fulfil these notions of sustainability, both in terms of actors, roles, relations and strategies etc. The functions of transition scenarios in this process of downscaling can be outlined as follows:

1. Direction and harmony

The first phase of the TM-Cycle is assumed to facilitate the convergence of different problem perceptions based on the articulation of diverse perspectives of forerunners. This leads to new visions on the nature of problems and future ambitions. Within transition scenarios these conditions of future sustainability are rooted in storylines, supported by reason generation and underlying causal mechanisms. In doing so, the gap between the current system and a desirable one becomes discernible, as well as the actions needed to close this gap. Transition scenarios draw up the boundaries of sustainability by sharply indicating the desired directions of development for the system as a whole. This direction functions as a compass and creates the space in which innovative transition activities, on a smaller scale and in the present, can be exploited while ensuring the harmony of the whole system.

2. Identification and selection

Building on what is said before, transition scenarios provide an imaginative framework at a systems level to challenge, draw out and operationalize. This framework puts forward and points out specific fields of interest that need close attention in the future in order to make sustainability approachable, such as problems that need to be tackled and neglected areas which have the potential to speed up the structural change process. Based on these fields of interest, urgent themes or domains can be identified that need close consideration in realizing future sustainability. These can subsequently be operational-

ized in transition images and pathways at the tactical level. At the operational level, coalitions can be formed and innovative experiments can be selected that need to be sustained in niches.

3. Testing
When experiments have been carried out and have left their marks in practice, the transition scenarios function as a benchmark against which the outcomes can be measured. Measured in terms of their contribution to the overall transition, and more specifically, to the initiation of goal-oriented modulation and structural change at a systems level. This reflection provides the ground based on which adjustments can be made in agendas and experiments as well as in the transition scenarios themselves. A transition process cannot be predicted in advance, and the tracks to be followed and the goals that are strived for can change over time as new insights emerge. Transition scenarios enable a transition to evolve based on progressive insight.

4. Communication and conveying
Transition scenarios intend to position sustainability as a long-term challenge which cannot be reached within existing structures or by taking short-term steps only. On the one hand they are general and broad enough for various people with differing perspectives to identify themselves with the stories. On the other hand, they are specific enough to infer notions on privileged directions and strategies to be followed. They can serve as a communication tool for conveying the urgency of a transition to a large group of people with different perspectives, while stimulating commitment and binding parties together in coalitions for change.

This section focused on explaining the functionality of transition scenarios in transition management. In the beginning of this section, we mentioned that the relation between transition scenarios and transition management is in fact reciprocal. The following subsection will clarify the functionality of transition management for transition scenarios.

3.3.6. Lessons from transition management for a method of transition scenarios

As mentioned before, transition scenarios are often criticized for their lack of practical guidance. This seems paradoxical, since this is exactly the added value of transition scenarios in the TM-Cycle. However, this is exactly the reason why the relation between transition scenarios and transition management is called 'reciprocal'. When transition scenarios and transition management are carried out separately from each other, they both have a lacuna in their approach which prohibits a structured translation of long-term ambitions into short-term actions. Within transition management this lacuna

relates to notions on how transformative change at the systems level proceeds in time, while with transition scenarios this lacuna relates to notions on the operationalization hereof for subsystems and concrete projects or experiments. When transition scenarios and transition management are intertwined, they complement each other.

The development of transition scenarios goes beyond reason generation in that it examines combinations of events that may seem idealistic and improbable seen from today's perspective. Hence, no levers, actors or strategies seem currently available to live up to the challenge posed within the transition scenarios – but they are possible, and maybe even necessary to achieve long-term goals of sustainability (Raskin et al., 2002). When the development of transition scenarios is integrated in the TM-Cycle, the condition arises to concretize and downscale the transition scenarios further in a stepwise manner: from transition scenarios at the strategic level into transition images, transition pathways and transition agendas at the tactical level and even further into projects and experiments at the operational level. This way, transition scenarios can provide support for bringing long-term desirable futures into contact with short-term practices that are of value for today. Lessons can be learned from this with regard to the construction of a method for transition scenarios. Since the embedding of transition scenarios within transition management is advantageous in light of its practical enhancement, this book develops a method which is suitable to apply in the TM-Cycle. The criteria that result from this are therefore relevant to take into account. However, empirical research on the embedding of transition scenarios within the TM-Cycle will not be conducted in this book. Only preliminary theoretical notions will be given in this regard.

When transition scenarios are employed to reside in a trajectory like the one offered by the TM-Cycle, several *content criteria* have to be taken into account, ensuring that transition scenarios build on and enrich the visions at the strategic level while linking up perfectly with the transition images and paths at the tactical level. With regard to the intersection at the strategic level, the transition scenarios should not only capture the conditions of the visions and use them as a lead in the future stories of the transition scenarios, but also integrate them into consistent storylines. Furthermore, the phase of problem structuring at the strategic level usually results in the identification of several persistent problems that need to be tackled in the future course of events. Since the visions only portray future conditions, the transition scenarios should envision future stories that are free from current barriers to sustainability and explain how these persistent problems have been overcome, and moreover, how they have resulted in a process of structural change.

With regard to the intersection at the tactical level, the transition scenarios should be as concrete as possible for the system level at which they are developed. This implies

that a certain level of detail and specificity is desirable for making the step to strategies, (sub) goals, actor roles and agendas feasible. Transition scenarios should envision the aggregation of transition images and paths. It implies that transition scenarios should play out the joint consequences and outcomes (at a system level) of the individual experiments, projects, roles, goals and agendas carried out at the level of subsystems. Within transition scenarios the focus is on the strategies of and relations between networks and groups of actors and their influential capacity with regard to changes at a system level, such as scaling up of niche-based innovations by anticipating weak signals, causing synchronization between different sub-systems, advancing trend breaks while putting pressure on a regime to change or adapt etc.

3.4. Conclusions: a conceptual foundation

From a theoretical point of view, third generation scenarios have made a considerable contribution to scenario development efforts in the context of transitions and sustainability. Practical results that reflect these standards are in large part still to be awaited, however. Although various rather intuitive experiments concerning the development of transition scenarios have already been conducted, a solid underlying concept and method is still missing. With regard to the latter, this chapter concentrated on the prescriptive formulation of necessary criteria for transition scenarios, on the one hand paying specific attention to the integrative, consistent and comprehensive representation of envisioning transformative change, while on the other hand elucidating how this radical perspective on future change can result in processes related to reframing, reflexivity and mobilization. In doing so, promising qualities of existing scenario methods were combined with new criteria. The result was a conceptual foundation for transition scenarios, not just a mix of existing scenario approaches, but distinctive and innovative in itself.

With respect to the former, the theoretical claims underlying the conceptual foundation of transition scenarios have been empirically underpinned and by feeding back practical experiences from three different case studies throughout this thesis to our initial theoretical concept we have enhanced and validated the concept further. Within the context of this research, this resulted in criteria for transition scenarios that are theoretically prescriptive while being empirically applicable at the same time. The criteria give practical insight into the various analytical notions underlying transformative change by pinpointing how these can be logically integrated into a narrative storyline of radical change. We developed a conceptual foundation for transition scenarios which makes the application of transition theory in scenario development possible and which provides insight into this application. We made suggestions that presumably enable

the short-term implementation of transition scenarios in practice by embedding the concept in the TM-Cycle.

In summary, this chapter elucidated a conceptual foundation for transition scenarios while making its methodological employment perceptive. The following chapter builds on these and previous findings by constructing an actual method fore the participative development of transition scenarios.

CHAPTER 4

Working towards a method

4.1. Introduction

This chapter outlines a method designed to develop transition scenarios, called TRANSCE. We integrate theoretical and practical insights gained throughout this research. It represents a product of this entire study. The theoretical insights are obtained from previous chapters - the promising qualities of and necessary improvements in existing scenario methods (Chapter 2), integrated in a conceptual foundation of transition scenarios (Chapter 3). The practical insights are obtained from the lessons learned and adjustments made in TRANSCE based on its application and evaluation in different settings (Chapters 5, 6 and 7). The theoretical and practical insights jointly add up to the method that we outline in this chapter.

At the heart of TRANSCE lies its aim to inspire, as it designates potential niches that can jointly contribute to sustainability. More importantly, it places potential micro-level initiatives in the bigger perspective of a long-term transition process to sustainability while indicating how these can be functional in initiating a process of structural change at a systems level. TRANSCE is a generic scenario approach, based on existing strains of thought in scenario development, but because of its integrative character, its complex systems perspective, and its explicit use of sustainability and uncertainties as a guiding principle, it constitutes a fundamentally new scenario method. The method forms a logical and iterative flow of essential design and discussion activities associated by techniques to stimulate and focus these activities. The activities can be perceived as generic steps or building blocks, constituting a compass that guides participative discussions. These in turn provide material for a set of narratives about complex systems going through a process of transformative change towards sustainability. In the previous sentences we used both the terms 'method' and 'technique'. These are used rather indiscriminately in articles about scenarios published in Futures over the last few years, so it is hard to define the distinguishing elements (Aligicia, 2004; Mannermaa, 2000; Marien 2002; Wiek et al., 2006; Bradfield et al., 2005; Inayatullah, 1990; Masini, 2001; Tapio, and Hietanen, 2002; Mendonça et al., 2004). Based on what we have come to acknowledge in these articles in relation to what we intend to convey in this chapter, we conclude that 'method' carries a solid, organized, even an analytical and academic connotation, whereas 'technique' relates more to style than to substance. A method focuses on the steps for carrying out the process, while a technique relates more to the particular way in which the steps are carried out (Hjorth and Bagheri, 2006).

This chapter is structured as follows. First of all, we try to formulate the ambitions required in a particular problem situation that make the use of TRANSCE valuable. We present a number of conditions under which the application of TRANSCE is more useful

and functional than other scenario methods. The second part of this chapter outlines the generic steps that comprise the method TRANSCE. Thirdly, we comment on the associated techniques.

4.2. A method to design transition scenarios

4.2.1. Conditions of use

The principles for third generation scenarios clearly underline the need for more systemic and anticipative approaches; however, they do not give adequate handles to develop a type of scenario specifically targeted at envisioning transformative changes to sustainable development. In presenting TRANSCE we try to apply the complexity and dynamics inherent in transformative change processes to societal transitions, accompanied by a normative ambition to direct these transitions towards sustainability. In this respect, transition scenarios differ from more conventional forms of scenario development, which are based on formulating robust strategies and/or reducing uncertainties. Translating this to the practical use of TRANSCE, the method is most constructive and valuable for the participants engaged in the development process when they have adopted certain ambitions. These represent additional basic requirements that should be considered by the users of TRANSCE. Based on these requirements participants can decide if the use of TRANSCE corresponds more to their ambitions than any other scenario method. Thus the use of TRANSCE is functional when one or more of the following problem solving ambitions are adopted:

- Assessing the necessity and desirability of a societal transition in relation to a specific problem situation
- Scrutinizing how ongoing rather isolated micro initiatives can be integrated, with the intention to result in synchronization and influencing the higher-order ambition of societal systems change
- Considering possible pathways and their associated opportunities and risks for realizing sustainability, and moreover, relating these pathways to current ongoing activities
- Creating space for the development and initiation of new and innovative system innovations that have the potential to break down the current dominant regime
- Assessing the existing capacity of a system or its possible lacks in relation to influencing a desired path of transformative systems change

Now that the conditions for constructive use of TRANSCE have been outlined, the next subsection deals in depth with the actual method.

4.2.2. The generic steps of TRANSCE

TRANSCE consists of seven generic steps that are iteratively linked (See Figure 4.1). The white arrows indicate the sequence of the steps; the black arrows indicate the mutual alignment between specific steps to ensure consistency in the eventual transition scenarios. In explaining the method we focus on the individual steps themselves and what they encompass, but more importantly, on how the steps relate to each other in terms of their mutual alignment. In doing so, we intent to shed light on the iterative character of the method. TRANSCE enables the methodological application and integration of the various transition concepts in scenario development. The pattern of transformative change that these concepts aim to visualize is difficult to grasp due to its various determinants and uncertain nature. In guiding the reader through the method while identifying the interactions between the steps, we divide the entire transition process in small, comprehensible pieces of information and explain how the integration between them adds up to the complexity and dynamics of the whole transformative change process. It is a means to introduce the readers – but also the participants engaged in the development process - step by step into the world that we call 'transitions' and make them gradually familiar with the way these processes occur.

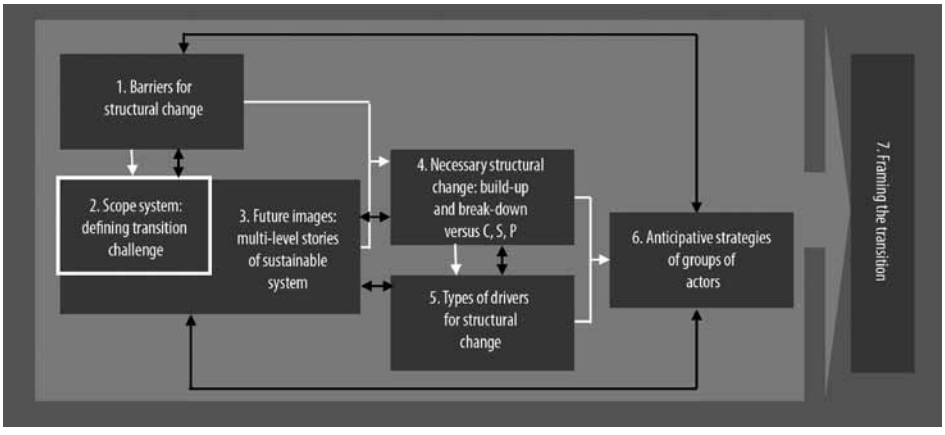

FIGURE 4.1 - *TRANSCE Version 3.0.*

Step 1: Barriers for structural change

In the beginning of the development process the participants are not always familiar with the concepts and language used in transition theory. Most of the time, integrated systems thinking is not part of their vocabulary, let alone their way of thinking and act-

ing. Initially, they do not always have specific ideas about the system (and its scope) that needs to go through a transition. This scope is not something that can be quickly decided upon or something that can be geographically marked; it is an ordering structure theoretically used within TRANSCE to define the demarcation of the system boundaries. It is an insight that emerges gradually, based on thorough discussions about the societal function of a system that a transition is expected to realize. Although this discussion activity is portrayed in step 2 of TRANSCE, it is not limited to this phase of the development process. Each successive step in TRANSCE and the iteration and alignment between the steps gradually makes this scope of the system more explicit.

As an orientation and a means of getting hold of the barriers that need to be overcome in reaching sustainability, TRANSCE starts off with defining currently ongoing and future-oriented problems that can be perceived as persistent. These problems have usually been there for a long period and many parties are involved in their coordination, but the individual parties' scope for managing them is relatively limited (Rotmans, 2005). In solving them, short-term economic interests take precedence over long-term societal values, resulting in incremental renewals of the existing order. More shortly, resulting in 'more of the same' instead of 'radical system innovation'. This is due to the fact that the relationship between those involved is for the most part well established and there is hardly any room for manoeuvre. Their uncertain and complex nature is currently not adequately recognized and dealt with; there is a clear necessity for system innovations that break with current dominant structures. This exercise addresses the necessity of a transition and outlines its challenges in terms of the problems that need to be tackled. Hence, the persistent problems are framed in terms of barriers against realizing the desired structural change. Examples of such barriers are specific regime conditions that hinder implementation of specific niche innovations. Moreover, a structural change process unfolds at three different levels – culture, structure and practices. It entails a process in time, bridging the gap between an unsustainable system state and a sustainable system state. It tends to accomplish this by intervening in the current culture, structure and practices (the barriers for structural change), and transforming these into more sustainable ones. In addition, the persistent problems or barriers are structured around these three dimensions. A theoretical definition of these can be found in Chapter 1. This trio is important further ahead in unfolding the structural change process, since they are put forward in transition theory, and derived from structuration theory (Giddens, 1984), as consisting of the parameters that describe transformative change in the functioning of a societal system (Rotmans and Loorbach, 2006).

Step 2: Transition challenge and scope of the system

The time perspective alters in the second step and becomes more future-oriented. Based on the foregoing step, the future 'transition challenge' is formulated (See also Chapter 3). The barriers for structural change can be thought of as 'challenges', in terms of problems that need to be tackled. However, these challenges need a certain compass or future ambition. Breaking down the dominant regime along with its barriers for structural change, needs to be carried out within a more long-term time perspective of sustainability. In addition, desirable sustainable conditions of a future system are considered under which it is believed the system can 'act' sustainably. This implies that our starting point stems from the presumption that the current unsustainable state of affairs can be transformed and overcome. This step is meant to give this transformation process a clear direction and focus. This change in perspective, from a negative connotation on the short-term to a positive connotation on the long-term, is called 'transitioning'. It prevents participants from restricting their thinking to things they believe are feasible or realistic from a current perspective.

It is a first attempt to get insight into several other things as well. First of all, to gain more insight into the scope of the system that needs to go through a transition. Based on the transition challenge, one can start to assemble the future functioning of a system as a patchwork of sectors or parts of sectors that need to or do not need to be involved in the societal systems change because they enable the emergence of desirable sustainability as formulated in the transition challenge. Secondly, comparing the current barriers for structural change (step 1) to the conditions of a future, sustainable system state (step 2), provides some first notions on the necessary structural change that is strived for. The conditions of a future sustainable system capture and reflect the outcomes of transformative change. Knowledge is obtained on required processes of build-up and break-down. This will not go any further than recognizing and distinguishing current conditions of the system that will no longer be there in the future system and future conditions of a system that are not yet present in the current system. However, a clear definition of the transformative change in terms of the culture, structure and practices that need to be broken down and built up is still difficult to deduce in this phase, since the barriers for structural change and the future conditions of a sustainable system are expressed in dissimilar variables. These insights are further enhanced in steps 3 and 4 respectively.

Step 3: Images of a desirable future sustainable system

'Image', 'story' and 'narrative' will be used interchangeably throughout this chapter, though they all refer to the same: a qualitative description of a sustainable future system state. This is probably the most creative step of TRANSCE, given that it requires the capacity of the participants engaged to imagine and envision the future system in its com-

plete and entire being and operating. The output of this step includes a distinguishing set of fully-fledged narratives of a future system state. These are based on the conditions of the future sustainable system (Step 2). The difference between the various stories originates from the contradictions that usually exist between the conditions underlying the transition challenge. Comparable conditions are grouped together, after which they are extended and deepened into consistent narratives of a sustainable future system. In order to make the narratives more realistic and vivacious, to enhance their empathy and identifiable character, to maintain a certain level of comprehensibility and make them functional in the following steps of TRANSCE, several additional characteristics of the narratives are considered to be important. First of all, the narratives should be told from the perspective of an end user who has gone through the transition. In the case of the care system this can be a patient, for example. Since we cannot speak of *the* care system or *the* patient, a further level of detail can be introduced by telling the same narrative from different end user perspectives, enriching the stories with different outlooks. In principle, each story is centred around a person who shares his or her daily life experiences in relation to the societal functioning of the system that we are dealing with. These experiences are based on the assumption that the transformative change has resulted in several of the sustainability conditions formulated in step 2 of TRANSCE.

Upfront consideration about alignment with upcoming steps is significant throughout TRANSCE. Two additional mechanisms for structuring the stories are introduced accordingly. First, similar to the barriers for structural change mentioned in step 1, the life experiences that are central in the stories should identify aspects of culture, structure and practices. It exposes the person's state of being and behavioural possibilities as a result of encountering the culture, structure and practices that subsist in the future system. It implies that this person explains how his or her personal life is affected or influenced by the new existing norms and values (culture), the institutions, rules and regulations (structure) and the routines, roles or behaviour of people around him or her (practices). It should be kept in mind that parts of the structure, culture and practices that are illuminated within the stories are new in addition to the culture, structure and practices that reside in the current unsustainable system. Secondly, the transformative change process unfolds at different functional scale levels. Hence, the stories should reflect the outcome of the transformative change process in terms of niche, regime and landscape. It implies that the life experiences central in the future stories should illuminate [1] personal implications inflicted by the traditions or habits of mind that are now part of everyday life but used to be limited to just a few and (regime); [2] how ongoing trends and existing uncertain developments impact his or her life and maybe even force it in a certain direction (landscape); [3] how the increase in new technology, behaviour, politics, rules etc. that he or she encounters through media or individual experience affects his or her daily existence (niche).

The difficulty in TRANSCE of first dealing with imagining a desirable future system state, is that we do not have any pre-knowledge about the spin-off resulting from the structural change process at the different scale levels. Hence, the purpose of this step is to provide the structural change process with a future and sustainability-oriented point of reference, thereby confining and constraining the transformative change process to certain boundaries. We experienced, however, that it is difficult to develop creative as well as consistent transition scenarios when the sequence of steps within TRANSCE is too fixed. The future stories should not impose any restrictions on the way the structural change process unfolds in a transition scenario. A continuous iteration and alignment between step 3 on the one hand and steps 4, 5 and 6 on the other is therefore necessary.

Step 4: Necessary structural change

This step lays the foundation for the structural change process described in the pathways. It connects the persistent problems of the current unsustainable system (Step 1) to the stories of the future sustainable system (Step 3). We previously mentioned that culture, structure and practices are the vehicles employed to explain the transformative change process. By comparing the outcomes of step 1 and step 3, transformative change in terms of culture, structure and practices can easily be distilled.

Subsequently, the specific pattern through which this structural change unfolds should be made transparent in terms of what is *built up* and what is *broken down* (See Chapter 3). These are not the theoretical terms used in transition literature for these mechanisms (De Haan and Rotmans, 2009; Haxeltine et al., 2008; Van der Brugge, 2009) but we experienced during the case studies that they fuel people's imagination. Since TRANSCE intends to envision the empowerment pattern, both mechanisms are strong and mutually reinforcing, leading the dominant regime to break down and the niches to develop into the new dominant regime.

The challenge is to assign the various necessary changes in culture, structure and practices to either the process of build-up or the process of break-down. If culture, structure or practices form a barrier for structural change (Step 1), they need to be broken down during the transformative change process. When culture, structure or practices are described in the stories of a future sustainable system but do not yet exist in present time - or are still part of the undercurrent or only visible in terms of weak signals - (Step 3), they need to be built up during the transformative change process. This step mainly focuses on the question *what* exactly changes during a societal systems change. It provides a first static impression of the structural change process in time. The complex and dynamic character of the pathways will take shape during the following three steps by focusing on *how* these mechanisms interact. At the centre of attention lie the interactions between niches at the micro level and drivers of change at the macro

level, resulting in pressure on the incumbent regime at the meso level, eventually forcing it to break down.

Step 5: Drivers for structural change

The mechanisms of build-up and break-down are accelerated by the interaction between the micro level, the meso level and the macro level. This particular step focuses on the interaction between what we call the 'drivers for structural change'. These entail the influences existing in the environment of the system under study - ranging from events at the micro level to the more slowly moving trends at the macro level. They create the right climate for transformative change and have the potential to cause the incumbent regime to destabilize and set a deviant, more sustainable direction for change. Appointing and structuring the drivers for structural change is at the heart of this step. After listing them, they can be categorized based on the different types of uncertainties put forward in Chapter 3: weak signals, uncertain developments (consisting of reducible ignorance, indeterminacy and imaginable surprises that are improbable) and certain developments. For each of the drivers it also has to be denoted if they hamper or accelerate structural change. Notice that certain developments have a less active role in enabling the right climate for structural change. They only channel certain pathways. However, they need to be included in the future stories since they are difficult to influence and therefore certain to survive.

What results is an ordering mechanism that, within this and subsequent steps, can be employed to infer how the emergence of discontinuities can be influenced or even stimulated. Interaction patterns between weak signals and uncertain developments are imagined with the intention to stimulate the emergence of discontinuities. A variety of these interaction patterns are probably conceivable here, eventually combined in different pathways that lead up to the future stories. Step 7 focuses in particular on the co-evolution of several of these interaction patterns within one and the same pathway. This exercise provides insight into and offers perspectives on required and potential new niches. Understanding and being familiar with the relations between the drivers for structural change is essential in several other respects. On the one hand it provides insight into the potential for accelerating a transition and on the other hand it gives an idea of the direction in which the societal system is heading if no action is undertaken. It designates the drivers that need to be anticipated by niches in order to overcome the current barriers for structural change (Step 1) and facilitate the break-down of the dominant culture, structure and practices while initiating new culture, structure and practices (Step 4) that lead up to the stories of a future sustainable system state (Step 3).

Step 6: Anticipative strategies of groups of actors

The information gathered during this step is supposed to be consistent with all the foregoing steps, iteration is therefore important. It is the last piece of the puzzle necessary for visualizing the complex and dynamic interaction pattern over time inherent in the structural change process. Within the realm of preceding steps, this step suggests, considers and selects potential new niches that can be employed for anticipating the drivers for structural change. Step 5 provides insight in this respect. It remains a creative process, however, which requires a lot of imagination. More importantly, an understanding of the patterns underlying structural change in complex adaptive systems and the capacity to consider the long-term consequences of short-term actions is relevant. The "desired interplay" between niches on the one hand and drivers for structural change on the other is explored. A sense of what this "desired interplay" consists of has gradually evolved in following the steps of TRANSCE: they build on contemporary initiatives that try to overcome current persistent problems and guide renewal towards sustainability (Step 1). They should contribute to realizing the desired future state of the system (Steps 2 and 3). They should facilitate the necessary changes in culture, structure and practices in terms of what needs to be broken down at the level of the dominant regime and what needs to be built up at a niche level (Step 4). Finally, they should match or connect to the weak signals that are expected to create, in time, the right climate for structural change (Step 5). In exploring the desired interplay, various strategies are shaped that intentionally result in discontinuities and force the regime to adapt or break down. To each of these strategies, networks or groups of actors can be linked. Because these strategies deviate from dominant perspectives on change, it is very likely that new networks and groups of actors are also introduced at this point.

Step 7: Framing the transition

The last and final step of TRANSCE is a coordinating step and ensures alignment and consistency between the previous steps altogether. No new information is added; the information gathered from preceding steps is integrated and framed according to the dynamics and timescale underlying the multi-phase concept (the S-curve). Although the preceding steps were tuned to fit each other, it remained a collection of several loosely coupled building blocks. The actual blending of the building blocks into a composite, complex and dynamic whole is done within this step. It results in several narratives, describing the empowerment pattern underlying the transformative change process towards sustainability.

The relevancy of introducing the multi-phase concept relates to the fact that it identifies that a transition consists of four subsequent phases in time, each having its own dynamics. The shift from the first to the third phase, also known as 'take-off', contains several features that are typical for initiating a structural change process. These

changeable dynamics in time should therefore be included in the transition scenarios. Explained in terms we have come to acknowledge in preceding steps, these dynamics can be outlined as follows. A transition starts off and ends with a phase of perceived stability. This implies that processes of build-up and break-down are ongoing but do not lead to visible changes. New niches are initiated in this phase and the desired interplay with weak signals and the subsequent influence on uncertain developments is explored. These processes proceed in the undercurrent, however. The shift between the first and the third phase is characterized by what we call 'synchronization' or 'modulation' (See Chapter 3). Several co-existing niches, weak signals and uncertain developments all move into the same direction and strengthen each other (Geels and Kemp, 2000; Rotmans et al., 2000). Because of that, the undercurrent slowly becomes mainstream. This means that uncertain developments unfold into discontinuities, niches scale up into niche-regimes, and tensions arise between the dominant regime and its environment, resulting in its destabilization and break-down. It reaches a point of irreversibility when the structure of the dominant regime appears to be too rigid to respond or adapt. A structural change is has begun. The third phase of a transition is characterized by instability. Here, the actual manifestation of the structural change process takes place. Processes of build-up and break-down are ongoing and result in radical and visible changes in culture, structures and practices. The incumbent regime is broken down and niche-regimes take over its dominant position.

In terms of reflection, the question that we left open in explaining TRANSCE is: based upon what notions do we decide that the transition scenarios are 'good enough'? This moment does not necessarily coincide with the moment that all the steps have been carried out; sometimes several re-iterations are necessary. The transition scenarios are 'finished' when the facilitators, who are usually transition experts, can point out the features characteristic for a transition process. and when the participants engaged reckon that the ideas played out in the scenarios are deviant and innovative compared to their daily practice. When these aims are both achieved, the development process can be rounded off.

Furthermore, the method may appear to be a bit 'mechanistic' as the steps are presented in a sequential order, starting from scratch and working in a rather linear mode towards the eventual transition scenarios. This presentation is partly because of scientific justification and partly because we use the steps as a conceptual ordering framework. As facilitator of the development process it is crucial to keep in mind the overall structure of the steps in order to [1] guide the discussions of the participants engaged and [2] offer participants insight into the contribution of each step in relation to the realization of the eventual transition scenarios and the overall process of development. Although TRANSCE may remind people of a roadmap or recipe, it has

been developed organically. TRANSCE started off as a theoretical claim which has been empirically validated and refined each time it was tested in practice (Chapters 5, 6 and 7). Learning experiments were fed back into the method before it was tested again. TRANSCE functions as a compass, guiding the development process. However, each time the development process unfolded in practice, the direction was modified based on learning experiences, leading to modifications in the compass itself. Additionally, the process of development *in practice* is cyclical and iterative instead of sequential. The demarcation between the steps is amorphous: although TRANSCE starts off with defining the scope of the system that needs to go through a transition, information gathered in subsequent steps gradually leads to a more detailed insight into this scope. Moreover, during the development process participants continuously go back and forth between different steps in order to ensure consistency and alignment between steps: the chosen strategies (Step 6) depend on the barriers that need to be overcome (Step 1). The relentlessness of practice is an additional factor that made it difficult to capture the cyclical nature of the process in the method. We experienced that the way the process unfolded in practice was different each time it was tested. The evolvement of the process in practice is dependent on non-influential factors like the nature and creativity of the participants involved in developing the transition scenarios, the diversity or deviant nature of the ideas generated in subsequent steps (stimulating the cyclical nature by making mutual alignment necessary), the resistance of the group towards ideas put forward by other group members etc. Therefore, in presenting the method on paper, we had to fall back on a framework which provides structured levers for use.

The following section comments on the types of techniques that are used within TRANSCE to support and structure the discussion activities put forward by the steps in TRANSCE.

4.3. The techniques underlying TRANSCE

This section intends to point out the types of techniques functional for practical support of TRANSCE. Scenario development techniques, which have their basis in creative problem solving (CPS), are relevant in this respect, but these techniques are at the same time very diverse and fragmented. The scientific strength of these techniques is rather low and their use is highly intuitive (VanGundy, 2005). Furthermore, literature about scenario techniques has limited discussion on the process of identifying, structuring and anticipating the systemic conditions that could create discontinuity (Burt, 2006). However, it is vitally important that we think systematically and creatively about desired futures, or else we run the risk of being surprised by its complexity and uncertainty

(Bishop, Hines and Collins, 2007). The functionality of techniques in the application of TRANSCE is to convey the theoretical rationale behind the method to the practical world of the participants engaged. Several potentially relevant existing types of techniques are revealed this section and fine-tuned in accordance with the requirements of transition scenarios.

This section is set up as follows. First, different types of techniques are distinguished based on a number of articles that review the field of scenario techniques and creative problem solving (McFadzean, 1998; Couger, 1995; VanGundy, 1992; Bishop, Hines and Collins, 2007; Osborn, 1957; Simon, 1977; Brightman, 1988; Bradfield et al., 2005). Second, these types of techniques are assigned to the various generic steps of TRANSCE, depending on their potential function in TRANSCE. It contains a relevant contribution to this book since it offers general though practical guidelines for applying TRANSCE. Finally, some examples are given of individual techniques that fit the types mentioned and can be used in the application of TRANSCE. At the same time, we address the adjustments that we introduced in these techniques relevant for envisioning the complexity that is strived for in transition scenarios.

4.3.1. Types of techniques

Creative problem solving techniques have a long history, going back to the seventies. At that time they were mainly used for organizational problem solving and product development. Since then, these techniques have diversified and can nowadays be applied in a variety of ways and in a number of different settings. Due to the evolving nature of creative problem solving techniques, various classifications exist (McFadzean, 1998; Couger, 1995; VanGundy, 1992; Bishop, Hines and Collins, 2007; Osborn, 1957; Simon, 1977; Brightman, 1988; Bradfield et al., 2005). For example, VanGundy (1992) classifies them by individual and group techniques and Brightman (1988) uses Simon's (1977) three stage model of problem solving, intelligence, design and choice to classify them. A classification of techniques is relevant for this book since different types of techniques serve different functions. Likewise, different steps in TRANSCE serve different functions in the eventual transition scenarios. It is important to match the type of technique accurately with the different generic steps involved. However, neither classification mentioned above provides a clear distinctive guideline for categorizing *types of techniques*. A more powerful classification in this light has been put forward by Couger (1995). He suggests that scenario techniques can be classified in two groups: intuitive and analytical. Intuitive techniques allow the participants engaged in the development process to make giant leaps. They encourage the participants to look at the situation from a completely new perspective. Based on the work of Nagasundaram and Bostrom (1993),

McFadzean (1998) has come to the conclusion that intuitive techniques lead to output that can be denoted as 'paradigm breaking'. Couger (1995). Keeney (1993), Solomon (1990) and Evans (1993) suggest that creativity and novelty can be enhanced by utilizing intuitive techniques because they force participants to be imaginative, break with old paradigms and mind patterns and form new connections and patterns. Examples of these techniques are 'Metaphors' and 'Wishful Thinking' which encourage participants to use unrelated stimuli to help them develop more novel ideas (McFadzean, 1998; Garfield, Satzinger, Taylor and Dennis, 1997) Within TRANSCE, this type of technique is used to generate the future stories. These are, from a normative point of view, structurally different from current dominant culture, structure and practices. Intuitive techniques are functional in TRANSCE with respect to stimulating novel and more sustainable perspectives on the future, encouraging processes of reframing and mental enrichment.

Analytical techniques on the other hand are defined by Couger (1995, p.44) as those that "use a structure to generate a logical pattern of thought". They follow a step-by-step structure, taking a logical path towards the desired output. Analytical techniques lead to output that can be denoted as 'paradigm preserving' or 'paradigm stretching'. These techniques do not force the participants engaged to use their imagination to develop completely novel ideas. Instead, they lead participants to explore and search more systematically for relations, structures and patterns (McFadzean, 1998). Examples of this kind of technique are Force-Field Analysis and Progressive Abstraction which use free association and related stimuli to develop insight into the underlying forces of a problem situation (Couger, 1995). TRANSCE uses this type of technique to unravel and structure the complexity inherent in systemic and transformative change processes and envision the emergence of discontinuity. They are employed to search for levers how to influence structural change in societal systems. They are a means to anticipate the complexity and uncertainty inherent in transition processes, making it comprehensible and amendable. Furthermore, it is meant to structure and arrange discourse about future sustainability and structural change.

Based on what is said above, the type of technique used can be linked to the generic steps of TRANSCE. It is important to mention that no strict boundaries can be drawn and that a combination of both types will always be present in each step. Couger (1995) suggests that a wider range of solution possibilities can be derived if both types of techniques are applied jointly. One type of technique prevails, however. For example, step 4 in TRANSCE is meant to look for processes of build-up and break-down in a very structured and guided way, thereby searching to find a systemic pattern that connects the future to the present via a pathway in which culture, structure and practices change. This would logically be realized by using analytical techniques. However, the path that results is paradigm breaking from a current perspective, initiating new relations and pat-

terns. Hence, more intuitive techniques would be appropriate in this respect. Thus both types of techniques are present, though in general we can state that the techniques utilized to facilitate the processes ongoing within step 4 of TRANSCE are mainly analytical. Following this reasoning, the steps of TRANSCE can be divided into two different parts. The development of future stories (the first three steps of TRANSCE) is mainly guided by intuitive techniques, whereas the development of pathways (the last four steps of TRANSCE) is mainly guided by analytical techniques.

An example of both types used in TRANSCE is described below.

Intuitive techniques in TRANSCE

What follows is purely meant to provide the reader with some animated illustrations and workable notions in order to clarify the application of TRANSCE further. It is not meant to provide the reader with an in-depth and structured insight into the existing and novel techniques necessary for developing transition scenarios. Assigning and linking specific techniques to specific steps in TRANSCE would make the method somewhat mechanistic and restrained. Moreover, the array of feasible techniques that can be used within TRANCE is endless, not the less since so many techniques exist. Nevertheless, these existing techniques should be adapted to the specific context of transitions. This section is meant to provide some examples of that. We will present an example of each type of technique, starting off with an intuitive technique. First the essence of the technique in existing scenario literature is clarified, after which the adjustments in relation to its use in TRANSCE are elucidated.

Most people think of the future as extending from the present, a natural extension of the timeline running from the past and through the present (Bishop, Hines and Collins, 2007). But that perspective has its disadvantages, chief among which is that the future then carries all the "baggage" of the past and the present with it into the future. The baggage limits creativity and might create futures that are too safe, not as bold as one desires the actual future to turn out. An antidote is to leap out into the future, and subsequently connect the future to the present by continuously working backwards and forwards, discerning how we might get there. In the case of a transition scenario, the first step then is to envision a future state of the system at a time horizon at which we believe it is possible to reach sustainability, while having dealt with and overcome all the barriers for structural change. Having established that future state of the system as an overall frame of reference, it is easier to connect the present to the future than it is to imagine the events leading to an unknown future. This approach refers to what is called 'backcasting' (Robinson, 1990). In the literature of creative problem solving (Grossman, 1984; Haefele, 1961; Glassman, 1989; Mac Crimmon and Taylor, 1976; Olson,

1980; Souder and Ziegler, 1977; Taylor, 1961; VanGundy, 1988), several techniques underlie this approach. The first is called 'law breaker'. Just like societal laws prescribe and govern social behaviour, similarly, problem laws govern the assumptions people use to perceive and define problems (VanGundy, 2005). The assumptions we have about the way things are, influence the ideas we generate about the future. Unfortunately, these assumptions constrain our thinking most of the time, limiting the futures we might consider possible. Hall (1994) designed law breaker as an activity to generate ideas by breaking assumptions about the way things are. This technique is very closely related to the technique called 'altered states'. Herein, a dysfunctional or narrow perspective is altered, disrupting locked-in viewpoints. The technique presupposes that changing the perspective can provide the insights needed to generate breakthrough ideas (Hall, 1994). Translating this to TRANSCE, it can be perceived that the formulation of a 'transition challenge' embodies in essence the same as the techniques mentioned above. The way in which the perspective is altered is different, however. It is not just about changing the perspective into anything but the current perspective, it is about providing scope for short-term actions in terms of a long-term, normative orientation of sustainable development. According to Van Gundy (2005) this particular focus within a transition challenge stimulates imagination and creativity for several reasons. It minimizes negative thinking, keeps sight of the big picture and takes prudent risks in visualizing a future that is challenging to realize in practice.

Analytical techniques in TRANSCE

With respect to the example of the analytical technique we can say the following. Generally, people perceive the past as a series of events (Bishop, Hines and Collins, 2007). So we can think of the future that way too, except that we do not know which events will occur and which ones will not. Each event then has a probability of occurrence. The future branches in different directions at each of those points depending on whether the event occurs and what reactions it provokes. The intention of this approach is then to string a number of those branches together and develop a logical order of event sequences which adds up to a desired pathway (Lisewski, 2002; Buckley and Dudley, 1999; Covaliu and Oliver, 1995). The technique underlying this approach is called 'Heuristic Ideation Technique' (HIT) or 'divergence mapping', developed by Tauber (1972). It generates events and subsequently differentiates those that are desirable or considered necessary by comparing them to heuristics or rules of thumb. These are used as a guideline within this technique to structure and focus the idea generation process and increase the chances of achieving a certain outcome. When specifying this technique for its use in TRANSCE, the heuristic is embodied in the multi-level concept (Chapter 2). The idea generation process involves considering uncertain developments, weak signals and niche-based innovations. The possible linkages between them generate event se-

quences. The branch points take shape based on the anticipation of weak signals that can lead uncertain developments to branch in different directions. The pathways within the transition scenarios are then composed by stringing and selecting those branches that result in discontinuity and force the dominant regime to break down.

4.4. Conclusions: a solid methodological basis

In this chapter we presented a solid methodological basis for future thinking, specified to the development of transition scenarios: TRANSCE. TRANSCE is innovative in the sense that it demonstrates the combined applicability of integrated systems thinking, complexity theory and sustainability in scenario development. In practical sense, it integrates the transition concepts, provides insight into patterns of transformative change and makes long-term oriented governance strategies discernable. It has the potential to fuel processes of reframing as the development process intends to envision a radical and trend breaking perspective on long-term change. TRANSCE is presented as a method that is generic as well as specific. It is a generic method in the sense that it contains building blocks of transition scenarios, applicable in any context where the envisioning of future sustainability in the context of transition is central. It is also specific because its effective use is dependent on contextual requirements, like the underlying techniques that are used and the means of process facilitation skills. The latter is not explicitly mentioned in this chapter but throughout the case studies it emerged as an important vehicle for successful implementation. We chose to pay considerable attention to this subject in the concerning case studies. However, since process facilitation was not a core research subject of this thesis, we were reluctant to present it as a core methodological result of this thesis in this specific chapter.

The scenario method as presented in this chapter is as much based on theory as on practical experience. It is therefore not a complete method. However, within several practical contexts, the approach has proved to be successful. TRANSCE provides, in close interaction with and adaptation to specific techniques and process facilitation, a valid and promising method for the development of transition scenarios. One could say that TRANSCE provides the basis for any visionary project which has the aim to develop transition scenarios. Sufficient practical learning experiences put forward that TRANSCE can be adopted as a method to employ on a bigger scale, thereby evolving beyond the experimental phase of continuous evaluation and refinement. By practically accounting for what is theoretically preached, while blending conventional and new scenario methods, TRANSCE enhances third generation scenarios.

PART THREE

Empirical

CHAPTER 5

Case 1: Learning from ISA in the European Union

5.1. Introduction

This chapter deals with the case study 'MATISSE' in which scenarios and transition for Europe are developed with a timescale to 2030. From a research perspective, this case study is approached as an explorative setting with the ultimate aim to develop a first rudimentary version of TRANSCE. This case contributed to the conceptual foundation and methodological basis of TRANSCE as presented in Chapters 3 and 4. MATISSE is proposed as a response to the challenge of reinforcing unsustainability at the European level with the aim to enhance the methods underlying Integrated Sustainability Assessment (ISA). MATISSE proceeds from the assumption that the methods used to support ISA should be conducted as a means to stimulate a transformative change at the level of institutions and underlying forms of assessments. Hence, a conceptual framework for ISA is developed, new methods and tools are explored and existing ones are better employed.

This case study started in a rather early phase of our research. At that point the concept and method for transition scenarios were both immature and for the most part even undeveloped. We needed a case study in which we had the freedom to explore what a method for the development of transition scenarios should look like. The character of the MATISSE case coincided with this prevailing research aim which resulted in several advantages. First of all, the strong focus within MATISSE on the development of new, innovative tools and methods for transformative change and sustainable development enabled the development of actual transition scenarios while exploring the underlying generic method for development. Furthermore, the aim of this case coincided with our scientific research aim to build on existing scenario methods. MATISSE explored how new methods for transformative change can be developed based on (extending) existing methods. Finally, due to its explorative character MATISSE enabled the emergence of a concept and method for transition scenarios based on the dynamic interplay between theory and practice. It provided the breeding ground for a participative setting in which theoretical expert knowledge regarding sustainability and transitions and practical insights concerning scenario methods and modelling could be cross pollinated, integrated and experimented with. This supported the maturing of our existent concept and method for transition scenarios.

The aim of this case study in relation to the main research question of this thesis was twofold: [1] further developing the content criteria underlying the conceptual foundation of transition scenarios with the aim to [2] construct a first applicable methodological version of TRANSCE. At the start of the case study we had, based on theory development, some preliminary notions about relevant content criteria for transition scenarios and ideas how to construct a method for its development in view of that. We decided to feed the development process within MATISSE with these pre-conceptualized notions, while

at the same time preserving openness and accuracy in our data gathering process. We observed and participated in the development process ongoing in the case study in an unobstructed manner and used the empirical insights to complement our initial ideas regarding the theoretical concept of transition scenarios. The subsequent integration between them led to an adjusted and more mature conceptual foundation of transition scenarios which we accordingly used to 'complete' a first version of TRANSCE.

This chapter contains different sections. Section two proceeds with a more in-depth description of the background of the MATISSE case and the rationale of scenarios and transition scenarios herein. We zoom in and confine ourselves to that part of the MATISSE case which is specifically interesting for this thesis. In section three the organization and scope for the development of the scenarios and the transition scenarios within MATISSE are outlined. Section four describes the actual participatory development process leading to the eventual scenarios. Explicit attention is given to observations, considerations and decisions that led to shifts and turns in the course of the development process. Section five addresses our own role in this case and the research methods fundamental in drawing conclusions concerning the enhancement of the concept and method of TRANSCE. In section six, a comparison of different scenarios developed within MATISSE results in the identification of distinctive content criteria for transition scenarios. Subsequently, the creative process is described in which the scenarios and content criteria are used as a starting point to construct and 'complete' a first version of TRANSCE. We close this chapter with a general conclusion and outlook for subsequent case studies in this thesis.

5.2. The MATISSE case

5.2.1. Background

The MATISSE (Methods and Tools for Integrated Sustainability Assessment) case was funded by the European Commission under the 6th Framework Programme, proposed to achieve a stepwise advance in the science and application of Integrated Sustainability Assessment (ISA). It was a three-year project, running from April 2005 till March 2008, in which 22 partners from institutes in 11 European countries participated. MATISSE should be seen as a means to reinforce sustainability by complementing existing policy assessment processes in the European Union. MATISSE was designed to [1] develop new tools and methods in light of integrated sustainability efforts [2] better employ existing tools and methods for ISA and [3] develop a conceptual framework for ISA in which the tools and methods could be employed. First and foremost, MATISSE was a project with a mandate to innovate methodologically. Scenario methods were part of

this attempt, and the focus of this chapter will be on this specific part of MATISSE. Two different types of scenarios were developed: business-as-usual scenarios and transition scenarios. With regard to the former, a number of case studies of unsustainability were carried out within MATISSE – environmental technology, resource use, water domain and agriculture, forestry and land use – in which modelling assumptions were used to reflect on future trends. The rationale of the business-as-usual scenarios herein was to ensure consistency and harmony between the assumptions underlying the various models in the different case studies. The transition scenarios were developed to explore the extent to which the models used could handle the complexity of transformative change processes and they reflected the softer aspects (e.g. cultural, sociological) of sustainable development. The intention of this exercise was to demonstrate that existing models and tools are insufficient in light of reflecting on more radical and non-linear patterns of change, thereby addressing the need for novel tools and methods.

MATISSE used a two-track strategy for developing the scenarios involved. With regard to the transition scenarios, new scenario methods were explored that reflected and did justice to the nature of transformative change processes. Running parallel, business-as-usual scenarios were developed with the aim to learn how to use existing scenario methods more efficiently, thereby extending and enhancing their function in relation to long-term sustainability efforts. The ultimate aim of these two parallel tracks was to accomplish mutual reinforcement and alignment between new and existing scenario methods.

This strategy ensured several advantages research wise. First of all, it ensured integration in the sense that we built on the qualities of existing scenario methods and captured these in the method for the development of transition scenarios. In this way transition scenarios remain grounded in accepted theory and practice while exploring novel methods. Secondly, we could discriminate the distinctive character and innovative requirements of transition scenarios in relation to business-as-usual scenarios, relevant for identifying the content criteria for transition scenarios.

The following subsection outlines the organizational aspects of the development of the scenarios. Decisions that emerged from the format-driven character of the MATISSE case and which further defined the scope of the scenarios developed, are identified in this respect. These decisions influenced and accounted for the evolution of the development process followed.

5.2.2. Initial choices concerning the development of transition scenarios

Although transition scenarios are central in this thesis, relevant lessons were learned from the development of the business-as-usual scenarios as well. They contributed to the

development of the transition scenarios. Both efforts are taken into account and outlined in this chapter. The organization and scope of the development process is outlined below.

5.2.3. Organization of the development process

In addition to the work packages within MATISSE, a Scenario Task Force Group (STFG) was established to develop the scenarios. The STFG was initiated by Jan Rotmans and Jill Jäger who both acted as coordinators of MATISSE and were responsible for its eventual authorization by the European Commission. The STFG consisted of a fixed group of people. They developed the required scenario in a participative setting. These people already participated in the MATISSE case in various work packages and were selected by Jan Rotmans and Jill Jäger to form an additional group for this specific purpose. The selection process aimed to fulfill two different goals: [1] to attract participants that had relevant theoretical background knowledge with regard to modelling, transitions and/or scenario development, and more practically, [2] to attract participants that participated in the case studies, since the scenarios were supposed to have a harmonizing function in this regard. The overall aim was to compose a group of people that jointly covered the knowledge necessary to develop these scenarios. It led to a diversified group of people including experts in the field of modelling, scenario development, transitions and case specific knowledge. The names of the participants engaged in the STFG are outlined below, together with their affiliation:

- Jan Rotmans - *Dutch Research Institute for Transitions (DRIFT), scientific director*
- Jill Jäger - *Sustainable Europe Research Institute (SERI), senior researcher ISA*
- Anthony Barker - *Cambridge Econometrics (CE), director*
- Hector Pollitt - *Cambridge Econometrics (CE), project manager international modelling*
- Tom Kram - *RIVM, senior researcher agriculture*
- Wolfgang Schade - *Fraunhofer Institute for System- and Innovation Research, head of business area transportation systems and project manager*
- Stefan Bringezu - *Wuppertal Institute for Climate, Environment and Energy, head of research group material flow and resource management*
- Isabel van de Sand - *Wuppertal Institute for Climate, Environment and Energy, researcher material flow and resource management*
- Saartje Sondeijker - *Dutch Research Institute for Transitions (DRIFT), PhD student transition scenarios*

On an equal footing throughout the development process, they took part in developing, commenting on and validating the scenarios, and therefore acted as expert judges for this research. Knowledge and expectations of how the scenarios should evolve and what elements should be included were not only shared during the participative work-

shops but also in a more bilateral setting (with us) via e-mail and telephone conferences. This was due to the large distances between the places of residence of the participants involved which inhibited regular physical contact. These virtual meetings were relevant to ensure regular alignment of the work in progress in between workshops. Jan Rotmans and Jill Jäger were in charge of the entire development process, at least in terms of the organization and facilitation of the participative workshops and telephone conferences. Processing the outcomes after each participative workshop was a shared responsibility which was carried out by different people throughout the development process.

5.2.4. Scope of the transition scenarios

Besides the organizational set-up which corresponded to our scientific research ambitions, several additional decisions emerged from the format-driven character of the MATISSE case. Since the rationale of scenarios within MATISSE was to provide an overall image for the individual case studies, the level of aggregation of the scenarios should function as an umbrella for the level at which the various case studies were carried out. The case studies provided outlooks for the year 2030 with a focus on different subsystems within Europe. Accordingly, the scenarios were supposed to:

- have a timeframe that ran up to the year 2030
- be developed at the systemic level of Europe as a whole
- encompass an integrative description of the subsystems with which the individual case studies dealt

These considerations led first and foremost to a further definition of the scope of the content of the transition scenarios, not influential with regard to the followed development process or the exploration of innovations in scenario methods. The second decision originated based on time constraints. During MATISSE, the development of the scenarios was dependent on the progress made in the various work packages that were dealing with the case studies. This was because of the necessary mutual alignment and fine-tuning. MATISSE started in the spring of 2005, but it was only in the spring of 2006 that the case studies were launched and that we could start developing the scenarios. Due to this delayed start we had to regain time. Accordingly, we chose to start the development process based on already existing business-as-usual scenarios for Europe as a whole in 2030. This choice did not affect the eventual development process followed, but we derived some valuable lessons regarding the distinctive requirements of transition scenarios. The following section addresses these lessons more thoroughly.

The eventual outcomes of the development process are captured in the report called "MATISSE: Methods and Tools for Integrated Sustainability Assessment." The following section describes more in depth how we proceeded in developing the scenarios.

5.3. The development process of the transition scenarios

The evolution of the development process of both types of scenarios is clarified by giving an account for the three main steps that we pursued throughout the process: [1] development of two narrative variants of a quantitative business-as-usual scenario based on encountered bifurcations, [2] development of a transition scenario, including a future image and a pathway and [3] incorporating the bifurcations derived in the first step in the pathway of the transition scenario. Below, the important considerations and choices underlying the course or changes in the course of the development process are outlined. Although we learned some valuable lessons from the creative process of development, the conceptual foundation and methodological basis of transition scenarios were for the most part derived from a comparison of the scenarios that resulted (See Section 5.5.). Accordingly, we chose to keep this overview concise.

5.3.1. Step 1: Two narrative variants of a quantitative business-as-usual scenario

As mentioned in the preceding section, there were time constraints in the beginning of the development process. Therefore, we decided tot start off with an already existing business-as-usual scenario and fine-tune this in accordance with the requirements within MATISSE. In view of providing an umbrella for the modelling assumptions within the case studies of MATISSE, a business-as-usual scenario was needed with a common format, consisting of a joint set of societal drivers relevant for Europe as a whole. With this search criterion as starting point, several telephone conferences addressed the matter after which it was decided to use the baseline of the European Environmental Agency (EEA, 2005). Although some adjustments were necessary for its use within MATISSE, this was, as we judged, the most appropriate scenario we encountered. The EEA is located in Copenhagen. The baseline follows a conventional definition and expands on current expectations of major socio-economic and environmental trends. The analysis that they present extends to 2030 and beyond. An additional reason for using this baseline was that it is a well-known and often used scenario for inferring perspectives on the future.

The next step was to decide how this baseline should be fine-tuned or transformed in order to provide a usable format for the case studies within MATISSE. First and foremost we wanted to develop the quantitative baseline into a narrative. Hence, a participatory session with the STFG was organized. In trying to develop the story behind the numbers, we tried to integrate the various sets of individual extrapolations into a consistent narrative explaining future developments. We noticed, however, that the EEA baseline had some blind spots with regard to the softer aspects of future development. Furthermore, that the baseline consisted of a set of isolated assumptions which showed some bifurcations

when trying to integrate these assumptions into a consistent storyline. A bifurcation represents a structural uncertainty in one or several underlying assumptions of the baseline, hiding different future implications. At each of these bifurcations the pathway could branch in different directions, resulting in different future outlooks. In particular, these bifurcations made it impossible to develop one consistent and comprehensive storyline. It impelled us to explore these bifurcations systematically by revealing the ambiguity underlying the assumptions. Accordingly, two contradictory lines of interpretation were developed, both reflecting the same set of assumptions. The bifurcations represented the dimensions based on which the narratives could be distinguished. We developed an extremely dark narrative (titled: "Old and dense Europe") and a rather optimistic narrative (titled: "Motivated Europe"). The bifurcations we encountered in the baseline are outlined in Table 5.1, together with the implications for the two variants of the baseline.

TABLE 5.1 - *Bifurcation points.*

"OLD AND DENSE EUROPE"	**Bifurcation points**	**"MOTIVATED EUROPE"**
No structural influences of government.	Institutions	Structural influences of government with respect to policies and subsidies.
Lack of educational system while more skilled people are needed.	Education - Migration	Investments made in educational system. Fair chances for migrants in the labour market.
Pressure on health care sector due to ageing population.	Health care	Shift to a more caring society.
Increasing air pollution through increased car ownership, growing amounts of construction waste, energy demand and commuting.	Pollution	Decreasing air pollution through increased use of public transportation, R&D for technical breakthroughs for cars, improved urban planning, car sharing and car-free cities.
City centred area for business, green areas are for living.	Infrastructure	City centres become the place for living, working and caring.
Slow penetration of renewable energy, no major innovations in modes of transport.	Technology	Innovations in sustainable modes of transport including smaller cars and new engine technology.
High trade barriers due to failing WTO negotiations; Intensification of land use leads to competition between nature and agriculture.	Trade	Successful WTO negotiations lead to abandonment of 20-25% of current agricultural land. Organic farming, low input farming, grazing etc. supported.
Absolute levels of resource use increase. Increased imports of metals (problem shifting to areas outside of Europe).	Resources / Material flows	Rate of increase of material use stagnates as a result of technological developments, efficiency improvements and more durable products.

The two narratives that eventually resulted from elaborating on the implications of these two variants, are displayed in Boxes 5.1 and 5.2. The plots outlined are the result of a creative process whereby the different assumptions described in the baseline were integrated and made qualitative.

BOX 5.1: "Old and dense Europe"

When sizing up prospects for the future, most people are quite apprehensive. The European society displays feelings of uneasiness with respect to the acceleration of the ever-growing tensions existing within European boundaries. These feelings are reinforced by the fact that they have not received any kind of structural or integral attention by Governments for the last 30 years. Therefore, citizens see even more risky times ahead than they are experiencing already. They point to unequal expansion of skills due to higher migration rates, resulting in the accumulation of power and wealth in just a few hands. The obvious distinctions between 'haves' and 'have-nots', between Western and Eastern Europe and between skilled and low-skilled workers, puts subjects regarding crime, terrorism and political polarization on the policy agenda of the future.

Furthermore, some Europeans see an increasing growth in pollution due to an increase in per capita car ownership and increased commuting distances. Growing [although stabilizing] populations and individualism continue to intensify demands for water, food, resources, transport and space. In this regard, European society objects to the encouragement of traits and lifestyles founded on individualism and greed, which they see emerging from a global consumer culture. Also, they fear a generation conflict due to the ageing population in Europe and they expect profound changes of the environment and society when considering the climate changes ahead, which may lead to excess of water and increasing frequency and intensity of extreme events, such as floods and droughts. When lines of temperature are shifting in a northern direction, large regional differences will develop with regard to tourism, migration and cultivation. Spain for instance will be too hot in summer and lose attraction for tourists while Sweden will have a perfect climate for growing food.

On a more global scale, the more apprehensive citizens see a growing disparity, not only within Europe, but also in the relation of Europe with the "rest of the world" in terms of resource use per capita, such as land, raw materials, energy. Moreover, they believe European problems are increasingly shifted to regions outside of Europe. Resources are now imported on a large scale from other countries. Besides a negative influence on resource productivity, this could lead in future to environmental degradation in those places as well and to increasing economic risks. As a result there will also be growing migration pressure on Europe and also concerns about international security.

As the integration of the quantifications in the EEA Outlook give us reason to believe that, when extrapolating current trends, an unsustainable Europe in 2030 is more realistic than a sustainable one, we will expand on this first perspective a little bit more in the upcoming sections.

The ageing population, the stabilization in population growth and the fact that migration rates exceed birth rates, means Europe has become more and more multi-cultural. Together with the inadequate educational system for the low-skilled and the absence of cultural integration, this leads to poor-skilled and disoriented, mostly young migrants. At the same time, the development towards a more service- and knowledge-based economy together with the withdrawal of the elderly from the labour market, leads to a request for more high-skilled people.

This discrepancy means that there is an unmet need for labour from which mainly the low-skilled migrants suffer while at the same time there is an increased time pressure on those that do have the required skills. This divergence also focuses our attention to the topic of welfare. In the future, the overall welfare will increase but large absolute differences will exist within and between countries in Europe. The reason for this originates from the high migration rate in combination with the lack of an adequate educational system for this group. Divergence between people throughout Europe with regard to welfare, consisting of educational performance, skills, GDP and employment is the obvious consequence.

Also, the generation conflict that will progress due to the trend of the ageing population in combination with the stabilization in population growth, confronts us with a possible paradigm shift. Can the health care sector deal with this trend of absolute and relative increase of the elderly in society? Will the role of caring still be in the hands of the health care sector or will family and children become more central? Will there be a shift from 'parents for children' to 'children for parents'?

The overall air pollution in Europe will increase. Although air quality across Europe has improved with respect to a decrease in fine particles [PM10], this must be set against the increased greenhouse gas emissions, the strong increase in freight and flight transport and the slow penetration of renewable energy. On top of this, the trend of individualization has led to an increase in passenger transport per capita. Also, the ageing population, who have moved to live in green areas, have longer distances to travel in order to satisfy their needs which are more often than not accessible in the city centres only. When analyzing this, we see a stabilizing population growth in combination with an increase in air pollution. Our conclusion is then that individuals travel more and/or longer distances, analogous to an increase in transport per capita. When this is set against the background of a lack of revolutionary innovations with regard to environmentally friendly performances in modes of transport, we hint at an increase in air pollution throughout Europe.

Another consequence of individualization is the growing stock of buildings and infrastructures, which have led to a further expansion of settlements and road area and a reduction of productive soil. Because people are becoming more mobile, they can settle in green areas far away from their working place. Living further away from their work, people will spend more hours a day away from home and therefore expect their working place to be luxurious, comfortable and large. In this sense, the trend of separating working from living will not only lead to city centres filled with larger business parks, but also to uncoordinated land planning outside city centres and an increase in infrastructure due to urban sprawl. Furthermore, there is a growing amount of construction waste, and natural and financial resources are required for maintenance.

The intensification of land use is leading to a massive policy conflict: due to an increase in sprawls, settlement patterns and road area, the accessible space for agriculture is running out. At the same time, the trend of growing individualization leads to an increase in energy demand. The question arises whether Europe wants to 'grow for food' or 'grow for energy'. Growing for energy will inevitably speed up the loss of biodiversity due to the existence of monocultures and fertilizers. Growing for food will lead to environmental problems regarding unsustainable use of energy. To make things even more complicated, in the near future high trade barriers will be implemented by the WTO, putting a further pressure on land-use. This form of regulation, showing us the way to the protection of the environment, will lead to an increase in energy crops and biological farming. Although this will initiate sustainability, these forms of land-use ask for a lot of space, which is not vacant. In this sense the dilemma with regard to the accessibility of space will be strengthened even more. What also should be mentioned in this sense, however, is that for EU-10 and EU-15 there is the expectance that the increase in energy demand cannot keep up with the increase in GDP per capita. A strong decoupling between energy demand and GDP and a relative decrease in energy use is the result.

Decoupling can also be seen between GDP and domestic extraction of raw materials. This decoupling is driven however by the increase in GDP due to a shift from industry to a service-based economy. Another explanation for this decoupling is that there is a growing import of metal and copper. So while the raw material use in general stays the same, the domestic extraction will decline, strengthening the decoupling with GDP.

Europe seems to become a region of disparities and tensions. We battle with the tensions between decreasing unemployment as a result of the more knowledge-based economy and increasing migration rates and poor-skilled young people. We see the trend of individualization and the associated growth in energy demand, traffic pollution and waste flows, while at the same time we see some modest environmental improvements, such as improved air quality. It is not clear to us how unbridled pursuit of economic growth can be kept within environmental limits. It seems that our children will inherit an impoverished and fragile world that is ecologically, socially and economically depleted.

BOX 5.2: "Motivated Europe"

From a perspective of 2007, the autonomous trends evolving within Europe seemed to lead us to a world where growing pollution, generation conflicts, intensified demands for water, food, resources, transport and space, disasters due to climate changes and economic risks and environmental degradation due to problem shifting were bound to happen. However, when sizing up prospects for the future of Europe, most people find grounds for optimism. Even in spite of potentially powerful anti-globalization forces which have the potential of leading to growing disparities and tensions between 'haves' and 'have-nots', between Western and Eastern Europe, between skilled and low-skilled workers and even in the relation between Europe with the "rest of the world", the optimists foresee the formation of a true global market and relish the opportunities for greater efficiency and connectedness. The pursuit of individual wealth on a global economic playing field made level by universal governance mechanisms to reduce market barriers can, they believe, open the way to a new age of affluence for all. If developing country institutions can be adapted to benefit from the new technologies and the emerging borderless economy, and if appropriate forms of global governance can be created, the rising tide of global prosperity will lift everyone to new heights of well-being.

The ageing population, the stabilization in population growth and the fact that migration rates exceed birth rates, means Europe has become more and more multi-cultural. Also, the transformation of Europe from industry to a more service- and knowledge based economy, together with the withdrawal of the elderly from the labour market means there will be a growing demand for high-skilled young people. In order to overcome anticipated problems related to an unmet need for labour from which mainly the low-skilled migrants would suffer, investments are made in the educational system within Europe. Up-scaling and retraining is without doubt desirable for employees who are already hired, but the main focus of the new training and educational system will be on the low-skilled migrants in High Schools. Also the parents of these children should receive some kind of education, giving them the opportunity to pass it on to their children and set them a good example. If young migrants can speak English with their parents instead of having to revert to their native language whenever they come home from school or friends, they will integrate within Europe more rapidly. However, solely investing in a new educational system will not solve the problems related to the culture in Europe. If an employer for instance can choose between a migrant and a white person with exactly the same skills, he would probably go for the last one. Therefore, the paradigm within Europe must be changed whereby migrants will be more motivated to learn, to apply for a job and to compete on the labour market with white collar workers.

An additional policy option aligned with solving anticipated problems regarding the trend of migration in relation to the growing demand for high-skilled people in Europe, is to ensure 're-migration' after migrants have followed their education abroad. This innovation, which can be given shape in regional policies around city centres, guarantees them to pursue a proper education in Europe. After this education they will be sent back home again to apply for a high-skilled job in their mother country. This way the expectancy is raised that the overall welfare within Europe will increase without large, absolute or relative differences between countries.

Focusing our attention for a moment on the expected generation conflict which will transpire due to the ageing population in combination with the stabilization in population growth, Europe will be confronted with a possible paradigm shift. As the elderly spend 80 percent of the total cost they spend on health care in their life during the last 5 years of their life, we should start considering the question if the role of caring for the elderly should and can rely solely on the health care sector. If the new educational system actually works in upskilling young people, the possibility arises to broaden the role of caring to the children of the elderly. This development would possibly change the mindset in Europe from 'parents for children' to 'children for parents'.

In the future the overall air pollution in Europe will significantly decrease, even in spite of the increasing greenhouse gas emissions and the ever intensifying passenger, freight and flight transport due to individualization, adding up to a boost in mobility with a factor ranging from 2 to 10. In former times, policies of The Government were directed at stimulating people to use public transport when commuting to work. But as people started to appreciate the calming living areas near green parks, leading them to consider the option of moving out of the cities and thereby prolonging their commuting distance, these policies alone were not adequate anymore to downsize transport pollution. Because the expectancy was that transport would not decrease by itself due to things like a decreasing population growth, The Government started to grant subsidies for R&D in working towards technological breakthroughs for car engines. Smaller cars with higher occupancy and gasoline pressured engines were the innovations that stimulated a significant decrease in emissions of mobility. Also, cities were made more attractive and policies concerning car-sharing and car-free cities were called into being.

Coordinated and integrated city planning ensured that malls, schools, hospitals, green areas and other facilities came available in the city centres. This structurally broke the trend of people moving out of the cities and reversed it into the elderly moving back into the cities, and the working population with their young children to choose the city centres over the calming green areas and playing grounds at a further distance from work. Within Europe a culture arose where living, working and caring was integrated, balanced and organized around the city centres. The rise of virtual realities, which made it possible to work from home, intensified these developments even more. So, although car usage per capita has not been reduced and may even be increased due to individualization, Europe found its way in solving air pollution. Europe became a continent with fewer infrastructures, less space needed for business centres, less mobility and more green areas and productive soil. Therefore, by 2030 the air pollution is decreased significantly.

The former paragraph shows that land use is decreasing because city centres throughout Europe became the heart for living, working and caring for all age groups. This tendency ensured the availability of land and thereby more or less solved the policy conflict related to the question whether Europe wanted to 'grow for food' or 'grow for energy'. Now, both are possible at the same time. Also, as the barriers for trade from WTO and CAP reform became less strict, 20% to 25% of land use could be saved. This space that became obtainable gave Europe some room to manoeuvre, which led to the intensification of energy crops. Furthermore, as people started to change their diet, biological farming was replaced by high technical farming.

The last point of interest for Europe is with regard to the large absolute decoupling, of a factor 4, between GDP and domestic extraction of raw materials. As this decoupling was mainly driven by the increase in GDP in the beginning, (in its turn due to a shift from industry to a service-based economy), the further rise in decoupling was more and more a consequence of recycling, waste policies and consumer behaviour. The fast technological developments increased efficiency and downsized life cycle costs. Furthermore, products became more durable and quality control programmes were initiated.

In conclusion, in spite of negative connotations with regard to most trendsetting developments throughout Europe, the optimists identify seeds of change regarding awareness raining, exerted policies by governmental bodies and preliminary practical expressions of a paradigm shift within Europe. These developments are all in need of care and nurturing in order to achieve a true sustainable pathway for Europe. They are fed by the fact that citizens are anxious about future developments, as they become intensely aware of the vulnerability of the environment and people in Europe. Also, there is a growing consciousness regarding the urgent need to tackle environmental problems. Therefore, not only governments are exerting pressure to become more sustainable, citizens also start paying attention to the quality of life.

Most remarkable in the preceding exercise was the fact that a set of assumptions underlying one single business-as-usual scenario can be explained in different future outlooks. One of the major lessons we drew based on this is that more conventional scenarios are inconsistent and include hidden assumptions that conceal the necessity for a more transformative description of future developments as opposed to describing the future in terms of extrapolative trends. It implies that the description of a more radical type and nature of change process is fundamental in realizing consistency between the assumptions in the baseline.

5.3.2. Step 2: Development of a transition scenario

This was the starting point to develop a transition scenario from a more rosy perspective. A participative session was organized between the members of the STFG to create the contours of this transition scenario. A plenary brainstorm was held which was fed by the theoretical content criteria for transition scenarios we had developed thus far (See Box 5.3).

After the session, Jill Jäger individually developed these contours further into a fully-fledged transition scenario, consisting of a future image and a pathway (See Box 5.4). The pathway consisted of the four transition phases and unravelled the pattern underlying transformative change. With respect to this thesis, this was a relevant exercise since the distinctive character of transition scenarios originates out of the complexity of this trans-

formative change process. This way, theoretical content criteria for transition scenarios can be inferred (See Section 5.5.).

BOX 5.3: Content criteria for transition scenarios

Transition scenarios are:

1. developed at a societal system level
2. anticipative towards future complexity and uncertainties
3. explorative by nature
4. normative with regard to sustainability
5. developed at a strategic level
6. deviant from our prevailing perception of reality
7. unravelling the complexity underlying a structural change

5.3.3. Step 3: Capturing the bifurcations in the transition scenario

In the final step, the bifurcations put forward by the baseline were linked to the pathway of the transition scenarios to perceive if and ensure that they could in fact be incorporated in a consistent and systematic fashion, opposed to the narratives of the baseline. In the previous subsection, the bifurcations were used to describe the most extreme opposite stories that were still consistent with the same set of assumptions underlying the baseline. A transition scenario, however, is supposed to break with these assumptions that presuppose trend extrapolations. In developing a transition scenario we therefore built on the optimistic narrative variant of the baseline by stretching it into a more desirable and sustainable scenario. The eventual results are outlined in Box 5.4. The box presents a concise version of the future outlook of the transition scenario accompanied by the pathway that reveals the underlying structural change process in time with the bifurcations as underlying principles.

Our initial observation after carefully reading the transition scenario is, that it captures the bifurcations without concealing hidden assumptions. Therefore, it is stated that the character of this transition scenario fundamentally differs from more conventional scenarios. The transition scenario is less trend-based, less predictive and less incremental but more explorative, more anticipative and more radical instead. Taking into account that the existing field of scenario development is still rather conservative, (in Chapter 2 we revealed that most recent scenario studies go beyond trend scenarios but cannot

be adequately characterized as dynamic or ground-breaking, because quite often the anticipated changes are merely incremental), this result contributed to the advance-

BOX 5.4: The transition scenario

FUTURE OUTLOOK

By 2030 the dominant practices, rules and assumptions of the European Union have changed dramatically from those that were in place in 2007. The prices for energy, resources and land truly reflect the value of ecosystem goods and services. Society measures its progress not in terms of economic wealth but in terms of well-being of people and the environment in Europe and worldwide. Paid work is distributed, so that all people who want a job have a job, while work that was previously unpaid (caring for the young, the old and the sick, voluntary work to support environment and society) is paid through a guaranteed basic income for all citizens. The former gender-biased distribution of work (low-paid with lower social prestige done mainly by women) has disappeared. Due to basic income, typical low-wage work had to be paid better and therefore also gained prestige. This resulted in a more equal distribution of work and income between the genders.

UNDERLYING PATHWAY: THE TRANSFORMATIVE CHANGE PROCESS IN TIME

TABLE 5.2 - *Transformative pathway of the transition scenario.*

Bifurcations	Take-off (2008-2012)	Acceleration (2013-2021)	Stabilization (2022-….)
Institutions	Ecological Tax Reform – energy and material taxes in selected European countries. Redistribution to reduce labour costs. Price increases in energy and materials begin to affect demand and stimulate technological innovation.	Ecological Tax Reform introduced at European level. Price increases for energy and materials affect technology innovation and consumer choices, including mobility choices. Positive employment effects. Reduced waste and increased recycling.	Major changes in consumer and producer behaviour, have taken place. Labour shortages due the ageing society are satisfied through a "caring immigration policy" that also provides training for immigrants.
Education-Migration	"Life-Balance" discussed in an increasing number of countries and some countries experiment with introduction of basic guaranteed income.	"Life-Balance" is adjusted in all of Europe. More attention is paid to caring for the old, young, sick and the environment. Generation conflicts are reduced. Overall income levels drop, which reduces levels of excess consumption.	A new dynamic equilibrium is established in which work is more equitably distributed, within the population as a whole, but also between genders and age groups. Overall health has improved dramatically as a result of reducing over-consumption and stress and increasing care.

Health Care	Attention to "well-being" rather than economic growth shifts attention to the importance of social capital and personal security and away from attention to accumulation of material assets.	Sufficiency becomes a more and more accepted concept in politics as well as in public. Consumer demand is increasingly for more durable and high quality products, "less is more".	Attention to "sufficiency" as much as to "efficiency". Material consumption in Europe is considerably lower while quality of life/well-being/happiness is higher than today.
Technology	Technological innovation spurred by rising energy and resource prices.	Widespread technological innovation due to energy and resource prices and government legislation, which also begin to affect consumer behaviour and demands for products with lower energy and resource use. Shift to the use of rail for goods transportation. Car sharing for personal mobility.	Environmental quality showing great improvements. Much lower waste generation because more durable products are used and production is more efficient.
Pollution	Public awareness about the impacts of resource and energy use stimulated by experiments with ecological tax reform. The shift of the energy system towards a renewable basis is the goal of several countries. Leading countries present their concept of how to reach the aim and show that an effective decrease in energy demand is possible.	Widespread public acceptance of ecological tax reform leads to behavioural changes. The aim of 100% renewable energy basis is set at the European level. At the same time, major efforts to decrease energy demand are initiated. For the energy imported from other parts of the world, fair prices are paid and life cycle analysis is the basis for decisions.	"Learning to be" (living a fulfilled life) and "learning to care" are central elements of the European way of life. European energy demand is based 100% on renewable energy. Energy demand has decreased dramatically since the beginning of the century.
Trade	Organic farming begins to develop more strongly in some countries. Dietary change begins in some societal groups (move towards regional produce, organic, seasonal, less meat).	Rapid dietary change – driven by focus on well-being and by energy price increases (transport costs). Interest in the quality of food increases. Farmers get fairer prices for their products and therefore can also become carers of the rural landscape. Subsidies on fuel used by farms removed. All perverse subsidies in the food sector eliminated.	Organic produce dominates European agriculture. Rural communities have moved out of the poverty trap, since they receive an income as carers for the cultural landscape.

Infrastructure	Some countries begin to tackle the issue of urban sprawl.	Massive improvements in public transportation, cities invest in improving city centres as places for sustainable living. Transportation across Europe relies on high-speed trains; perverse subsidies in the transportation sector eliminated.	Europe's population is distributed between compact urban areas or more rural areas both of which offer a high quality of life (health, jobs, good social relations, security and opportunities to fulfil aspirations). Rural-urban migration trends have been reversed throughout Europe.
Resources/ Material flow	The fact of outsourcing environmental, economic and social problems to other parts of the world is increasingly acknowledged as a problem that does not comply with the European way of life by politics and the public.	Legislation is set on the European level to ensure that all imports to Europe comply with European social and environmental standards. At the same time, legislation ensures that Europe's exports do not lead to unsustainability in the receiving countries.	Europe has fair relationships with all other parts of the world.

ment of the field of scenario development. Furthermore, the limited capacity of current models was emphasized since the models within MATISSE could not deal with the complexity inherent in the transition scenarios. In this respect, a process of reframing was realized. The modellers, who first could not see the added value of transition scenarios in light of modelling assumptions, gradually perceived transition scenarios as relevant for portraying more realistic assumptions about the future.

In Section 5.5., a more thorough analysis of the transition scenario is provided with the intention to deduce its distinctive elements and develop these into required content criteria for transition scenarios. The following section clarifies, amongst other things, the research methods used for conducting this analysis.

5.4. Evaluation: analysis of the transition scenario

Before we explain which research methods were used to evaluate this case study, our roles within this case study are clarified.

5.4.1. Traditional roles of the researcher

Contrary to following case studies, within this case we acted primarily as traditional scientific researchers. We explored, described and analyzed the (transition) activities in light of a first conceptual foundation and methodological basis for transition sceanrios. Nonetheless, it is relevant to explicate our roles throughout the MATISSE case. Jan Rotmans and myself were involved in different roles in the MATISSE case. Jan Rotmans was continuously and solely involved as a coordinator, ensuring that the alignment between the scenario development efforts of the STFG remained functional in light of providing a coordinating context for the modelling assumptions of case studies within MATISSE. For this reason, we undeniably had a certain influence on the outcomes of the scenarios. This influence was, however, not initiated based on a scientific or research-related conviction. We merely determined the scope of the eventual scenarios developed (See Section 5.2.) as a means to realize the goals set by the European Commission. Fortunately, these aims coincided with our scientific research aim and enabled an explorative approach for developing transition scenarios.

My role on the other hand was more reserved. Throughout the development process of the scenarios I participated in the STFG on an equal basis with the other participants involved. Therefore, my role was less prominent. Only in the very beginning I was responsible for describing the narrative variants of the EEA baseline based on the raw material that resulted from the participative sessions with the STFG. For the most part, however, the members of the STFG developed the scenarios together and therefore influenced the eventual outcomes equally. Of course, their input differed, depending on their interests and background. Hence, each participant had a specific function, role and contribution in the whole. My specific contribution was based on providing knowledge about transition processes, together with two other participants in the STFG. When the scenarios had been developed, my role changed into researcher, and more specifically into analist. From that point onwards the STFG was not involved any more. My role was to structure and interpret the types of scenarios that were developed throughout the participative engagement of the STFG in terms of their contribution to a conceptual foundation and methodological basis for transition scenarios. These results are thoroughly explained in the following section.

5.4.2. Research methods for evaluation: comparative review and creativity

Essential in this case study was expert validity: to let various experts jointly develop scenarios that describe "true transitions" which they verify as such. This process was ongoing during the participative engagement of the STFG. After the scenarios had been developed and verified as 'transition scenarios' by the experts involved, we (Jan Rotmans and myself) used this information to develop a first draft of a concept for transition

scenarios and based on this to construe a first rudimentary method for its development. Within this research, this conceptual foundation and methodological basis are perceived as two different aims, though the second was an extension of the first. They are approached and achieved differently.

With regard to the conceptual foundation, a comparative document analysis was conducted. The optimistic narrative variant of the baseline was contrasted with the transition scenario. Distinctive characteristics of the transition scenario were identified and opposed to the more conventional scenario effort of the baseline. In addition, a literature review about the transition theory (See Chapter 2) together with our initial theoretical content criteria (See Box 5.3) was set against these distinctive characteristics we deduced. Our main reason was to ensure theoretical support for our findings and provide an analytical structure. With the transition theory as guiding principle we analysed the distinguishing elements of the transition scenario and tried to deduce analytical features that are in theory characteristic for the nature of a transformative change process. We noticed that some of the distinctive characteristics jointly account for the same analytical feature, while others can be separated in several analytical features. In the end, it provided the opportunity to translate the distinctive characteristics into theoretical and systemic content criteria.

A first rudimentary version of TRANSCE was developed by using both the transition scenario developed within MATISSE and the above-mentioned content criteria as a starting point. With regard to the former, a document analysis was used to disentangle the transition scenario. An attempt was made to provide insight into the underlying building blocks of the transition scenario and derive consistent and logical methodological steps for TRANSCE. We analysed which discussion activities and subject matters needed to be addressed, and in what sequence, in order to end up with the information necessary for construing the transition scenario logically. With regard to the latter, we fine-tuned and fed the resulting steps of TRANSCE based on the content criteria we had developed. This procedure served to complement the empirically constructed method from a theoretical perspective.

In the following section the outcomes of both these efforts are outlined after which some general conclusions are drawn and ambitions for further research are explicated.

5.5. Lessons learned: starting grounds for this research

The MATISSE case provided us with many degrees of freedom: in terms of deciding on the analytical structure underlying the content of the scenarios and in terms of how we proceeded in our development process. For all participants engaged this was an explorative journey, within which the outcomes and the process followed were initially

unknown and only emerged gradually as we proceeded: an approach characterized as learning-by-doing and doing-by-learning. It does not imply that we started this journey without certain specific ambitions. We believe, however, that the open and unobstructed approach in this preliminary phase of the research, prevented the participants involved from focusing on a specific outcome or testing certain theoretical and methodological claims. This could have led to an underestimation or neglectance of relevant outcomes simply because they did not correspond to our pre-conceptualized notions of what a transition scenario should look like or how it is developed. Below, the outcomes resulting from our analysis of the joint efforts throughout the MATISSE case are described. A first conceptual foundation and rudimentary method for transition scenarios is elucidated.

5.5.1. A first common classification of relevant content criteria

The conceptual foundation consisted of a first common categorization of required content criteria for transition scenarios. This categorization gradually emerged and progressed along a stepwise advancement. First, the observed differences between the optimistic narrative variant of the baseline and the transition scenario were elucidated (See Table

TABLE 5.3 - *Discrepancies between the optimistic variant of the baseline and the transition scenario.*

Positive baseline	*Dimensions of discrepancy*	*Transition scenario*
	PATHWAY	
Trends	Character of continuation	**Trend breaks**
Incremental change	Nature change process	**Structural change**
Low level of complexity	Level of complexity	**High level of complexity**
Macro level	Level of analysis	**Multi-level**
Extrapolative	Sustaining the current	**Explorative**
Isolation	Degree of alignment	**Integration**
Certain developments	Drivers of change	**Uncertain developments**
	FUTURE IMAGE	
Realistic	Imaginative character	**Utopian**
Realizable in short term	Timeframe	**Realizable in long term**
Paradigm preserving	Paradigm	**Paradigm breaking**
Equilibrium	Ambition	**Disruption**
Domain specific	Domain(s)	**Societal orientation**
Objective	Subjectivity	**Normative**

5.3). The middle cells of this table resulted based on the comparative document analysis described in Section 5.4. and illuminate the various dimensions we identified for which the two types of scenarios differ, in terms of the future images and the pathways. The outer cells describe the characteristics of both types of scenarios on these dimensions whereby the discrepancy between the scenarios becomes perceptive. The right-hand cells explicate the distinctive characteristics of the transition scenario opposed to the

TABLE 5.4 - *Common categorization of content criteria for transition scenarios.*

Categorization of content criteria for transition scenarios	Distinctive characteristics
Content criteria 1: Long-term time span A transformative change process takes one or two generations. Hence, the transition scenarios need to embrace a long-term time perspective.	- Realizable in long term
Content criteria 2: Societal system level A characteristic of a transition process is its societal orientation. This can be addressed in a transition scenario by explicitly showing the integration and interaction between various sectors or subsystems.	- Societal orientation - Integration
Content criteria 3: Utopian and realistic character A transition is necessary when sustainability cannot be reached by optimization strategies that strive for 'more of the same'. Therefore, a transition scenario needs to describe a future system that is deviant from our prevailing perception of reality. The realistic character is preserved by the fact that the future system unfolds based on the current situation.	- Realisable in long term - Utopian character - Paradigm breaking
Content criteria 4: Explorative and normative character The complexity of a transition process implies that developments can branch in different directions making the future emergent and only partially knowable. A transition scenario is meant to describe how future sustainability can be reached. Since the pathway leading up to the future system is characterized by uncertainty, various pathways need to be explored.	- Normative - Societal orientation - Disruption - Explorative - Utopian - Paradigm breaking
Content criteria 5: Delineating the structural change process in time A structural change process is explicated and unravelled by addressing the multi-phase, the multi-level, and the multi-pattern concept: [1] Multi-phase: Elucidating different phases in time according to variations in the pace and acceleration of change throughout a transformative change process. [2] Multi-level: Providing insight into the multi-level interaction by addressing how macro level developments influence the activities ongoing at the micro level and enable its scaling up. [3] Multi-pattern: Providing insight into how a transformative change process is composed of various interacting developments over time, which in due course strengthen each other and result in modulation. Uncertain developments are starting point for influencing modulation.	- Trend breaks - Structural change - High level of complexity - Multi-level - Explorative - Integration - Uncertain developments

positive variant of the baseline. Secondly, these distinctive characteristics are translated into theoretical content criteria as can be perceived in Table 5.4 (See Section 5.4. for the procedure we followed). The left cells of the table identify the eventual content criteria, the right-hand cells demonstrate which distinctive characteristics as presented in Table 5.3 accounted for their emergence.

The following subsection demonstrates how we built on these insights to construct a first version of a method that is intended to provide a process design for the development of transition scenarios.

5.5.2. A first rudimentary method for transition scenarios

Section 5.4. describes the two parallel lines of development along which we constructed a methodological design for the development of transition scenarios. The insights that resulted based on these two complementing approaches are outlined below, accompanied by a visualization of the resulting first rudimentary version of TRANSCE.

After carefully reading the transition scenario developed within MATISSE, several discussion activities and subject matters seemed relevant to address in the development process. 'Relevant', in terms of covering the pattern underlying the transformative change described in the transition scenario:

1. Under which conditions can a future system act sustainably?
2. What is the necessary structural change for transforming the current system into the future desirable system?
3. What developments in the environment of the system play a role in this structural change process?
4. What new system elements can we distinguish as emerging from the structural change process?
5. What prevailing system elements have disappeared throughout the structural change process?
6. What is the influence of actors and their actions in the transformative systems change?
7. How do the above developments interact and strengthen each other in one and the same direction?

Based on the content criteria we distinguished, the following additional concerns seemed relevant to take into account in constructing TRANSCE.

[1] First of all, the third content criteria explains that the character of the future system image is different than the character of the pathway leading up to this image. The

former is lingering in the future and displays a desirable and sustainable system state on the long-term which seems improbable and almost unreachable from the current perspective. The latter on the other hand is far more realistic since it starts from existing and therefore sensible short-term assumptions in trying to link the current system state to this almost unimaginable future by accounting for its underlying analytical process. Hence, we decided to distinguish between the development of the future system image and the guiding pathway in TRANSCE. [2] Second of all, to incorporate the ideas behind the multi-phase concept we added a step in TRANSCE that focuses explicitly on the framing of the transformative change process according to the phases and turning points visualized in the S-Curve. [3] In the third place, the last content criteria, and specifically the multi-level concept, addresses that there are various drivers in the environment of a system that eventually account for the structural change process in time. However, of all these drivers the *uncertain* developments are a starting point for the *initiation* of a transformative change process. Throughout the MATISSE case these uncertain developments were represented by the bifurcations in the baseline. They accounted for tensions in the system at which the pathway could branch in different directions depending on how these bifurcations were anticipated. Hence, it is relevant to distinguish the uncertain developments in the environment of a system with the intention to influence these developments in a more sustainable direction. Accordingly, we decided to construct a step in TRANSCE which makes the different types of drivers explicit.

With the findings presented above as a starting point, a creative process accounted for the actual construction of the method. Herein, the aim was to integrate the pieces of information into a logical and constructive flow of discussion activities. The first rudimentary version of TRANSCE that resulted is visualized below (See Figure 5.1).

5.5.3. Conclusions: a feasible procedure?

The MATISSE case was an interesting learning exercise with two parallel tracks of scenario development. Two divergent business-as-usual narratives were developed based on the same set of assumptions, indicating the ambiguity and hidden structural uncertainties of conventional scenario efforts. The need for more transformative scenario development was addressed in this respect. Logically following from this, a transition scenario exercise was carried out. There was an enormous difference in complexity, underlying assumptions and nature of change of this transition scenario, compared to the business-as-usual narratives. In this regard a large step forward was made. The scenario world is still rather conservative and the development of transition scenarios is not common at all. It is stimulating to perceive that the transition scenario had numerous distinctive characteristics. It addressed the need for new methods and models since the models

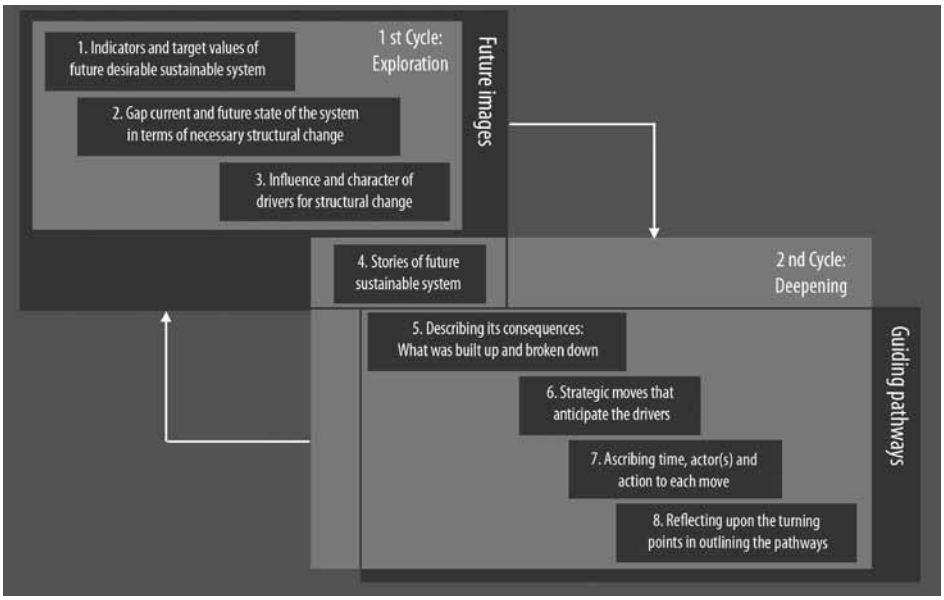

FIGURE 5.1 - *TRANSCE Version 1.0.*

used within the case studies of MATISSE could not (or could only barely) handle the complexity of the transition scenario. As a result, the transition scenario was eventually not used within MATISSE. A change in the mindset of the modellers was realized, however. They gradually started to believe that these types of scenarios were fundamental in creating more realistic modelling assumptions and that the capacity of existing models needs to be enhanced. In light of the findings mentioned above, a first rudimentary version of a concept and method for transition scenarios was developed. The following case studies are primarily conducted to further develop and validate our initial ideas presented in this chapter. This empirical enhancement and theoretical underpinning aims to contribute to a generic applicable conceptual foundation and methodological basis for transition scenarios.

Reverting to the scientific research aim of this chapter, the MATISSE case was carried out simultaneously with the development of our theoretical framework (Chapters 3 and 4). Analytical insights gained from literature reviews about the transition theory were contemplated and aligned with empirical lessons resulting from scenario development efforts within MATISSE. It enabled the maturing of our first conceptual and methodological ideas for the development of transition scenarios, leading to more consistent and analytically structured design efforts. In relation to the entire research as presented in this book, the MATISSE case accounts for several major contributions. First of all, with respect to the conceptual foundation of transition scenarios, we developed an initial

general and common classification of relevant theoretical content criteria for transition scenarios. These content criteria emphasize the distinctive characteristics of transition scenarios in relation to more mainstream scenario development efforts. The distinctive requirements are mainly put forward by the complex nature underlying transformative change. This classification will be used in following case studies as a starting point and frame of reference, with the ambition to enhance, deepen and fine-tune the content criteria throughout this research into a more fully-fledged and detailed conceptual foundation for transition scenarios. The eventual result is presented in Chapter 3. Second of all, with regard to the method for transition scenarios, the MATISSE case led to a first rudimentary version of TRANSCE which serves as a methodological basis for the development of transition scenarios. The relation between concept and method is crucial throughout this research and will constantly be explored and aligned. Following the steps in TRANSCE is supposed to result in scenarios that describe the analytical pattern underlying the nature of transformative systems change, thereby addressing the distinctive requirements of transition scenarios. The conceptual foundation serves as a benchmark and standard against which the added value of the method is evaluated. For subsequent case studies it is significant to test and evaluate if TRANSCE is effective in supporting the development of transition scenarios that reflect the conceptual foundation of transition scenarios.

In conclusion, MATISSE provided the basis for subsequent research phases to build on. In addition, it can be perceived as the groundwork and foundation of our final research outcomes in terms of a conceptual foundation and a methodological basis for transition scenarios.

CHAPTER 6

Case 2: introducing TRANSCE in the 'Base of the Pyramid'

6.1. The research setting: a valuable case study?

This chapter deals with the case study that we labelled in Chapter 1 as 'Tilburg University'. The case involved the organization of the course 'The Strategy Process' in which master students were enabled to independently develop, amongst other things, transition scenarios for client organizations that were experiencing problems with entering the market of the Base Of the Pyramid (BOP-market).

Several reasons can be mentioned why we chose to work with students, and so many of them, in this phase of our research. The primary reason was that we were looking for a pilot case. It was the first time TRANSCE was going to be used as a guide in developing transition scenarios. A project with real practical long-term implications and societal ambitions would be too high a risk since we had to take into account that our first attempt of practicing TRANSCE could result in disappointing outcomes. With students, we could take this risk since they would not experience severe negative consequences when the method proved to be unsuccessful. However, the students developed the transition scenarios with the ambition to advise existing client organizations with tangible practical ambitions. Hence, we approached this case as if we were dealing with a real client. Nevertheless, we could, more than in any other context, afford a trial-and-error approach. The fact that the students had a background in social sciences and were already familiar with scenario development supported this case study further. It implied that they were open to this kind of method and would probably learn to work with TRANSCE more quickly than lay-persons.

With respect to the validity of this research, there were several advantages related to the amount of students who were going to practice TRANSCE. We had 125 students to our disposal, who jointly accounted for the development of 23 transition scenarios for client organizations working in a variety of sectors. Hence, we could test the method in different domains which supported its generic value. Also, conclusions regarding necessary adjustments and refinements in the conceptual foundation and methodological basis of TRANSCE would be well-founded, consistent and valid, since we could base our evaluation on repeated exercise with TRANSCE. The downside of all this was that we had to work with so many students that it was difficult for us to facilitate their development process, so therefore we had to rely on a more reductionistic version of TRANSCE. The context too of this case study, as we will see in Section 6.2., led to constraints in time, goals, set up etc., which almost certainly affected the quality of the eventual transition scenarios negatively. However, when weighing these negative aspects of the case study against the potential benefits mentioned above, we came to take them for granted. Nevertheless, we tried to overcome these negative influences as much as possible.

The character of the case was twofold. On the one hand it leaned strongly towards a consultancy project in which the students were expected to deliver results for client organizations within a limited amount of time while at the same time using an underlying and innovative method based on scientific research. On the other hand the character of the case study resembled that of learning-by-doing in which the researchers involved could invest research time to systematically evaluate and adjust TRANSCE. We could approach the case study as an experimental garden. It meant that the case study provided an ultimate environment for the explorative development of TRANSCE in at least three ways. Firstly, the case study provided a context in which a number of ideas underlying TRANSCE could be tested and refined. For example, we wanted to explore if the generic steps of TRANSCE had a logical order and provided all the levers necessary to add up to fully-fledged transition scenarios. Secondly, it provided a context in which we could learn about the necessary role of researchers in facilitating the development process and structuring substance. In the third and perhaps most important place, it provided a context which allowed for adjustment and refinement of the theoretical concept and method of transition scenarios based on a rich pool of practical experiences.

The aim of this case study in relation to the main research question of this thesis is twofold: evaluating and refining the method of transition scenarios and its underlying content criteria. This specific case study was set up to experience if and how the generic steps of TRANSCE are represented in the eventual transition scenarios. Our main question for this case study is if TRANSCE is effective in supporting the development of transition scenarios that describe the complex and dynamic pattern underlying transformative systems change in time. Our starting point for this case study is the version of TRANSCE that resulted from the MATISSE case in the preceding chapter (See Figure 5.1, Chapter 5). We aim to describe the evolution of the conceptual foundation and methodological basis of transition scenarios based on practical learning experiences of the students involved. Both concept and method underlying TRANSCE gradually mature throughout this research based on the continuous interplay between theory and practice. The empirical data forthcoming from this case study are fed back into the theoretical concept and method as presented in Chapter 5. It leads to an adjusted version of TRANSCE that more closely reflects the development of 'ideal' transition scenarios. If necessary, the conceptual foundation of transition scenarios is enhanced by adding relevant new content criteria or modifying existing ones.

This chapter contains different sections. Section two starts off with describing the context and background of the case study. Subsequently, the restrictions for research are outlined and the set-up of the case study is explained. The section ends with an example of a transition scenario developed by the students. In section three the case

study is evaluated. The lessons learned concerning concept and method are formulated. In section four these lessons are translated into an adjusted version of TRANSCE and fed back into the theoretical concept of TRANSCE. This has been an important source for the theoretical chapters in this thesis (Chapters 3 and 4). In this section we also draw some general conclusions regarding the importance of facilitation and techniques when using TRANSCE.

6.2. Developing transition scenarios for the BOP market

6.2.1. Context and background of the case study

This subsection partly overlaps with our explanation of the case study in Chapter 1, but is put here to prevent from having to go back and forth in the book. The specific theme for the master course followed by students at the University of Tilburg was 'The Base of the Pyramid' (BOP). Currently there are around four billion people at the bottom of the economic pyramid who earn less than two dollars a day and lack access to goods and services that meet their most basic needs. They have hardly benefited from Western development aid. It is difficult for American and European businesses to establish (daughter) organizations in these countries while maintaining their own prospects of economic growth and continuation. This is difficult, simply because the culture and lifestyle in these developing countries are low-key and their businesses lack scale benefits. Consequently, business organizations that have the ambition to enter the BOP-market are required to start cooperating with for them unusual partners like local businesses, NGOs and local Governments. They also have to involve locals in their work processes and start working on capacity building in terms of knowledge and finances. Recent studies have started to outline the possible roles of business organizations in sustainable poverty alleviation. This would challenge conventional assumptions about the poor as active market participants, the source of micro-level innovation and growth, the relationship between companies and developing nations, the willingness of managers to engage actively in complex social issues, and whether and how firms can structurally transform themselves and their environment over time. Since the issues ongoing in BOP markets have a long-term nature and correspond to realizing fundamental changes in low income markets, we have come to perceive these issues as a transition process.

In groups of five, the students had to develop an advice for business organizations that currently perceived problems with entering the BOP-market, like Coca Cola, Nike, Océ, Philips etc. They had particularly problems with analysing and anticipating the existing environment of the BOP market and deciding on the strategy to set up a new (daughter) organization that could serve low income markets while preserving eco-

nomic gains. These were genuine issues of existing organizations. Several organizations were explicitly contracted for this master course by the department of social sciences of the University of Tilburg. The advice the students had to provide was based on six different assignments: problem formulation, system analysis, business model, transition scenarios, strategy tables and game concept. In this chapter we primarily focus on the development of the transition scenarios for which TRANSCE was practiced. The transition scenarios had the specific aim to provide for each client an inspired and customized long-term future orientation of poverty alleviation and developments ongoing in relevant BOP market as a basis for anticipating the environment and deriving strategies to enter the BOP market.

6.2.2. Set-up of the case study: restricting circumstances and choices for development

The case study and associated research activities were carried out within the boundaries offered by the university and course coordinators of the department of social sciences. It implied that we had to be flexible and adapt the development process of TRANSCE to the structure of the master course. The conditions we encountered were as follows.

- the course only lasted one month in which all six assignments had to be completed;
- there was no room for participatory workshops or process facilitation with the students or the client;
- there was limited room for feedback or clarification during the development process of the transition scenarios;
- theoretical knowledge about the nature of transformative change processes and TRANSCE could only be provided by means of lectures (before the actual process of developing the transition scenarios);
- students did not have in-depth pre-knowledge about their client organization, BOP-markets or transition processes;
- the aim of the course was for students to become theoretically as well as practically acquainted with methods regarding future thinking;
- the transition scenarios that resulted had to be judged based on strict criteria which could legitimize and clarify differences in student grades.

These conditions forced us to make several choices with regard to the way we presented TRANSCE, the way TRANSCE was carried out and the requirements regarding the eventual transition scenarios. Most of these choices hindered an ideal research setting and may even have influenced the obtained learning experiences presented in our evaluation. This drawback is partly overcome by reflecting on these restrictions and drawing lessons from it for subsequent case studies (Section 6.4.) and partly by confining our evaluation to valid, measurable and accessible data. Key decisions were:

- mainly as a result of the restrictive conditions of the case study but also as a means to provide the students with as much concrete and detailed levers as possible for developing transition scenarios and ensure a slow but sure introduction to TRANSCE, we chose to develop a very sequential and streamlined version of TRANSCE. We transformed the original method in several individual 'hard' and tangible recipes that each addressed one or several specific step(s) in TRANSCE (See Box 6.1). We aimed to ensure that students could work independently with TRANSCE. Our expectation was that the students would be competent enough to integrate the intermediate products resulting from the individual recipes into fully-fledged transition scenarios;

BOX 6.1: Streamlined recipes for TRANSCE

RECIPE 1 – Indicators of future desirable sustainability

a. Identify 3 to 5 core indicators that describe a desirable and sustainable state of the BOP-market in which your client hopes to start working. Use the year 2040 as timeframe.

Example: Biodiversity as a resource for energy production

b. Determine the target values of these indicators. Example: Use of 20% more biodiversity than in 2000

NOTE: Make sure that these indicators and targets explore the borders of the imaginable while still being feasible. Be bold in your dreams and images!

RECIPE 2 – Defining structural change: the gap between the future state and the current state of the BOP-market

a. Use the 3 to 5 core indicators of recipe 1 to describe the current state of the BOP-market.
b. Determine the current values of these indicators.

NOTE: The difference between recipe 1 and 2 is the structural change you strive to realize and describe in your transition scenario!

RECIPE 3 – List the drivers for structural change
Make a list of 10 to 15 trends, events and surprises that will or could possibly influence the future state of the BOP-market.

For each driver you found:

- Score it on its level of certainty to happen:
  Certain = we know the direction of the trend and the impact-range in time
  Uncertain = we do not know the direction of the trend nor the impact-range in time
  Emerging = an event that could grow into a trend that could surprise us

- Score it on its influence on the structural change you strive for:
  Accelerating structural sustainable change
  Hampering structural sustainable change

NOTE: Summarize your findings in the DRIVER-MATRIX, see the example below.

	Accelerating structural change	Hampering structural change
Certain		
Uncertain		
Emerging		

RECIPE 4 – Stories of the desirable sustainable state of the BOP-market in 2040

Use the indicators and targets of future desirable sustainability (recipe 1) AND the certain drivers that accelerate and hamper structural change (recipe 3) to develop a story for the state of the BOP-market in 2040. Also give them a catchy name!

The stories must contain descriptions of:

- Culture: prevailing norms and values
- Structure: groups of actors (like knowledge institutions, NGOs, companies, Government, intermediaries etc.), rules and regulations, power relations, institutions
- Practices: behaviour and routines

NOTE: The story must be creative, consistent, desirable and be significantly different from the current state of the BOP- market (recipe 2).

RECIPE 5 – Pathway from the current state to the future state of the BOP-market

Mention 10 core words or short sentences that give insight into the pathway describing the development from the current state of the BOP-market (recipe 2) to the future state of the BOP-market (recipe 4)

In the lecture we explained that the mechanisms underlying a pathway can be defined as 'build up' and 'break down'. Try to frame your findings in these terms. Think of things like forming new actor networks, technology development, changing infrastructure, changes in mindset and behaviour, changing power relations etc.

RECIPE 6 – Define strategic moves of groups of actors in the BOP-market

Define 5 strategic moves that describe how different actors in the BOP-market should:

a. anticipate the uncertain and emerging drivers (recipe 3), in order to
b. stimulate and support the pathway you just described (recipe 5), and
c. reach the desirable and sustainable state of the BOP-market in 2040 (recipe 4).

In order to specify the strategic moves, mention for each:

- *the specific action* underlying the strategic move
- *the group of actors* pursuing the strategic move
- *the time* of pursuing the strategic move

NOTE: we focus here on the uncertain and emerging drivers since they are key in setting a new direction for structural change

RECIPE 7 – Describe the fully-fledged transition scenario

Integrate the outcomes of recipes 4, 5 and 6 into a consistent storyline.

In the lecture we explained that a transition process develops through four phases with different dynamics: pre-development, take-off, acceleration and stabilization. Specifically reflect upon these phases in your storylines and explain how these phases and alterations come about.

NOTE: This is the only product that you have to hand in by your tutors and for which you will receive a grade.

- we used plenary lectures and hand-outs to explain the revised version of TRANSCE and to clarify theoretically the pattern of transformative change processes which we were looking for in the transition scenarios. We further explained this perspective on change

on the basis of a practical example in which developments in wind energy from 1970 to 2000 were elaborated. It was a form of expectation management in advance;
- we chose a simple and straightforward explanation of the transition theory. Normally, participants involved in a facilitated development process become gradually acquainted with the definitions and ordering frameworks used to explain transition processes as they are guided in working with the various concepts. In this case we only had one moment in which we could explain everything, after which they had to work independently with TRANSCE. To prevent an overload of information, we chose not to use too much "transition speak".
- we introduced several feedback sessions between the researchers and the students. During these sessions the students received help with problems they were experiencing with the development of the transition scenarios. Some feedback sessions were planned and therefore arranged based on physical contact, others were via e-mail;
- because of the restriction in time, each group had to develop only one transition scenario;
- since the transition scenarios were part of an advice for a client organization, we chose a format that fitted a consultancy report: short, creative and concise, for instance in the form of a newspaper article;
- we graded the transition scenarios based on an objective format approved by the course coordinators. This format strongly leaned on the content criteria we had developed thus far and could therefore be used as a form of evaluation within this research.

Under these conditions each of the student teams developed the transition scenario. The following subsection provides an example of a transition scenario that resulted.

6.2.3. Example of a transition scenario: a worthy transition scenario?

The students worked independently on the transition scenarios. There is little information available on their development process or intermediate products that led to the eventual transition scenarios. It is the main reason why this case study was not appropriate for evaluating the *process*, but instead only content and method. However, the evaluation in Section 6.4. does reflect on the process experiences of the student teams based on retrospective interviews. Below, an example is provided of a transition scenario that resulted based on the efforts of the students in working with TRANSCE as outlined above (See Box 6.2).

BOX 6.2: EXAMPLE OF A TRANSITION SCENARIO WRITTEN BY A STUDENT TEAM

The transition scenario is written as an advice for the OLPC Network (One Laptop Per Child), a non-profit organization funded by a number of profit organizations who each donated 2 million dollars and take on a specific role in the realization of the OLPC initiative. The common goal of these organizations – nested in OLPC – is to provide children in the developing countries with new opportunities to tap into their own potential, to be exposed to a whole world of ideas and to contribute to a more productive and saner world community.

Titled: "Building multiple partnerships to stay alive"

We live in the year 2030 and have completely lost the overview over the developments in the OLPC industry as changes are taking place at such a rapid pace and on so many different levels simultaneously that they can hardly be kept track of, though they are all connected in a way. But let us start from the beginning: When the world's economic and political leaders came together at the World Economic Forum in 2010 and it became clear that the Millennium Development Goals would be missed by far, they realized that they had to act immediately in order to prevent the dreaded "inconvenient truth" from materializing. Consequently, they formed a global "Sustainability Pact" which committed them to subjugate all their decisions under the overarching principle of sustainability. This was the starting point of a major mind-shift that spread like a disruptive force throughout the entire planet. So when the world was hit by a series of devastating natural disasters in 2012 due to the global warming that had already been taking place, humanity pulled together and networked across the borders to implement a variety of coordinated local solutions that would restore the ecological balance on a global level. And so it did.

This was an enlightening experience for many and hence the idea of networking with others to share best practices and create innovative solutions spilled over to all aspects of life, including the way education had generally been understood until then. Instead of depending on lectures to acquire knowledge, more and more people prefered to form learning networks with peer groups that would allow them to advance in their specific fields of interest. This was supported by the advent of Web 3.0 in 2015 which allowed people to tap into the world wide web from anywhere on the planet, using an innovative holographic interface that could be reproduced at almost no cost and was therefore freely distributed among the world's poorest to effectively close the "digital divide". As a result, a revolution of the educational systems in many countries took place, based on the fact that it was no longer considered reasonable to acquire knowledge via teachers but rather have students learn how to teach themselves by navigating through the world wide web and forming effective learning networks with peers from across the world. Many schools thus turned into what can be described as "learning centers" whose purpose it was to provide an effective environment for students to learn and coach them in their learning process. Other schools took a different direction and saw their new role rather in the "proper socialization" of children, i.e. focusing on a community's traditions, arts and tacit knowledge that could not be transmitted via the Web.

Naturally, there were also communites that saw a threat in the unfiltered content of the world wide web and thus tried to censor or even ban the use of it altogether by installing powerful interfering transmitters.

The effect of these developments on the OLPC industry structure was tremendous. As there was a vast amount of learning networks developing that effectively pooled the knowledge of some of the brightest people, small companies were founded "en masse" to address the distinctive needs of their local communities with tailored solutions whereas many large companies could hardly keep up with the exhilerating dynamics and fell prey to their comparably slow internal processes. The only large companies that succeeded to survive in such an environment were the ones who were able to create an effective network of innovative partners who would themselves be networked with other pioneering start-ups. Thus the OLPC industry structure in 2030 is characterized by a vast diversity of small companies that constantly challenge the last "powerholds" of some larger companies that were once dominating the industry and are now dependent on partnering up with their toughest competitors.

Students at a university are used to follow lectures, learn literature by heart and make tests to round off the courses they have followed. This exercise was a rather unique experience for the students. It tested their ability to deal with genuine problems of client organizations and work independently with a complicated method. Also, it assessed their imagination and their capability to translate transition theory to practical results. An initial observation when carefully reading the transition scenario is that the students indeed succeeded in developing scenarios that incorporated the elements underlying the nature of transformative change and resembled in many respects the evolution of a transition process. The transition scenarios written for instance capture different scale levels, uncertain and emerging developments, a structural change of the system, storylines that exceed sectoral boundaries and include a societal viewpoint.

The remaining sections in this chapter deal more in depth with the evaluation of the transition scenarios that resulted and the lessons learned from the development process followed by the student teams. The following section addresses the main research question for this case study and the underlying research methods for evaluation. Ultimately, a summary of the outcomes of the evaluation is provided. In the end, the role of the researchers is clarified. In the last section these outcomes are translated into different types of lessons which are fed back in the theoretical concept and method of transition scenarios, leading to adjustments and refinements. We end this chapter with an adjusted version of TRANSCE and some general conclusions.

6.3. Evaluation: experiences with TRANSCE

6.3.1. Research methods for evaluation: document analysis and semi-structured interviews

This case study was mainly set up to analyse the contribution and usefulness of TRANSCE in relation to the development of transition scenarios. There was one central question we wanted to answer.

Does TRANSCE actually lead to scenarios that integrally describe the nature of a transformative change process?

In answering this question two forms of evaluation were necessary. [1] First, the transition scenarios that resulted needed to be judged on their content. The underlying question here was twofold: [a] are the theoretical content criteria for transition scenarios reflected in the transition scenarios developed by the students, and [b] can we deduce additional relevant content criteria or enhance existing ones based on the analysis of the transition scenarios that have been developed. [2] Second, the method TRANSCE, or in this case the recipes the students used to develop the transition scenarios, needed to be judged on their contribution to the development of transition scenarios. The underlying question here was if the recipes actually facilitated the development of transition scenarios. Based on these two evaluations the conceptual foundation and methodological basis of transition scenarios could be refined and adjusted. The ultimate aim was to come within reach of a method that enables the development of a distinctive type of scenario, in which the pattern of transformative change is visualized.

With regard to the first question, the content criteria we had developed thus far (See Chapter 5) assisted our evaluation. 'Thus far' because the theoretical content criteria were not fixed throughout this research but were shaped and enhanced through the interplay with empirical case studies (Chapters 5, 6 and 7). Expert judgments of professionals in the field of transitions, including professor Jan Rotmans, professor Jac Geurts and myself, analyzed if the content criteria could be validated as important elements to evaluate the transition scenarios that the students developed. With regard to the second question, a semi-structured interview was held among the students involved. Out of the twenty-three groups of students that participated in the master course, we selected five groups that did very well in the development of the transition scenarios, and five groups that most clearly performed below standard. In doing so, we covered the total range of student teams involved and elucidated both positive and negative experiences. Insight was gained into the varied experiences of students with regard to their development process and use of TRANSCE. Besides some general questions to break the ice, the interview focused on two related subjects: the ease of use (comprehensiveness) and

the structure of TRANSCE in relation to the development of transition scenarios. We interviewed the groups independently of each other to ensure an open and constructive atmosphere and prevent any form of discomfort that could arise out of shame based on differences in performance between the various student teams. The advantage of interviewing five students at the same time, forming one group together, was that they each had different perspectives on their development process and therefore added to and complemented each others' experiences. The interview questions are outlined below (See Box 6.3).

BOX 6.3 – Interview questions

Note: Although some of the questions mentioned below are 'closed' questions, there was enough room for further deliberation about the answers given.

General questions

1. If you could share your impression of TRANSCE in a few sentences, what are the things you would like to emphasize?
2. What was most essential in TRANSCE for writing the transition scenarios?
3. How did you proceed in developing the scenarios?
4. What did you think went well in the development and what were difficulties you encountered?

Ease of use and comprehensiveness of TRANSCE

1. Was the concept of transition understandable within TRANSCE?
   a. Did you know what was expected of you with regard to the eventual outcome?
   b. Did you understand the complexity and dynamics we were looking for in the transition scenario?
   c. Did you understand the transition speak we used?

2. Were the assignments understandable within TRANSCE?
   a. Did the assignments provide enough guidance and explanation for developing the transition scenario?
   b. Were the right levers present for reaching a fully-fledged transition scenario and visualize the transformative change process?

Structure of TRANSCE

1. Did the transition scenarios logically follow from carrying out the individual assignments?
   a. Had each assignment its function in the eventual transition scenarios?

b. Was the order of the steps logical? Do you have other suggestions?
c. Did you have the feeling assignments were missing?
d. Did you bring in own/new ways to develop the scenarios?

2. Was the integration between the assignments clear?
   a. Was the connection between the assignments constructive?
   b. Did the steps build on each other in a sense that you needed the information from former steps to fill in upcoming steps?
   c. Did you manage to integrate the intermediate products into a fully-fledged transition scenario?

The outcomes of both evaluations are represented in the following subsection.

6.3.2. Expert judgements and reflections of student teams

Based on the critical reflections of the expert judgements and the responses of student teams during the interviews, we will summarize the most valuable and fundamental outcomes in relation to the feasibility of the conceptual foundation and methodological basis of transition scenarios. To avoid overlap in elucidating the outcomes, an integral approach is chosen in which the outcomes are jointly discussed.

First of all, students thought it was difficult to draw the system boundaries for the future stories (recipe 4). No tips or levers were given in the preceding recipes to decide on the desired extensiveness of the future stories. In many cases the transition scenarios became too broad and comprehensive. The students suggested that they would have preferred to conduct an initial exercise in which the borders of the system are explored, distinguishing the fundamental sectors and themes for realizing future sustainability from the more trivial ones. They believed this would provide insight into the necessary scope of the transition scenarios. Thus, one could more easily decide on the boundaries of the system that needs to go through a transition.

Secondly, the students thought the recipes of TRANSCE were too fragmented, blocking their creativity. They believe one can easily work through the different recipes in isolation and come up with creative and rich 'chunks' of knowledge. However, integrating these chunks into one single consistent transition scenario appeared difficult. They believe that the assumptions one makes in the different recipes can easily be in contradiction to one another. Due to the fragmentation of the recipes and the lack of coordination between them, they experienced problems with integrating all the obtained informa-

tion into a fully-fledged, consistent narrative. The most problematic consequence is that the defining and distinctive characteristics of a transition scenario were poorly represented. Students had difficulties with integrating the created information throughout the recipes into a pattern of transformative change over time. An example of this is that the third recipe requests to imagine several uncertain developments. These uncertain developments were hardly used in the eventual transition scenarios to explain how different groups of actors anticipated these uncertainties in order to set a new direction for transformative change. Their proposed solution for this problem is to converge the recipes to a few successive and constructive phases that provide insight into the overall aim and underlying development process of the method. Adding techniques as an underlying mechanism can accordingly stimulate creativity and provide guidance in reflecting on the pattern of transformative change in time. The students acknowledge the distinctiveness of transition scenarios but think it can be made more explicit and transparent in the method by designing techniques that illustrate how these distinctive characteristics can be stimulated during the development process. A technique was suggested that resembled Figure 2.1 (See Chapter 2): a conceptual drawing of the S-curve interwoven with the multi-level concept. While pursuing the recipes of TRANSCE one can use this drawing as an ordering framework, adding the created information from each subsequent recipe into the drawing. This gradually adds up to a complete and integral visualization of the transition process. It is a means to focus attention on describing the integral nature of the pattern underlying a structural change process since it forces one to keep track of the overall picture, the dynamic relation between recipes, the feasibility and the mutual consistency.

Thirdly, a week before the students had to start working on the transition scenarios they followed a lecture in which we explained the transition theory and TRANSCE. The students concluded afterwards that it was difficult to grasp and internalize the whole complexity and dynamics we were looking for in the eventual transition scenarios based on just one lecture. They believe circumstances like this, where time is scarce to go into depth or to facilitate a process, are served by [1] being very explicit about the desired output, [2] formulating clear definitions and consequent use of the concepts and terminology in TRANSCE and finally [3] giving a lot of examples of transition scenarios.

In fourth place, the level of abstraction in transition scenarios is very high because the scenarios are written at a systems level, describe developments over a timescale of approximately thirty years, and are societal by nature. Some students thought it was difficult to imagine a future at such a high level of abstraction. Therefore, they chose to make the transition scenarios more personal, real and physical by incorporating actual persons into the transition scenarios. They described how these persons were influenced in their

daily lives and how they experienced the transition that was progressing. Students felt it gave them the stimuli they needed to be able to dream and be bold in their scenarios while also preserving a certain degree of probability. In a way, they improved TRANSCE by exploring creative ways to portray the structural change process in a tangible way in the transition scenarios.

The last experience of the students regarding TRANSCE is related to the drivers that influence structural change. Six out of ten groups pointed out that they strongly focused on the drivers in developing their transition scenarios. Listing the drivers in the matrix and categorizing them according to their character and influence stimulated the students to be imaginative and inventive. It encouraged them to broadly consider, in subsequent recipes, strategic moves that could and/or should be carried out in dealing with the drivers for future sustainability to be achieved. Of course, the uncertain and emerging developments offered more opportunities for this, since the certain developments are autonomous. However, focusing on the drivers was a means for them to construct the skeleton of the transition scenarios, around which the future stories and pathways could be built. The students felt that the drivers should preserve a prominent function in TRANSCE.

In the following section these reflections are translated into suggestions for modification of the conceptual foundation and methodological basis of transition scenarios. First, a clarification of the roles of the researchers is provided to verify the objectiveness of their role in the evaluation of the transition scenarios.

6.3.3. Roles of the researcher: clarification and critical reflection

Several authors (Smith and Stirling, 2008; Kern and Smith, 2008; Shove and Walker, 2007/2008) worry about the involvement of researchers in transition management projects, especially when these projects aim to have an impact on society at large. For our specific case study, this was only partly the case. Indeed, the intention of the master course was that the transition scenarios were part of an advice for client organizations regarding their strategies for entering a BOP-market. However, it is unlikely that these businesses let their strategy be dependent upon student results without any further research. Furthermore, the primary aim of developing these transition scenarios was to produce meaningful results within the context of the master course at the University, i.e. let students learn about transition theory and become practically as well as theoretically more acquainted with methods for future thinking. Finally, our impact as researchers in terms of "influencing society at large" did not go any further that offering an ordering framework to structure the discourse between students about developments ongoing

in BOP-markets; we did not have any influence on the content of the final transition scenarios.

In general, researchers are not merely exploring, describing and analyzing transition activities or adjusting the available models and methods; they are often actively involved as action researchers in the application and advocacy of transition management activities in various programmes and projects. Scientists (Smith and Stirling, 2008; Kern and Smith, 2008; Shove and Walker, 2007/2008) are suspicious about the fact that analysis and evaluation of a project is objective when the researchers are themselves heavily involved in and committed to inspiring structural change in society at large. Their involvement could function as an impediment for a realistic outcome and analysis of the project (Duineveld, Beunen, van Ark, van Assche and During, 2007). Whether or not this is problematic in itself, critics emphasize that this role of researchers needs to be clarified and critically reflected upon.

In light of this case study, the following can be said about clarification and critical reflection. As professor and teacher at the University of Tilburg and as DRIFT researcher, Jac Geurts and myself were actively involved in the master course, in different roles as the course progressed. From the start we were aware of these different roles throughout the master course. From our perspective we quite well managed to separate these roles. Even more so because the master course distinguished different phases in time that asked for different roles. We managed to prevent the need to commit ourselves to perform more than one role at the same time. Jac Geurts was continuously and solely involved as a teacher (which also distinguishes various roles) while my roles varied in time. In the first phase I was involved as a teacher and expert in the field of transitions. We organized the lectures and provided the students with theoretical information about the complexity and dynamics underlying transition processes and, based on TRANSCE, explained them how transition scenarios can be developed. We only provided an ordering framework in this respect. Information about the client organizations and several BOP-markets was made available by members of the organizations themselves. By the time the lectures came to an end and the students had to start working independently on their seven recipes, a second phase started and I was involved as evaluator or mentor. During feedback sessions and e-mail conversations we answered questions regarding the use and application of TRANSCE and offered methodological suggestions. When the course came to and end, the students had to hand in their transition scenarios. We had to grade the transition scenarios based on objective standards approved by the course coordinators. As mentioned before, these standards were based on the content criteria for transition scenarios resulting from our theoretical research. Besides using these standards for quantitatively grading the transition scenarios, we judged the scientific and qualitative 'transition-value' of the transition scenarios by weighing them against and contrasting them to these standards. Finally, three weeks after the students had

received their grades, we stepped into the role of researchers. We held semi-structured interviews with students to evaluate their experiences with the use of TRANSCE.

In general, our role and influence on the progress and evolution of this case study was greatest in the first phase. Due to practical restrictions as well as time constraints we had to make several choices regarding process facilitation, process management and conceptualization, outlined in the previous section. We made these choices explicit in order to identify the considerations behind them and to be able to explain and reflect on the outcomes of the case study. The following section will pay explicit attention to this.

6.4. Empirical lessons learned: revisions in concept and method

It has become clear that this case study was not only an exercise in future thinking, but also a methodological and theoretical journey; it was a real-life experiment for the researchers as well as the students. The setting of this case study taught us that the process of development followed is very context specific and context dependent. Without process facilitation, it proves difficult to pursue TRANSCE. We want to emphasize here that these student projects have very clearly led to some of the most important lessons and insights. The circumstances pointed out rather clearly the necessary conditions that enhance the outcome of the development process. Major lessons learned in this case study provided an important empirical and theoretical underpinning of TRANSCE, in terms of conceptual foundation and methodological basis. Most notably, it led and contributed to the operational development and theoretical refinement of TRANSCE and its underlying content criteria as presented in Chapter 5.

6.4.1. Enhancement of the conceptual foundation

Quite a lot of insights resulted from the case study. The following empirical lessons seem to have a generic value for the theoretical content criteria underlying TRANSCE. They must be perceived as conceptual levers that assist in more explicitly addressing and portraying the nature of the transformative change process in transition scenarios by providing insight into the underlying pattern. They focus on the enhancement and deepening of the content criteria as mentioned in Chapter 5. All lessons have been fed back to theory and are incorporated in the conceptual foundation of transition scenarios (See Chapter 3).

- Transition scenarios describe stories about future sustainability at *a societal systems level*. The scope of this system needs to be determined in advance of the development of the transition scenarios. Defining a so-called 'transition challenge' is a valuable aid. It explores the conditions under which a system can act sustainably in the

future and addresses relevant sectors in support of these conditions. It prevents the transition scenarios from becoming too utopian and too all-embracing.

- A description of the transformative change process in a transition scenario consists of simultaneously explaining what has been initiated throughout the transformative change process and what has been demolished. Accordingly, structural change is unravelled by describing its underlying mechanisms of build-up and break-down.
- In Chapter 5 it was revealed that uncertain developments are starting points for the initiation of a transformative change process. The transition scenarios developed in this case study further specify this notion. More specifically, it is the *interaction* between various drivers for structural change that can start a *new and more sustainable development direction.*
- Following this, the drivers are categorized in terms of certain, uncertain and emerging developments as a means to *jointly employ* the macro level and the micro level in order to pressure the dominant regime, bottom-up as well as top-down, to destabilize and set a new direction for change.
- The multi-pattern concept emphasizes that although uncertain developments are starting points for the initiation of a transition, the actual scaling up of a more sustainable system is created through the interplay between drivers for structural change and anticipative strategies, actions and innovations of niche actors at the micro level.

6.4.2. Methodological implications for TRANSCE: the importance of techniques?

A number of generic lessons were learned concerning the methodological basis of transition scenarios. These led to modifications in TRANSCE. A revised version of TRANSCE is provided in Section 6.5.

- In order to prevent any constraints regarding creativity during the development process and to ensure a more dynamic and integral description of the pattern inherent in a transformative change, TRANSCE benefits from a less rigid and more fluent underlying process design. The steps in TRANSCE are converged into five overall phases. In doing so, TRANSCE relates more to a generic method. The different phases represent the flow of discussion activities and subject matters during the development process, pointing out the major building blocks of transition scenarios and providing insight into the overall picture. The steps do not have so much the specific function of stimulating creativity and imagination of the participants engaged and providing analytical levers and concrete recipes that contribute to the integral description of the transformative change process. A more severe role in this last respect is assumed to lie in the hands of the facilitator(s) (See the following subsection) and

relevant new and/or adjusted techniques supporting TRANSCE. The necessity for new or adjusted techniques is addressed in Chapter 4.

- Techniques could be valuable in ensuring that the theoretical rationale behind the steps of TRANSCE are translated to the practical worldviews of the participants while providing structured levers that can guide the discussions and feed the eventual transition scenarios. For the following case study it is worth exploring which new or existing types of techniques are valuable in the context of the development of transition scenarios and how they need to be adjusted to have an added value in envisioning the underlying notions of normativity, uncertainty, complexity and systems thinking.
- TRANSCE was outlined in this case study as a sequential and streamlined method, whereas the students remarked that they were continuously going back and forth between the various recipes, trying to achieve synchronization, integration and consistency within the transition scenarios. This underlines the gap between theory and practice. And although TRANSCE needs to maintain its value as a scientifically underpinned method and needs to preserve its use as an ordering framework for the facilitator(s), the visualization of TRANSCE can more closely reflect its cyclical and iterative character. A less rigid method also ensures a more explicit focus on and insight into the overall aim of the development process.
- Linking the complexity of the pattern underlying a transition process to someone's daily life which is affected by this transition process, enables the participants involved to think more easily of relevant issues that need to be incorporated. It functions as a business case. Participants can more easily relate concrete strategies, developments and innovations to the transformative change that is portrayed at the systems level. In fact, personification assists in several other things as well, such as making the transition scenarios more empathic, making them easier to identify with and enriching them with concrete examples.

6.4.3. The assumed role of process facilitation

In the beginning of this chapter we outlined several restrictions of this case study which forced us to make quite a few choices regarding the development process. The lessons summarized below reflect on these circumstances and distil desirable conditions regarding the facilitation of the process. The core aim of this book is to reflect on the evoluation of the method for developing transition scenarios. Attention for the role of facilitation was initially not meant to be a subject that needed to be incorporated in this thesis. However, the circumstances within this case study have pointed out its relevance. From this chapter onwards, it will be an important issue for reflection.

- This case study required a tailored approach in which the basic principles of TRANSCE remained crucial but were adjusted to the timeframe, the competence of the students and the requirements of the master course. A rather reductionistic approach was the result. In this specific case it turned out to be a necessary condition for ending up with (for the most part) satisfactory transition scenarios, since the students had probably not been able to develop adequate transition scenarios without such a mechanistic, tight and detailed approach that strongly guided their development process. However, in a more ideal situation the opportunity exists to decide on a more fruitful balance between methodological guidance, process facilitation and creativity of techniques. Based on experiences within this case study, we assume that facilitation of the development process could then be crucial in several respects: [1] to indicate the relation between the steps and give insight into how each step builds on the previous one and contributes to the eventual transition scenarios; [2] to continuously provide along the way an overall image of the expected outcome in order to motivate participants and give direction; [3] to be aware of the ordering framework that supports the development of the transition scenarios and indicate how the information gathered can be synthesized, integrated and placed within this framework. The following case study will explore the feasibility of these notions more thoroughly.
- A strong emphasis must be placed on the role of 'expectation management'. It must be very clear in advance what the expected outcomes are in terms of focus, scope, integration, format etc. The development process would probably benefit from examples of similar ideal transformative changes at a systems level. It can be used to visualize the notions underlying transition theory and explain how the various steps in TRANSCE need to be integrated to visualize the transformative change process. It helps participants engaged to get acquainted with the kind of change we are looking for, and may even inspire them to internalize the way of thinking that is brought forward. It feeds the participants with knowledge about the building blocks and ordering structure within which the transition scenarios are nested.
- Expert knowledge about the system that is central in describing the transition scenarios, in this case the subject of the BOP-market, is a requirement with regard to the participants involved. It realizes more system specific and practically relevant transition scenarios. One can make better educated guesses regarding the plausibility of the incorporated structural change; one has a better sense of the developments and weak signals ongoing in the environment; one can better assess the relevant groups of actors in light of the desirable systems change etc. On the other hand, the lack of knowledge about the BOP-market led to more surprising and innovative transition scenarios since students reasoned based on perspectives that would normally not be thought of.

The experiences with TRANSCE have been evaluated and modifications for concept and method have been suggested. The following section draws some general conclusions about TRANSCE and provides recommendations for further research.

6.5. General conclusions: is the method doable?

The different types of lessons outlined above have partly resulted in an empirical configuration and validation, and partly in a further theoretical refinement of the conceptual foundation and methodological basis of transition scenarios. The proposed adjustments concerning the method are incorporated in an adjusted version of TRANSCE (See Figure 6.1). A thorough explanation of this new version is not required at this point since it is used as a starting point for delineating the development process of the case study in Chapter 7. The same goes for the lessons regarding facilitation; these are taken into account in organizing and facilitating the development process of the following case study. Nevertheless, some general remarks are in place as well as a short description of the choices that led to this adjusted visualization of TRANSCE.

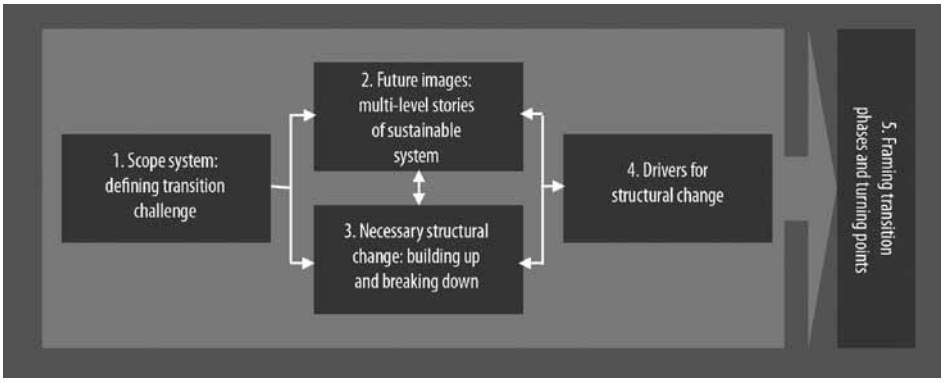

FIGURE 6.1 - *TRANSCE Version 2.0.*

To start with the latter, the following decisions are worth mentioning:

- making TRANSCE less mechanistic and reductionistic by synthesizing the various steps in a few overall phases
- starting off with defining the transition challenge as a means to determine the scope of the transition scenarios and the system boundaries

- neglecting the earlier distinction made between the development of the future images and the guiding pathways, since they reciprocally influence each other and are developed based on a dynamic interplay of mutual alignment
- placing step 5 apart from the previous steps since this step does not lead to new information, but is only a means to guarantee the structuring and integration of the information (if this has not yet been done throughout the process itself) gathered in foregoing steps in line with the multi-phase, multi-level and multi-pattern concept
- the white arrows between the steps are a means to indicate the constructive relation between the steps and the iterative character of practicing the method

More in general, the aim of this case study was to test and evaluate if TRANSCE enables the development of scenarios that visualize the nature of a transformative change process. Obviously there are many observations worth mentioning in this respect. First of all, this was the first actual transition scenario project in which we consciously used an underlying method, specifically aimed at and providing levers for visualizing systems change. It was verified by the student teams that the method is comprehensive and 'complete' in the sense that it offers levers for visualizing all ingredients of a transition process. Furthermore, it was evaluated by the students as a method that is straightforward and easy to use. More importantly perhaps, the case study achieved some remarkable results. Overall, the students succeeded in developing scenarios that incorporated the elements underlying the nature of structural change and in many respects resembled the evolution of a transition process (See Section 6.2. for examples). As an experiment for the development of transition scenarios this case study has been more than successful in terms of enhancing concept and method, as well as achieving concrete innovative results that differ from what can regularly be expected. The case study as a whole showed that the basic principles inherent in the concept and method underlying TRANSCE, as a means to describe complex systems changes, were valid and useful.

We should, however, be slightly modest in only claiming success. The quality of the transition scenarios did not entirely meet our expectations. There is a major hurdle to overcome in realizing integration between the various elements that constitute a transformative change process. The main question here is if we were realistic in expecting integration when having to rely on a reductionistic approach and if we did not have too high expectations regarding the competences of the students to solve the 'transition puzzle' independently. True or not, a tight method was not only required due to time restrictions but also because it probably suited the competences of the students best. However, experiences show that the ideal context for carrying out TRANSCE differs in many respects from the context we had to deal with in this case study. On top of the 'conditions of use' mentioned in Chapter 4, we learned that ultimately and intentionally,

TRANSCE should be practiced with participants that are engaged in a vision development process, having expert knowledge about the systems that are dealt with, offering a timeframe of at least half a year and with the ambition to learn more about the short-term practical implications of long-term desirable societal futures. This kind of situation lends itself for a more fluent, open and generic approach. In the following chapter we will see if these circumstances and the approach suggested do indeed support the development of more integral transition scenarios and help participants keep track of the overall holistic picture. For the following case study, two tracks of improvement seem advisable. [1] Ensuring a more loose and participative setting in which close facilitation of the process is feasible. This primarily supports the development process of TRANSCE in terms of providing overview, coordination and synthesis. [2] It seems useful to experiment with and develop techniques that support TRANSCE in terms of its capacity to ensure transition scenarios that have an imaginative character and include analytical rigor and analytical integration.

Thus, overall we can say that the constraints in time and the inexperience of the students, which led us to rely on a simplified version of TRANSCE, together with the still immature and rudimentary method of TRANSCE, have resulted in transition scenarios that lack a certain degree of dynamic interplay. However, based on the practical experiences put forward in this case study, we conclude that the results are encouraging and that there are sufficient reasons to keep advancing and developing the concept and method underlying TRANSCE. By and large, we have achieved some remarkable results and valuable steps in developing a distinctive type of scenario that more closely reflects our ideal standards than results brought forward with mainstream methods. We have overcome the main criticism that was experienced as most problematic by experts in the field of scenario development (Berkhout, 2005; Van Notten, 2005; Greeuw, Van Asselt, Grosskurth, Storms, Rijkens, Rothman and Rotmans, 2000; Bruun et al., 2002; Marien, 2002): we succeeded, for the most part, in accurately translating the theoretical claims of the conceptual foundation into scenario practice. Furthermore, we succeeded in picking up lessons and translating them into suggestions for modification and recommendations for following projects.

CHAPTER 7

Case 3: TRANSCE in the system of care and building

7.1. A real-life context for experimentation with TRANSCE

This chapter deals with the case study that we labelled in Chapter 1 as 'Stichting MAAT'. The case involved the organization and facilitation of the development process of transition scenarios for the system of care and housing in the region Nijmegen.

Several reasons can be mentioned why this case study provided an appropriate and desirable context for implementing and testing TRANSCE in this final stage of the research. First of all, Stichting MAAT foresaw a looming future in which the demand for care would further increase while at the same time the supply for care would decrease. Together with trends like ageing and individualization, they believed this could lead to a lock-in of the current care system. Stichting MAAT assumes that only radical and structural change within a long-term sustainable perspective, starting now, can prevent this unsustainable situation from happening. To gain insight into this process for structural change and deduce short-term practical levers for action, they wanted to gain insight into sustainable future developments from the perspective of transformative change. The choice for this transition perspective perfectly linked up with and provided an interesting and relevant breeding ground for experimentation with TRANSCE.

Secondly, although TRANSCE had been used before as a methodological underpinning of a development process for transition scenarios, it was the first case in which the development process was carried out with 'real actors' with genuine long-term societal ambitions and in which the transition scenarios were supposed to have real practical implications. It was something we had not done before but believed to be necessary for the validity and credibility of this approach. Herewith we do not imply that the previous two case studies were worthless. We believe the opposite is true: they were both necessary in terms of enhancing TRANSCE and developing it into a mature enough version for practical and real-life implementation.

Finally, since this was the first time during our research we had to deal with a real-life case in which TRANSCE had a central role and was taken as a starting point to initiate practical impact, we offered to run this project for free. Not only because we could not guarantee success with this still slightly uncertain version of TRANSCE, but also because we aimed to pursue certain research aims with this case that would be of little interest for Stichting MAAT (See the end of this section). By offering to organize and facilitate the development of the transition scenarios for free, we could insist on preserving the right to set up the development process in line with our specific research interests. It implied that Stichting MAAT would not smother us with all kinds of requests that could get in the way of the scientifically intended implementation of TRANSCE. Accordingly, Stichting MAAT was open for any form of methodological input from our side. They agreed

to participate in all kinds of scientific evaluations we presupposed were necessary for reaching well-founded conclusions.

The starting point for this case study is the version of TRANSCE that resulted from the preceding case study (See Chapter 6, Figure 6.1). In light of the lessons put forward in that specific chapter, this chapter places a strong emphasis on describing process facilitation and the use of underlying techniques in relation to the evolution of the eventual transition scenarios (See Section 7.3.). This case study is explorative and the new and/or adjusted techniques used throughout the development process emerged through learning-by-doing and doing-by-learning with the aim to envision the systemic conditions that create discontinuity and the anticipation thereof.

This chapter has different sections. Section two describes the background of this case study and the reason for initiation from the perspective of Stichting MAAT. Section three specifies how we intend to test and evaluate the primary research aim of this case study scientifically. Accordingly, the set-up of this case study is elucidated, underlining the choices we made that underlie the eventual development process followed. Section four describes the actual participatory process guided by TRANSCE. Section five addresses our own role within this case and the research methods used for evaluation. Section six builds on this by formulating the different types of lessons learned regarding the conceptual foundation and methodological basis of transition scenarios. In the final section, these lessons lead to a configuration of TRANSCE.

7.2. The initiation of the case study: national and regional worries of Stichting MAAT

In the beginning of this chapter we referred to the expected future lock-in of the care system which Stichting MAAT perceives as a current problem and which underlines the need for radical changes. Herein lies the main reason why Stichting MAAT chose to participate in the development of transition scenarios. In this section we address the different levels, both national and regional, at which this problem occurs. This analysis originates from a combination of care-related research carried out by DRIFT and observations from Stichting MAAT. By illuminating this analysis, the persistency and urgency of the problem is exposed, which more specifically addresses the reason underlying the initiation of this case study.

At the national level, the Dutch care system has become rigid due to the many institutions, regulations and structures that currently exist and which increase the lack of sensitivity and flexibility towards ongoing societal developments. These structures were,

however, once initiated based on well-intended purposes and have enabled accurate functioning of the care system for a long time. In the seventies, however, the first cracks in the care system became visible when the environment changed dramatically (due to trends like globalization, liberalization, ageing, individualization etc.), which led to tensions between the care system and its environment. It appeared that the former was inflexible in light of the changing requirements the environment posed. The cramp-like response of the care system focused on increasing control and mechanization. Hence, medical manipulation became central in the care system and since then the ideology prevails that any question regarding care can be dealt with. On the supply side this resulted in excessive professionalization, specialization, fragmentation and progressive medicalization. On the demand side it resulted in passivity of clients, overestimation of the care question and consumerism. The underlying structure is hierarchical, bureaucratic and dense, which strengthened the rigid and unsustainable direction the care system was already heading for.

Currently, three main reasons can be mentioned why it is presumed that the current care system is not sustainable anymore. First, if the existing scale and impact of the care system are extrapolated to the future, the image looms that, when holding on to the current state of the care system, chances for qualitative care for following generations will be decreased. Secondly, on the surface the care system shows many symptoms of unsustainability, e.g. low level of internal cooperation, lack of external societal integration, lack of satisfactory employees etc. Thirdly, the current care system is worrying in light of ongoing and anticipated societal developments that determine the music and rhythm of future care. Trends like decreasing social cohesion and the increased level of luxury, wealth and status that are associated with the ageing population will destabilize the care system (Neuteboom and Van Raak, 2009).

The situation described here is characteristic for the care system in the Netherlands. It depicts the background against which this case study is carried out. Stichting MAAT expects that the care system needs a radical and structural change to break with the downhill twirl that currently hampers more sustainable forms of care. Insight into how this transformative change process can proceed in time and deducing levers for short-term action from it was the overall reason for Stichting MAAT to participate in the development process of transition scenarios. However, the specific focus and eventual initiation of the case study related to more regional problems that existed in and around the city of Nijmegen, where Stichting MAAT is housed. We will go into this below.

Stichting MAAT is a niche-based network organization in the region of Nijmegen with the intention to stimulate cooperation between various organizations that provide services related to care, housing and well-being. Stichting MAAT assumes that part of the

services they have to deal with are figurative or estranged. This implies that the demand for care is not related to problems concerning health but originates from a lack of other primary societal needs, e.g. social contact, peace of mind, a job, safety etc. This lack can, when ignoring the underlying causes of the problem, slowly but surely develop into physical or medical problems for which people are sent to the care system. Thus, problems which originate out of stressful societal circumstances are translated into health problems at the expense of the care system.

As described above, Stichting MAAT perceived this spill-over effect in light of the unsustainable state of the current care system and the anticipated future developments in society. Hence, it was concluded that not very far into the future there will be a situation in the region of Nijmegen in which the demand side outreaches the supply side, resulting in disutility of the care system in terms of quality and/or quantity of care. For Stichting MAAT this implies that they will be overwhelmed by care questions with which they cannot deal properly due to lack of capacity. This looming image stimulated the sense of urgency to try and initiate a radical and structural change in this future outlook. Stichting MAAT perceived its role in this transformative change process as initiator, since in the region of Nijmegen it is one of the few organizations which have the resources and the power to bundle the forces of various organizations and stimulate bottom-up initiatives that can jointly contribute to or result in a regional transition process. However, Stichting MAAT lacked insight into the required direction and focus of this so-called movement they wanted to initiate, and they had no ideas whatsoever about the desired and sustainable future state of the care system. Hence, our scientifically based method for the development of transition scenarios (TRANSCE) guided them through a participative process in which they gradually became acquainted with necessary conditions for transformative systems change. The eventual transition scenarios provided them with an inspired future orientation from the perspective of transformative change as a basis for deducing relevant system innovations, networks and strategies that could underlie the governance of the regional transition process. Stichting MAAT perceived this case study as a pilot. If this project provided insight into practical short-term solutions concerning a sustainable approach for the care system, it could be scaled up at a national scale.

The following section describes how we systematically tested and evaluated the research contributions of this case study. In view of that, the set-up of this case study is clarified, underlining the considerations that led to the eventual development process followed.

7.3. Evaluation of the research contributions: pursuing our aspirations?

The character of this case study offered us the possibility to pursue our primary research aim: to validate and enhance our scientifically and empirically developed conceptual foundation and methodological basis of transition scenarios based on a real-life setting. We evaluated TRANSCE on three aspects: process, content and method.

7.3.1. Aim of the case study: intentions for evaluation versus practical feasibility

Several intermediate learning experiences from preceding case studies as well as restricting conditions during this project led us to choose a slightly modified and more focused approach than described above. First of all, with regard to the process, we wanted to analyse if and verify that certain cognitive and behavioural changes result from participation in the development process of transition scenarios. Examples of these behavioural changes are stimulating a mental shift, social learning or a more anticipative attitude towards complexity. These changes are referred to in this book as 'process criteria' of transition scenarios (See Chapter 3). The initial intention was to have developed these process criteria in advance of this case study. Based on these process criteria we could develop an interview format which we could employ in this specific case study, by means of a pre-test and a post-test, to validate these process criteria. The ultimate result would be to perceive changes in their responses over time, provoked by the involvement in the development process of transition scenarios, indicating a different mindset in terms of cognition and behaviour. However, the process criteria we had developed thus far, solely relying on theory and literature reviews but not being empirically validated and enriched, were not substantial enough and did not have enough gravity to permit systematic scientific testing. Nevertheless, because this specific case study could provide us with relevant empirical data that could underpin and enhance these theoretical process criteria, we chose to evaluate it anyway but by means of a slightly different approach. It was not an ideal testing ground but despite our approach we managed to define the process criteria more explicitly. We observed the participants engaged in the development process very closely and distilled changes in cognition and behaviour that we believed were initiated through the engagement in the process. Afterwards, we interviewed the participants and verified our ideas. The outcomes were subsequently fed back into the theoretical process criteria underlying the concept of transition scenarios (Chapter 3). Secondly, with regard to the content, we chose to evaluate the integral character of the eventual transition scenarios in light of the contribution of two specific aspects: facilitation of the process and techniques underlying TRANSCE. This specific focus is based on the lessons put forward in Chapter 6. Here it was concluded that the eventual content of the transition scenarios, in terms

of more integrally describing the pattern inherent in a transformative change process in time, would benefit from paying more explicit attention to process facilitation and techniques. With regard to the former, the participative context of this case study provided the opportunity to test if process facilitation - providing overview, synthesis and structure throughout the development process - is indeed supportive of more explicitly and integrally addressing the pattern underlying structural change in the eventual transition scenarios. With regard to the latter, the case study provided a context in which we could experiment with new and existing techniques in different phases of the development process. The opportunity arose to evaluate if these techniques supported the participants engaged in terms of creativity, imagination and analytical rigor. Furthermore, we could explore what kinds of adjustments were necessary in existing techniques to be of relevance for envisioning the complexity and uncertainty underlying the pattern of transformative change. Finally, with respect to the method, it has become redundant to evaluate the generic steps of TRANSCE based on its capacity to analytically support the eventual transition scenarios (like we did in the previous chapter), since this role has been taken up by the facilitators and the techniques underlying TRANSCE. Based on the adjustment made in the preceding case study, TRANSCE merely renders the stream of discussion subjects, pointing out the major building blocks of transition scenarios and ordering them in such a way that the development process logically adds up to fully-fledged transition scenarios. Hence, we chose to evaluate the method based on aspects regarding comprehensiveness, ease of use and logical ordering.

The scientific research activities that we aimed to carry out, led to several choices regarding the set-up of this case study. These are outlined in the following subsection.

7.3.2. Set-up of the case study: initial consideration for development

In advance of the actual start of the case study we, Jac Geurts and myself, had several meetings with our main contacts within Stichting MAAT, Jelle de Visser (Advisory Board ZZG Zorggroep, part of Stichting MAAT), Peter Weyers (Director of Stichting MAAT) and Ton Moors (Senior adviser of Stichting MAAT). During these meetings we discussed their rationale for participating in the development process of transition scenarios. Accordingly, we formulated the scope of the eventual transition scenarios in broad terms and determined the central aim of this case study. The intention was to develop transition scenarios for the system of care and housing in the region Nijmegen focused on enhancing the quality of life for the disabled, referring to people with physical or mental defects.

After reaching agreement about the aimed content of the eventual transition scenarios, the first step was to write and discuss a proposal for the methodological set-up and

organization of the development process. Jac Geurts and myself took the lead in this, which provided us with the autonomy to shape the development process in accordance with our own scientific research aims. All together we had six months, from January 2008 to July 2008, to develop the transition scenarios. The choices we made reflect *methodological and organizational* considerations. All choices were made with the aim to facilitate and enable the scientific validation of TRANSCE in terms of process, content and method, as discussed above.

In terms of methodology we wanted to take as a starting point the version of TRANSCE put forward in Chapter 6. Hence, we suggested five phases in time in accordance with the steps of TRANSCE. Each phase represents one generic step of TRANSCE and is exercised by facilitating one or more participative sessions. As will be witnessed in Section 7.4., throughout the development process several practical learning experiences led us to modify these phases in accordance with e.g. the iterative character of the discussions, the relentlessness of practice, disappointing intermediate results or a more logical sequence. In advance, however, they were outlined as follows:

- *Phase 1 (February 2008): Defining the transition challenge*
  Exploring the scope of the system by defining future sustainable conditions concerning the quality of life for the disabled. A transition challenge was formulated in this respect.
- *Phase 2 (March 2008): Sustainable future system states*
  Deepening the transition challenge by describing a vivid and animated narrative in which the daily life of the disabled is outlined. The multi-level framework provided the structure for constructing these narratives.
- *Phase 3 (May 2008): Necessary structural change*
  Defining the necessary structural change for reaching the sustainable future system states. Hence, necessary changes in culture, structure and practices of the system under study were illuminated. These changes were addressed in terms of the mechanisms of build-up and break-down.
- *Phase 4 (June 2008): Drivers and anticipation strategies*
  Exploring the trends, uncertainties and weak signals that may influence the transition pathways towards sustainability. Furthermore, thinking of groups of actors and related system innovations that can jointly initiate modulation.
- *Phase 5 (July 2008): Framing the transition*
  Delineating the phases of the transition process.

Central defining decisions in terms of organization were:

- To start with a select number of participants in the sessions who were all personally driven. This means that they were each frontrunners in the field of care and housing

and were attracted to participate in this process as private persons instead of based on an institutional connection. This was to ensure a high-quality spirit in the group and prevent any form of 'opportunity picking'. We anticipated, however, that due to this limited number of participants the possibility existed that not all relevant fields of expert knowledge, put forward by the scope of the eventual transition scenarios, were represented by the group members engaged in the development process. We decided to invite additional experts in the development process at times when the group experienced that relevant fields of knowledge remained underexposed or not exposed at all. The role of these experts in the development process was equal to the other participants already engaged. They participated in one or two sessions throughout the whole process, dependent on the relevance of their knowledge contribution in relation to the eventual transition scenarios. This was a conscious choice to advance the richness of the transition scenarios, whereby we accepted the risk that the process would be delayed due to the necessity of repeating and explaining the results from earlier sessions for these 'new' participants.

- To start off with interviewing possible candidates for the participation in the sessions. This as a means to [1] select the participants who could be perceived as frontrunners in terms of their personal drive, expert knowledge and background, visionary qualities and level of creativity, [2] find out if our formulated scope of the transition scenarios, which was perceived as necessary by our main contacts within Stichting MAAT, was also shared by the participants engaged in the development process, and to [3] write a starting document as a shared basis for the development process in which all responses and perspectives were synthesized into an overall problem sketch. Due to time restrictions it was a quick way to overcome anticipated delays in the first phase of the development process in terms of becoming acquainted with and understanding each others' viewpoints in relation to their own viewpoint and learning to recognize and respect the agreements or disagreements between various viewpoints.
- Several decisions made were initiated by our research aim to analyse the influence of process facilitation and techniques in relation to the integrative character of the eventual transition scenarios. We took on the responsibility to organize the sessions and determine which type of techniques would be used in what phases of the development process. In terms of facilitation, we guided the sessions and analytically structured, enriched and integrated the outcomes after each session. Also, we wrote the final document that included the transition scenarios. Furthermore, we used the processed outcomes of a session as a starting point for the following session. This ensured that subsequent sessions built on one another and that the contribution of each session was integrated and captured in the eventual transition scenarios. It

provided integration and synthesis between the various outcomes of the sessions as well as an overview for the participants involved.
- Since the facilitation of the process involved quite a lot of work in terms of time and competences, Jac Geurts and myself decided to take on this responsibility together. Jac Geurts was responsible for the actual facilitation of the discussions and group dynamics throughout the sessions, whereas my role focused on methodologically preparing and organizing the sessions and providing overview, integration and synthesis by processing the outcomes according to an analytical ordering of transformative change. My specific role as researcher is more explicitly addressed in Section 7.5.

Several additional choices that further defined the scope of the eventual transition scenarios were put forward during the actual development process. Stichting MAAT insisted on including these suggestions for various reasons. We explicate the choices and their underlying motivation below. These suggestions all referred to the content of the eventual transition scenarios, it did not interfere with our methodological ideas regarding the implementation of TRANSCE.
- To develop transition scenarios as well as lock-in scenarios. The reason was that Stichting MAAT wanted to explore if a transition process was urgent and necessary as opposed to continuing existing policy. Furthermore, to reassess if a transition process is an accurate approach for the problems they were currently experiencing or if other forms of change management, less radical forms, could also suffice. This case study was a means for them to analyse if it is probable that the system will run aground and if a radical breakthrough is actually necessary.
- To define a plan for transition management based on the eventual transition scenarios as a means to deduce concrete short-term actions based on which niches can be derived that can jointly initiate modulation.
- To take the integrated systems approach as a starting point and focus herein on the integration between care and housing. A recent development contributed to this choice to define the system boundaries of the eventual transition scenarios in terms of care and housing. Governments in The Netherlands are steering towards a financial separation of care and housing. This implies that housing will be liberalized and influenced by market developments, leading to a whole different power game. It results in tensions between different organizations and invokes many questions, like if it is still possible to offer care and housing as an integrated service. Who is going to take it upon himself to arrange housing? Where are the disabled going to be housed, who are now staying in nursing homes? Various organizations that are partners in Stichting MAAT, are, each in their own specific field of interest and expertise, confronted with powerful societal and policy pressures that stimulate attention for a more integrated systems approach between care and housing. Hence, the organiza-

tions that will almost certainly be affected by this Governmental decision wanted to get insight into the consequences of their changing role and function, as well as in changing relations with others in the future.

- A final choice was to distinguish between a steering group and a core team. The former had the role to follow the participative process from a distance and ensure that the eventual transition scenarios actually reflected the scope that was set out in advance of the development process. The latter consisted of the participants engaged in the development process of the transition scenarios. Although the name 'steering group' may remind people of things related to the exertion of control, in practice this choice to appoint a steering group implied that these people participated two times in the development process while being very constructive and open for suggested changes in the scope of the transition scenarios when this appeared necessary. They did not hinder our research aims.

In the end, based on the interviews we held in advance of the development process (see the organizational choices mentioned above) and the selection process that followed, the people outlined below participated throughout the development process. The core team consisted of people that were permanently engaged in the development process. These people were suggested by Stichting MAAT and stemmed from their network in the region of Nijmegen. Some of these people were partner in Stichting MAAT, others had direct relations with Stichting MAAT, and in two cases the people had indirect relations with Stichting MAAT and were put forward due to what in literature is referred to as 'snowballing'. The members of the steering group had an advisory role at a meta level and consisted of two of our main contacts for carrying out this case study. Finally, the experts assisted the core team by sharing their knowledge about a specific field of expertise that had not been not touched upon till then but was relevant for covering the scope of the transition scenarios. These people were suggested and attracted by various members of the core team at times they believed their knowledge was necessary. In the end, several experts participated in one or two sessions of the entire development process.

A more general remark in relation to the composition of the group is called for here. Most of the people who participated in the development of the transition scenarios were (closely) related to Stichting MAAT. This does not imply, however, that their visions regarding sustainable care and housing were comparable or in line with each other. We ensured that various perspectives on sustainable care and housing were present in the group. The importance for Stichting MAAT of only involving network relations related to their ambition to initiate a regional transition process. This process was a means for them to perceive how different actors in the region can strengthen and complement each other in starting a transformative change process.

Members of the core team
- Petra Eshuis - *Manager Estate and Accommodation ZZG Zorggroep*
- Gerard Kersten - *Director Dichterbij, Region Rijk of Nijmegen*
- Hans Goeman - *Advisory Board RIBW Nijmegen and Rivierenland*
- Ton Moors - *Senior Consultant Stichting MAAT*
- Marion Pieters - *Architect BNA, Interior Designer BNI, Pi.unlimited BV*
- Kees Knipscheer - *Em. Prof. Social Gerontology VU Amsterdam*

Members of the steering group
- Jelle de Visser - *Advisory Board ZZG Zorggroep*
- Peter Weyers - *Director Stichting MAAT*

Experts
- Angela Thissen - *Senior Consultant Stichting MAAT*
- Lood Arons - *Municipality Nijmegen, Policy associate Department Residents*
- Wim van Geffen - *Medical Director Dichterbij*
- Bram Hakkenberg - *Advisory Board MEE Gelderse Poort*
- Sarine van der Klis - *Regional Director Nijmegen Zuid-West, ZZG Zorggroep*

The results of the case study are captured in the document called *Transitiescenario's op MAAT: een transitieagenda voor het systeem van zorg en wonen in de regio Nijmegen* (Sondeijker, 2009). The document entails a fully-fledged description of three transition scenarios and three lock-in scenarios. The transition scenarios are mainly qualitative and can be perceived as narratives which describe how the transformative change towards future sustainability, regarding the system of care and housing, can come about. The lock-in scenarios provide storylines about how the future system of care and housing will function if no structural change is initiated. Within this chapter only the products in-between are captured, which have contributed to the eventual transition scenarios in the final document.

The next section comprehensively spells out the development process in relation to the evolution of the transition scenarios.

7.4. The development process of the transition scenarios

Everything was set to start the first phase of this case study by the beginning of February 2008. The set-up was agreed upon, interviews were held, participants were selected and a starting document containing a common problem sketch was completed. For each ses-

sion Ton Moors arranged an inspiring venue in the region of Nijmegen. This underlined the focus of the project on the region itself and provided the appropriate atmosphere for developing unusual and innovative ideas. The general set-up of each participative session was more or less the same. First we provided a plenary presentation in which the processed outcomes of the foregoing session were explained in terms of their function and role in the eventual transition scenarios. We always tried to clarify this on the basis of the same visual drawing, as a means to provide consistency, structure and overview. Since we structured the outcomes in terms of analytical ordering frameworks underlying the transition theory, the participants gradually became acquainted with our terminology as well as with the overall aim of the project. After this presentation there was room for feedback and questions after which the subject matter for the session was explained. Most of the time, due to the amount of participants, the discussion activities were carried out and facilitated in various groups. This was the time during which we could support the creative process with various techniques. Finally, when the discussions were rounded off we gathered and recapped the outcomes plenarily. We closed each session with an informal dinner.

7.4.1. Phase 1(February 2008): Defining the transition challenge

The first session was somewhat different from the following ones since participants had to be introduced to one another and become acquainted with each others' perspectives, the overall aim of the project had to be outlined, the transition approach and its usefulness had to be explained and the defining characteristics of transition scenarios had to be elucidated. After this was finished, the subject matter (in the form of an assignment/task) for the first session was clarified. The aim was to define the scope of the system we ought to be looking at more explicitly by discussing the conditions underlying the transition challenge. Since our starting point was the recent development that Governments were steering towards the separation of care and housing, the precise question we discussed plenarily was: what entails the challenge of sustainably realizing the separation of care and housing for people with mental and physical defects? This created a constructive and optimistic atmosphere as participants had all kinds of ideas about what the future could bring. The most noteworthy remarks were, that the *separation* of care and housing is a euphemism for all kinds of financial cuts. Since we are reasoning from a client perspective, the ambition is to *combine* care and housing and let this be the responsibility of society again. People in need of care want to be able to identify themselves with the living environment they grew up in or have been living in for a long time. Institutions and nursing homes have an alienating effect and disentangle people from these roots. Thus the conclusion was reached to visualize a different regime for the arrangements regarding care and housing, reasoned from a client perspective and

their associated perspectives on the quality of life. Another remark was that different categories of people handicaps can be distinguished, each having their own specific needs in terms of care and housing. Since we decided earlier on to imagine the consequences of the transition process for the client involved, it seemed useful to select the groups we wanted to capture as cases in the eventual transition scenarios. Inspired by the *Fatima series* (Rathenau Institute, 1995), it was decided to select several so-called 'symbolic clients' that each represented a group of clients with specific needs in terms of care and housing.

We subsequently set these results against the background of the current situation. The analysis was enriched with information from the problem sketch in order to deepen the discussion while stimulating a sense of urgency. In this respect, an additional question was taken up: What persistent problems, inside and outside the care sector, prevent the realization of the transition challenge? Although the participants agreed upon the elements illuminated in the problem sketch, they approached it from an optimistic viewpoint. They mentioned that in spite of the fact that current structures are rigid and have become insensitive for their environment, the chances for niche developments to scale up, compete with the current regime and initiate a more sustainable direction for change are higher. Overall, by contrasting techniques that initiate discussion about different time intervals, the conclusion was reached that the care sector had reached a lock-in and structural change was necessary. Additionally, that MAAT was one of the few parties in the region of Nijmegen which could provide the space for many niche activities to develop and scale up, thereby facilitating the initiation of a transition process.

We structured and synthesized all the information gathered during the session. The different techniques used enabled us to distil a clear and univocal line of reasoning out of the discussions held, making the necessary scope of the system for describing the transition scenarios explicit. In view of that, we stated the following things very clearly: [1] the focus of the transition scenarios in terms of the desired future state of the system for disabled people; [2] the current persistencies that contribute to the sense of urgency for realizing this transition; [3] the necessary scope of the system in this respect and [4] the broader societal transition challenge that results. For a concise overview of our findings see Box 7.1.

BOX 7.1: necessary scope of the system

1. Focus transition scenarios

Preserving autonomous functioning and self-chosen life fulfilment as a source of happiness for disabled people.

2. Current persistencies that address sense of urgency

- *Societal environment:* The acceleration of society and the decrease in social cohesion stimulate that people with handicaps can no longer take care of themselves or can no longer be taken care of by people living in the same district.
- *An unbearable care system:* The anticipated doubling of the elderly demands that the production of care increases with 70% in the next two years. Disutility results in terms of quality of care.

3. Scope of the system going through transition: care and housing

a. Housing refers to *'accommodation'* and is defined as the material surroundings that people can experience as their home.

Problem: corporations lack the knowledge and sensitivity to realize necessary care-infrastructures for accommodations and districts.

b. Care refers to *'support structure'* (steunstructuur) and is defined as the societal arrangements that are explicitly employed to provide support.

Problem: informal networks fail to provide the support that was once relied upon. Family, friends and neighbours are not always prepared to provide care for loved ones in need of care.
Conclusion: independent from each other, care and housing do not seem to be capable of providing disabled people with the care they need to preserve autonomous functioning and self-chosen life fulfilment. Thereof, the joint cooperation and alignment between organizations related to care and housing is urgently needed to initiate a movement and direction for structural change that can realize a breakthrough with regard to the lock-in the system is heading for.

4. Broader societal transition challenge for 2030 in the region of Nijmegen

Although the ultimate aim of the transition is focused on individual persons, imagining desirable future images and directions for more sustainable solutions forces us to explore how we can structurally influence the societal environment surrounding the system of care and housing. This is exactly why the transition perspective is valuable. The transition challenge is defined as follows.

How can society by means of intentionally organized and as legitimate experienced accommodation and support structures contribute to assist disabled people to preserve their autonomous functioning and self-chosen life fulfilment?

7.4.2. Phase 2 (March 2008): Sustainable future system states

In the second session we took the scope and focus that was put forward in the previous session as a starting point for exploring desirable as well as undesirable future images. Based on the aim of this thesis we chose to disregard the development of the lock-in scenarios for now, and focus our analysis entirely on the development of the transition scenarios. The aim was to develop future images by elaborating on the transition challenge for three different symbolic clients. These clients were selected by the participants themselves based on their existing client record. We thus dealt with real clients in need of care. A short description of each client was provided, giving insight into the condition and restrictions of the client in question.

We anticipated, based on the tone of the discussions in the foregoing session, that it would be difficult for the participants to leap into the future and imagine desirable images without being blocked by current barriers for change. To ensure the utopian character of the future images, we chose to use a technique that is supposed to stimulate a change in mindset. A thought experiment was held in which the central idea was to imagine that care and housing currently do not exist and can be built from scratch in any kind of form desirable in light of the client perspectives. The underlying question posed was: what are the conditions under which Mr Pieterse, Jowie and Peter ultimately live in 2030? The ambition was to focus the discussion on the most essential functions of care and housing, bringing it back to its origin while disregarding the spill-over effects that have broadened the system throughout the years and made it unbearable. In addition, it would become visible to what extent the system of care and housing can be peeled off and what functions it leaves in this respect for society to pick up. Furthermore, following TRANSCE, we had to ensure that the future images included the multi-level perspective. We wanted to describe the interactions between various parties and their environment at different scale levels in such a way that control and self-chosen life fulfilment for Mr Pieterse, Jowie and Peter prevailed. Hence, several triggering questions were posed during the discussion to focus the dialogue if needed. Examples of some of these questions are: Who is affected in what?, Who works where (together)?,Who provides care where?, Who lives where?, Who meets where?. Relevant points of attention resulted from the discussions which we then integrated into three different lively and animated stories of clients in need of care living in 2030.

The format and techniques for the third session dealt with the necessary structural change in the system of care and housing in terms of build-up and break-down. Since this would be a rather vague assignment to deal with, we decided to concretize the assignment. Based on transition literature we agreed to focus the discussion in the following session on the build-up and break-down of culture, structure and practices surrounding the system of care and housing; culture, structure and practices being the underlying building blocks of

transformative systems change. These necessary changes can be derived by contrasting the current situation with the future images. Accordingly, we decided to distil elements of culture, structure and practices from the future images we had already written. We noticed rather quickly that because of the focus on concrete living conditions of existing clients, the stories primarily dealt with elements of 'culture' and 'practices', disregarding elements of 'structure' that facilitate the practices at a higher level. To enrich the future images with elements of 'structure', we decided to plan several additional interviews in between the two sessions with several of the participants involved. We chose the participants that had showed to have visionary capacity, clear-cut ideas about what the future should hold and a job position in which strategic and institutional insights prevailed.

One of the eventual future images is outlined in Box 7.2.

BOX 7.2: Future image for Mr Pieterse

It is a beautiful morning in May 2030. Mr Pieterse wakes up in his own bed, in his own apartment, in the district where he has been living for a long time. He realizes that it has been two years already since his wife died. Despite the fact that a lot of love, support and attention disappeared when he lost his wife, he has regained a lot from society and the district he is living in. Life is indulgent, society is tolerant and people live in solidarity, much more than they used to. Mr Pieterse has a lot of life experience and acquired wisdoms and notices that the ever increasing individualization has come to an end. He assumes that this trend has been necessary to free ourselves from tight relations. Ties that were prescriptive, stimulated dependency and restricted individual deployment. Today, people look after each other again; not from a materialistic standpoint, but based on the desire for spirituality, solidarity and fraternization. People make emancipated choices and choose self-chosen social surroundings.

Despite the fact that a strong digitalization has taken place and Mr Pieterse can consume the world from behind his frontdoor, he feels the urge to make a personal contribution to society, just like others in his district. People make more explicit choices about what they want or do not want to use from digital media. This preserves a balance between physical and virtual life and contact. Solidarity has emerged bottom-up, not stimulated by bureaucratic institutions. Network ties and an intensification of associations determine the rhythm of today's society. There is a balance between work and leisure. People work less and more at home, thereby saving time to invest in society. There is more time for emotional involvement. Also within schools there is the tendency to make societal internships part of the education. Even performance standards at work have changed, paying more attention to societal commitment. It has become part of the policies of organizations to invest in these values that deal with sustainable and societal entrepreneurship. In short, in 2030 social and societal living is a common responsibility.

Mr Pieterse is obviously not used to this since he is not a social creature by birth. He likes to be alone. Sometimes he experiences all the care and support from the neighbourhood as patronizing and meddlesome. However, Mr Pieterse is 88 years old and is becoming vulnerable. More and more he notices that his life is threatened regarding health, loneliness and income. His old teacher colleague and also neighbour saw this coming and has engaged him in a diversity of associations in the district. Mr Pieterse can get used to this at his own pace. Via TV he can observe what is happening in the district and decide whether to participate or not. Furthermore, he can communicate with other residents. These devices are so user-friendly that even Mr Pieterse, with Parkinson's disease, can use them. His Parkinson's is, however, recently operationally removed. The medication that he needs because of this is digitally implanted. Mr Pieterse has come to a point where he can experience all the changes as pleasant and safe.

There are several organized meeting places in the district. These have had a powerful role in the emergence of solidarity. Realizing meeting places and a natural mobility in the district have become dominant in the structure and plans of spatial planning. Solidarity is therefore supported on the level of the whole district. Creating a liveable environment has gained attention in each sector. Sustainable services outreach material artefacts. These circumstances have stimulated shifts in the scope of care; from organized professional care to natural informal care. Professional care is scarce and a maximum appeal is placed on society to jointly solve problems concerning care. The essence of care has been reduced to treatment-directed diversified curative care, a broad package of preventive care and professional care.

Besides the care and support he receives from his social living environment, he is observed by a so-called 'companion'. This function is taken up by people in their 2nd adolescence. Through medical conditions people become older and are longer vital. When turning 60 they make revised choices concerning life fulfilment. More often this means they want to support the elderly and peers. These people have a permanent place in the district with a monitoring function. Mr Pieterse can reach them (digitally) when he needs professional care. They can subsequently transfer him to appropriate specialists. These people have a close relationship with the social environment of Mr Pieterse from which they also receive information regarding his condition. In short, they supervise the risks of Mr Pieterse by being present in the district and preventing anything from happening to him.

Despite the fact that the tendency related to the ageing population finally has become visible, the composition of the population is not changed. The number of children has been increasing, partly due to the increased multi-cultural character of society, partly because people realize that children and family have a social function in support, care, meaning, life fulfilment and communication.

Characteristic for the future images is that they express the interaction between norms and values (culture), rules and institutions (structure) and routines and behaviour (practices), mainly driven by new constellations in terms of actors, societal developments and

niche-based innovations. The technique used facilitated future images to be denoted as 'utopian'. The participants agreed that the future images could not be reached within existing structures and habits of mind. Also from a theoretical viewpoint the future images can be perceived as 'utopian' because the stories seem unfeasible, low in probability and high in consequence from a current perspective on reality (according to the definition of 'utopian' mentioned in Chapter 3). Furthermore, the future images do not express *universal* narratives about future sustainability, but are dependent on and driven by the background and visionary capacity of the participants involved.

We distracted a concise overview of the elements of culture, structure and practice from this future image (See Figure 7.1). With regard to elements of structure, the initial aim was to provide an elaboration at the organizational level, pointing out the role and function of institutions and organizations related to care and housing. This seemed difficult at this phase of the development process, since the level of abstraction in the discussions was still rather high. We anticipated that this could also be addressed later on in the process, specifically in phase 4 when discussions would focus on strategies, actor groups and system innovations. Most notably, Figure 7.1 addresses the need for a transformative change process since the participants involved agreed that the elements of culture, structure and practice illuminated can only be reached through a fundamen-

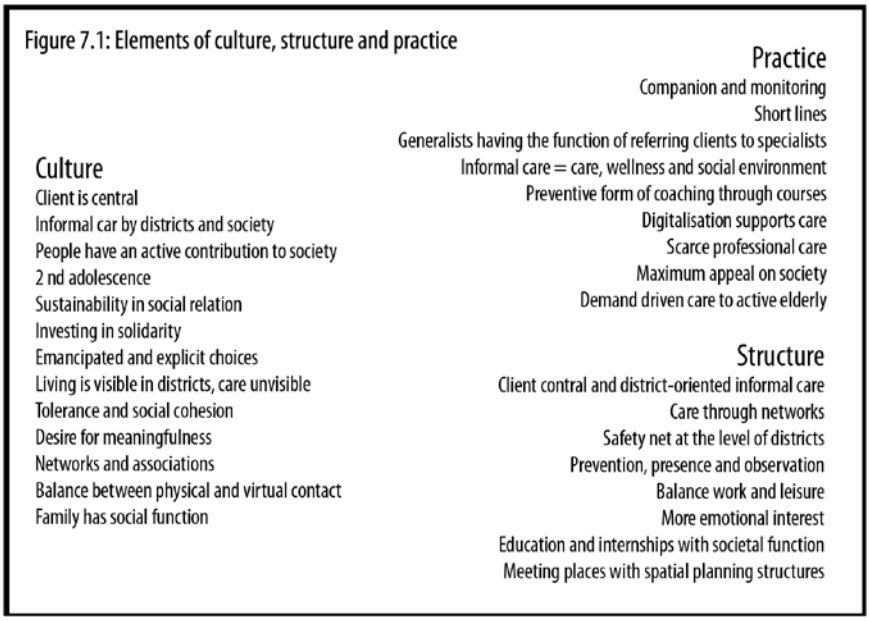

FIGURE 7.1- *Elements of culture, structure and practice.*

tal systems change. Figure 7.1 elucidates a desirable outcome of this systems change in terms of culture, structure and practices. This information was used in the following session as a starting point and frame of reference to deduce the necessary structural change process in time. In doing so, the culture, structure and practices of the existing system of care and housing will be contrasted to the elements of culture, structure and practice mentioned below. It can be deduced which elements of culture, structure and practice need to be built up and broken down in order to realize a system of care and housing that embraces the elements in Figure 7.1.

7.4.3. Phase 3 (May 2008): Necessary structural change and associated drivers for structural change

From the third session onwards we started working on the pathways that led to the future images. We realized that the character of the sessions changed from imaginative to analytical. We translated this observation in using other kinds of techniques to support the creative process, from now on focusing more on the exploration and search for patterns underlying the transition process. Each following session would deal with a certain aspect of these pathways. This clarifies the need for repeatedly integrating the results of each subsequent session with the previous outcomes throughout the remaining development process, thereby gradually enhancing and enriching the pathways into a composite and dynamic whole. The aim of this specific session was twofold. Analysing the necessary structural change in terms of culture, structure and practices and exploring the societal drivers for structural change. Based on TRANSCE, the latter subject matter was actually planned for the following session, but we assumed that discussing changes in culture would self-evidently link up with the discussion on trends and societal developments. We anticipated that with this change in plans we did not need to deal with the drivers for structural change (at the macro level) and the anticipation on these drivers (at the micro level) in one and the same session. This could block creativity since the participants would not only have to think of system innovations and strategies but simultaneously ensure consistency with the environment. Also, this rearranged set-up would provide more time in between to understand and internalize the representation of the structural change process in relation to the environment that is supposed to drive this change. Meanwhile they could think about the function of the different types of drivers in relation to initiating the transition process, thereby getting acquainted with the transition pattern we were looking for. In doing so, they could use this framework in following sessions as a means to make the pathways more dynamic by adding strategies and actor perspectives.

The first part of the session dealt with a technique which consisted of two related questions that jointly exposed the necessary structural change process in terms of its underlying mechanisms:

1. Breaking down regime: What culture, structure and practices currently exist that have been broken down in the future images?
2. Building up niches: What culture, structure and practices need to be initiated/emerge throughout the transition process but do not yet currently exist?

This discussion was aided by a visualization of the entire transition process (the S-curve); the beginning of the S-curve was marked by the problem sketch and the end by the culture, structure and practices underlying the future images. The intention was to add red cards (break-down) and green carts (build-up) to the S-curve, displaying the structural change process in between.

In the second part of the session we tried to deduce the drivers for structural change that were implicitly mentioned within the future images. The drivers were categorized into certain developments, uncertain developments and weak signals. Definitions of these types of drivers were provided (See Chapter 3). A plenary brainstorm was held to explore and add additional relevant drivers to the list. As mentioned in Section 7.3., we sometimes invited experts to the sessions when it was perceived that certain fields of knowledge were lacking in the group. Accordingly, for this specific session we invited several new participants who were experts in ongoing trends and developments surrounding the system of care and housing. Besides the fact that this led to relevant information concerning the drivers for structural change, it also caused some resistance and delay, like we expected beforehand. However, the benefit of richer transition scenarios outweighed the delay. The newcomers had not been introduced to anything related to the transition approach before and they felt that the future images were too idealistic. In view of this, we tried to explain the purpose of the development process and the phases we had already gone through as a means to familiarize them with our ambitions and course of action, with the intention to stimulate a more considerate attitude.

Because the techniques provided a structured format for representing the outcomes, our role in terms of processing was to ensure integration between the outcomes. The result of this effort is presented in Figure 7.2. The processes of build-up and break-down were merged with the drivers for structural change. Based on the techniques used, we could provide a first insight into the climate for structural change by means of a visualization of a transition pathway. The figure identifies the forces in the environment that can drive the transformative change in terms of discontinuity (the large grey oval) and the mechanisms underlying the necessary and desirable transformative change process itself (the small white and black ovals). The text in the final document also describes various examples of how the drivers can initiate processes of build-up and break-down. Since this chapter focuses on the role of techniques in relation to the development of transition scenarios that embody a more dynamic interplay and underline the integral pattern underlying a transformative change process in time, we chose to represent the

visualization instead of the plain text. In the following session, this information was used to explore which system innovations and strategies could be supportive in anticipating the weak signals and uncertain developments with the ambition to initiate the visualized processes of build-up and break-down.

7.4.4. Phase 4 (June 2008): Strategies, system innovations and actor groups

Although the aim was to use the visualization presented above as a starting point in this session, we expected it could constrain the creativity in the group. We did not want

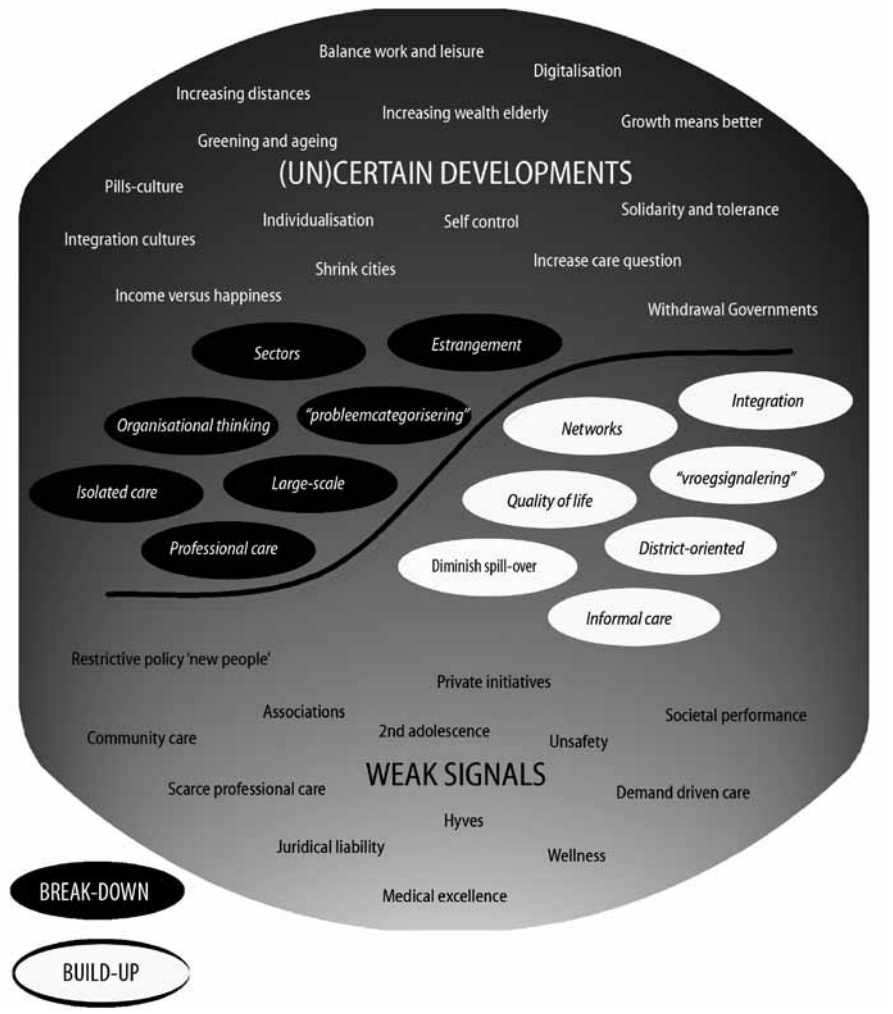

FIGURE 7.2 - *Drivers and mechanisms underlying the transition pathway.*

to frame subsequent discussion activities in consistency with the outcomes we had developed thus far, never allowing for contradictions or deviating results and thereby confining ideas of participants to the ones that fitted the framework. This would narrow the horizon of the participants and neglect ideas that had the potential to enrich the transition scenarios with new perspectives.

In this regard we e-mailed the participants a week in advance of the fourth session with a homework assignment. They were supposed to think freely of bold and relevant actions of interested parties in the region of Nijmegen in light of the transition challenge we were dealing with. They brought these ideas with them and we subsequently tried to contrast them to and integrate them with the outcomes already developed. The technique we used here is called 'brainwriting'. Throughout the development process we were also engaged in writing the final document, piece by piece, adding new findings after each session. Each participant randomly received a few pages from this document, outlining for instance the problem sketch, the transition challenge, the future images, the structural change or the drivers for change. They had to read these pages individually and underline sentences which implicitly indicated necessary innovations or actions. More specifically, they had to mark the sentences for which actions were needed in order to realize them. They had to define this action and think of actor groups which could be held accountable for this. In doing so, they first had to consider if the results of their homework already addressed some of the necessary actions and actor groups. If not, they had to write down additional actions on post-its. In a sense they translated the descriptive transition scenario into action-oriented strategies that underlie the initiation of the transition process. After the break we listed all the outcomes and explored if certain actions could strengthen each other in one and the same direction. We ended up with several clusters of actions that could jointly be perceived as a strategy to stimulate modulation and initiate a take-off, thereby describing the dynamic interplay of the pattern underlying structural change.

Since we chose in advance of this session to stimulate creativity instead of consistency, there was quite a lot of work to be done in processing the outcomes. The main steps we undertook in integrating and structuring the outcomes were: [1] addressing the necessity of the actions in light of the gap between the current state of affairs (persistencies and renewal) and the desirable future system state. This led to the 'transition-stimulation-profile', [2] perceiving the actions in light of the drivers for structural change and the processes of build-up and break-down. We subsequently merged the actions and unravelled strategies that anticipate drivers for structural change and activate processes of build-up and break-down. This led to a so-called 'strategy table'. Both outcomes and associated techniques invented for this specific session are clarified in Box 7.3. Based on these techniques we were able to indicate what strategies could possibly anticipate discontinuity as a means to initiate a transition and influence modulation.

BOX 7.3: Initiating the underlying pattern for structural change

1. Transition-stimulation-profile

The actions in a transition scenario are focused on realizing the processes of build-up and break-down as presented in Figure 7.2. In doing so, they bridge the gap between the current state of the system and the desirable state of the system. The amount and force of actions necessary is, however, dependent on the extent of this gap. Some processes of build-up and break-down may be well on their way due to ongoing novel initiatives, others may need more consideration due to persistencies in the system that hinder the necessary processes of build-up and break-down. **In this respect we developed a so-called 'transition-stimulation-profile' which makes the necessary focus (and force) of the actions explicit in light of the current state of a system.** The expressions in the profiles below correspond to the necessary processes of build-up (Figure 7.3) and break-down (Figure 7.4) as presented in Figure 7.2.

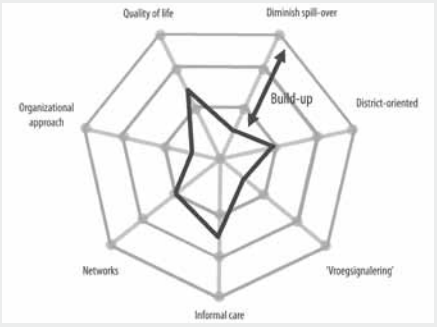

FIGURE 7.3 - *Profile for stimulating mechanisms of build-up.*

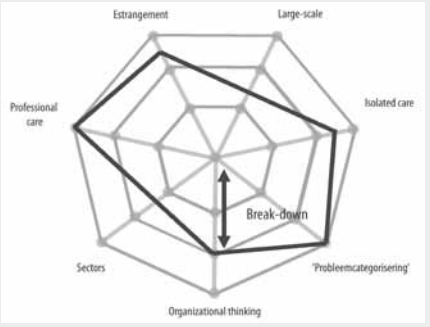

FIGURE 7.4 - *Profile for stimulating mechanisms of break-down.*

Each expression is represented by means of a continuum, ranging from 'present in the current system' (outer dots) to 'absent in the current system' (inner dots). The expressions in Figure 7.3 are desirable and should be built up (maximized to outer dot) while the expressions in Figure 7.4 are undesirable and should be broken down (minimized to inner dot). The black lines within the transition-stimulation-profiles represent the current state of affairs. We used a business case, data and information for a specific district in Nijmegen, to distil these lines in the profiles above. The larger the distance between the coordination of the black line on a specific continuum, the more actions need to be initiated to realize the desired state of affairs. It is a means to explore, specify and frame the necessary (force of the) actions in the transition scenario according to the necessary structural change as described in the transition pathway in terms of build-up and break-down.

2. Strategy table

When the necessary actions are identified, they are linked to the drivers for structural change as presented in Figure 7.2. More specifically, to the weak signals they are supposed to anticipate in order to unfold into discontinuities (see the columns in Figure 7.5). Simultaneously, they are focused on realizing the processes

of build-up and break-down as presented in Figures 7.3 and 7.4 above (see the rows in Figure 7.5).

The actions are clustered into strategies that can jointly result in processes of scaling up and modulation. Each grey tone represents a strategy aimed at realizing a different process of *build-up*. Figure 7.5 displays a snapshot of the final result. In the final document the cells reach further down and right including all weak signals and all processes of build-up. The same strategy table is developed for processes of *break-down*.

Weak signals / Build-up	2nd adolescence	Associations	Safety	.....Etc.
Quality of life ←	Redefinition of work: personal growth and pleisure	Transform institutions to demand driven care	Companion with function risk aversion	
Diminish spill-over ←	Offer alternative jobs for elderly people	"Meeting" instead of "thinking"	Spatial planning facilitates safety	
District-oriented ←	Presence at the level of districts initiated by private initiatives	Hyves at the level of neighbourhoods	All houses built for disabled people	
.....Etc.				

FIGURE 7.5 - *Strategy table.*

7.4.5. Phase 5 (July 2008): Framing the transition

Due to time restrictions we took on the role of framing the transition ourselves. The reason was that the participants suggested tackling a business case in the final session as a means to become acquainted with and learn how to employ TRANSCE in practice. More particularly, we used available data and information of an existing district in the region of Nijmegen which was currently dealing with persistent problems concerning care and housing. On a very abstract level we deliberated about what the transition-stimulation-profile would look like for this district and what actions and strategies could be derived from this. The results of this session do not add anything to what has already been explicated and is therefore left out of this thesis. Hence, by the end of the spring of 2008, the outlines of a final document had emerged in which the coherence and consistency between all elements was presented in a straightforward style and accessible writing. Based on the document, the participants emphasized the relevance of providing a final overview in which all intermediate outcomes would be visualized in an integrated fashion, portraying how each individual outcome resulting from the sessions contributed to the eventual transition scenario.

The following section describes the evaluation of the development process and the transition scenarios that resulted.

7.5. The development process and the transition scenarios: how to evaluate?

7.5.1. The active involvement of the researcher

In the previous chapter we drew the attention to the involvement of researchers in transition projects, especially when these projects aim to have an impact on society at large. Their active commitment as action researchers in the application and advocacy of transition management activities in various programmes and projects creates suspicion regarding the objectiveness of the analysis and evaluation of a project. In response to the claims made, we do have to acknowledge that Jac Geurts as professor at the University of Tilburg and myself as a DRIFT researcher, we were actively involved in the project and performed different roles throughout the process. However, several observations can be set against this.

First of all, the broader practical aim of the case study was not to delineate concrete system innovations or strategies that could be implemented and affect society at large. Moreover, it was a pilot case for MAAT to explore if the transition approach suited the problem issues the region was currently dealing with and provided possible long-term perspectives for their solution. The intention of their participation in the project was to obtain and learn more about analytical levers that offer, from a more radical and far-reaching perspective than they were acquainted with, a viewpoint for understanding and anticipating the complexity behind ongoing persistencies.

Secondly, from the start we had been aware of the different roles we had throughout the process. To prevent the need to commit ourselves to perform more than one role at the same time, Jac Geurts and myself decided in advance of the case to be responsible for separate roles throughout the development process of the transition scenarios. Jac Geurts concentrated on the facilitation aspect during the sessions and took on the role of consultant by creating trust and confidence in the process, broadening their horizon by providing examples, contrasting and synthesizing ideas of different participants during discussions, triggering their creative and visionary skills through communicative excellence and stimulating commitment by clarifying the usefulness of the project. My function throughout the development process had a more systematic orientation, taking on the role of analist and expert, i.e. explaining the overall aim of the project, clarifying the transition approach, explaining the method and techniques used in the sessions, offering analytical ordering structures to integrate their discussions, providing overview and providing insight into the contribution of each session to the final result. Moreover, all the aspects mentioned here came together in processing the outcomes after each session and developing the final document in which the fully-fledged transition scenarios were described. After the development process I stepped into the role of scientific researcher, primarily evaluating

the outcomes of the process in terms of content, method and process (See the following subsection for a thorough explanation of the research methods used for this).

Finally, as facilitators of the development process, we did not have a role in the eventual content of the transition scenarios. We only offered an analytical ordering framework to structure the discourse between the participants, leading them to explore, perceive and obtain novel insights with regard to the magnitude of the problems and the potential directions for solutions. As a means of reframing and mental enrichment we provided frameworks and visualizations that structured the complexity underlying transition processes. In essence we could say that, although the participants engaged produced numerous ideas, questions and suggestions, it was due to and in spite of our competences in terms of process facilitation and techniques that a type of scenario resulted which dynamically describe the underlying pattern and nature of a transformative change process.

7.5.2. Research methods for evaluation: a synthesis of various perspectives

In Section 7.3. we mentioned the triple aim of this case study: [1] evaluating the integrative character of the eventual transition scenarios (content), [2] evaluating the cognitive and behavioural changes of the participants due to the engagement in the development process (process) and [3] evaluating the aspects related to the comprehensiveness of the generic steps underlying TRANSCE (method). The research methods we used to evaluate these results are clarified in this section.

With regard to the content, expert judgements of Jac Geurts, Geert Verbong and myself were used to evaluate and judge the resulting transition scenarios based on the theoretical content criteria we had developed thus far. These clearly underline the integrative character of the pattern of transformative change. We also tried to explore the added value herein of process facilitation and techniques. A valuable aid in this respect was that we focused the description of the development process in Section 7.4. on the evolution of the transition scenarios in relation to the role of facilitation and techniques. Based on this we could more explicitly depict the function of process facilitation and techniques in constructing the pattern of transformative change.

With regard to the process, we wanted to underpin as well as enrich the theoretical process criteria we had developed thus far empirically. We observed the participants throughout the process and made notes of the perceived changes in cognition, behaviour and language in terms of their understanding and use of the transition approach. Afterwards we verified these observations as well as our initial theoretical process criteria. Interviews were held in this respect in which we, indirectly, asked question about our findings (See Box 7.4). 'Indirectly', because we wanted to prevent answers that were socially desirable.

BOX 7.4: Verification of observations during the development process

Introductory questions

1. What were your most striking experiences throughout the process that truly inspired you?
2. What were the main reasons for you to stay involved and committed?

Main questions and sub question

In answering the sub question we always asked them to provide practical examples based on which we could distinguish changes in cognition and/or in behaviour.

3. Have you gained a deeper understanding of the complexity of a transition process?
    - Do you better understand how structural change can be influenced or realized?
    - Do you think you can better anticipate weak signals and appoint spaces for renewal?

4. What did you learn from other participants in the process?
    - Have you come to understand the perceptions and viewpoints of others in relation to your own better?
    - Have you developed a common knowledge base which reflects ideas about a desired direction for future sustainability?

5. How has your relationship/connection with other participants changed through this process?
    - Have you come to perceive the other participants as part of your network?
    - Is there a basis on which you could develop common action agendas?

6. Did you come to perceive the nature of current problems differently?
    - Do you perceive current problems more from a long-term time perspective?
    - Have you developed a more societal anchor from which to perceive current actions?
    - Have you changed your perception about the necessary type and nature of change?
    - Has your sense of urgency to overcome current problems changed?

7. Have you come to understand the 'transition speak'?
    - Do you use a different language or wording when talking about societal systems change?
    - Have you internalized the language and underlying ideas regarding the initiation of a transition process?
    - Can/have you put it into practice? How?

8. Have you come to perceive your role as change agent differently after experiencing the process?
    - Do you see yourself increasingly as a frontrunner?

Since we experienced difficulties with deducing a certain structure out of our observations, we did not manage to condense a classification that could underlie our interview questions. Accordingly, we chose an open interview with a small number of more general questions that could guide the conversation. If necessary we had more targeted and specific sub questions that could be used to focus the conversation. Furthermore, we created a control group, not only by interviewing members of the core team which had extensively been nourished with the transition approach, but also participants that had only joined the process one or two times. Based on these interviews we even obtained information that could assist the evaluation of the content of the transition scenarios. Participants provided their opinion about the transition scenarios in terms of how they believed the stories differed from the existing system of care and housing.

Finally, in evaluating the method, we held interviews with the members of the core team. During the interviews several propositions were put forward on which they had to respond by means of a continuum ranging from 1 (fully disagree) to 5 (fully agree). Aspects were evaluated regarding theoretical grounding, ease of use, comprehensiveness and ordering. Furthermore, there was room to give a verbal account for their response when they felt the urge to do so, e.g. due to ambiguous feelings towards a proposition. The propositions are outlined in Box 7.5.

BOX 7.5: Interview for evaluating the method TRANSCE

	Fully disagree Fully agree
Theoretical grounding	
The transition theory was clearly elucidated by the method	1 2 3 4 5
I understood the pattern that was supposed to be part of the transition scenarios	1 2 3 4 5
The method clearly facilitated the use of transition concepts in the transition scenarios	1 2 3 4 5
I personally wanted more explanation regarding the transition dynamics	1 2 3 4 5
Ease of use	
I personally wanted more explanation regarding the steps in the method	1 2 3 4 5
I knew what was expected of me during the sessions	1 2 3 4 5
From the start it was clear to me how the end result should look like	1 2 3 4 5
I understood the language and transition speak	1 2 3 4 5
Comprehensiveness	
The method offered sufficient levers to develop transition scenarios	1 2 3 4 5
The end result was to a large degree dependent on the skills of the facilitators	1 2 3 4 5

The method offered sufficient levers to visualize the pattern underlying a transition process	1 2 3 4 5
I felt that there were gaps in the method with regard to the expected end result	1 2 3 4 5
The end result was to a large degree dependent on the method followed	1 2 3 4 5
Ordering	
Each session had its function in and contributed to the end result	1 2 3 4 5
The set-up of the sessions (the order) was not logical	1 2 3 4 5
The relation between the sessions was clear	1 2 3 4 5
The sessions clearly built on each other	1 2 3 4 5
Afterwards, certain sessions seemed redundant	1 2 3 4 5
The transition scenarios logically resulted out of the sessions	1 2 3 4 5
The relation between the sessions was constructive	1 2 3 4 5

The types of lessons learned from these various forms of evaluation are outlined in the following section. The resulting suggestions for refinement are fed back into the conceptual foundation and methodological basis underlying TRANSCE.

7.6. Lessons learned: working towards a 'final' concept and method

From the client, we obtained many degrees of freedom at the start of this case. We organized the entire development process to our methodological interest and Stichting MAAT was willing to participate in scientific evaluations. As a result, this was a true explorative and experimental journey from which many scientifically valid lessons have been drawn. The lessons learned contribute to the further development and refinement of TRANSCE and its underlying conceptual foundation in terms of content and process criteria. Some lessons empirically underpin the theoretical notions underlying the concept and method of TRANSCE (See Chapters 3 and 4); others led to new challenges for future research. Most notably, this case study took the lessons from the previous chapter as a starting point. We extended TRANSCE by addressing and defining the supportive role and function of techniques and process facilitation in carrying out the method, developing transition scenarios and conveying the outcomes. It helped us gain further insight into required content criteria for describing the integral pattern of a transformative change process. In summary, it was more than a case study for the development of transition scenarios; it was a context in which we could discover how to practice what we already theoretically preached.

Below, the various lessons learned are categorized according to the research methods used (See Section 7.5.). This implies that we distinguish between content lessons, process lessons and methodological lessons accordingly. Throughout our evaluation we drew some relevant lessons concerning process facilitation that are not directly linked to envisioning the pattern of transformative change in the transition scenarios. These will be listed at the end of this section.

7.6.1. How to envision the integrative pattern underlying transformative change

Overall, this has been a successful case for this thesis as the development process resulted in transition scenarios in which the integrative character of the underlying pattern of complex structural change was visible, i.e. the transformative change was expressed in terms of fundamental changes in culture, structure and processes (See Figure 7.1), uncertain developments and weak signals were employed to initiate processes of build-up and break-down that underlie this transformative change process (See Figure 7.2), system innovations and strategies were considered that anticipated the drivers for structural change and attention was paid to the reciprocal strengthening of the strategies in light of modulation (See Box 7.3). This case was even more successful because the contribution of process facilitation and techniques could be defined in light of these results. Based on our observation and experience of the entire development process, without specifically addressing or pinpointing examples, it is perceptible and discernable that a continuous focus on realizing integration in the pattern of transformative change prevailed because of our attention to new techniques and process facilitation. The techniques stimulated the creative imagination of the participants and provided a systemic analytical structure for the subsequent integration and framing of the discussions. It supported the eventual transition scenarios in terms of envisioning complexity and discontinuity. The facilitators used this structure to provide direction and overview, and to indicate the relation and synthesis between the discussions and their contribution to the eventual transition scenarios. Below, we outline the lessons we learned from this with regard to a more integrally envisioning of the pattern of transformative change. The focus is thereby on enriching and deepening the fifth content criteria as mentioned in Chapter 5, while building on the lessons regarding the content criteria addressed in Chapter 6. All lessons have been fed back to theory and are incorporated in the conceptual foundation of transition scenarios (See Chapter 3).

- In Chapter 6 we mentioned that the necessary structural change should be defined in terms of the mechanisms underlying a transformative change process, build-up and break-down. Based on this case study we further specify this assumption. A structural change process is defined by irreversible changes in the culture, structure

and practices of a system. Hence, processes of build-up and break-down should explicitly address the culture, structure and practices that are supposed to be initiated and demolished.

- For deducing the necessary structural change, the differences can be distilled between the future state of the system, as described in the future images, and the current state of the system, as described in the problem sketch. Accordingly, the future images and the problem sketch should include elements of culture, structure and practices.
- The interaction between the drivers for structural change are not only a starting point for influencing and initiating a transition, they also determine the *climate* for structural change. This climate for structural change can be anticipated and unravelled by linking the different types of drivers. More specifically, transition scenarios should scrutinize and consider weak signals (drivers at the micro level) in the context of long-term uncertain developments (drivers at the macro level). In addition, discontinuities are exposed that have the potential to destabilize the prevailing, dominant system.
- To *activate* the right climate for transformative change, actor groups are supposed to anticipate these discontinuities. Accordingly, a transition scenario should describe the actions of various actor groups, in terms of the system innovations that they aim to perform, in response and anticipation to the weak signals in the environment surrounding the system.
- To visualize and describe the process of *scaling up* resulting in modulation and a take-off of the transition process, the transition scenarios should combine the various system innovations proposed into strategies which enable their reciprocal strengthening in one and the same direction.
- The latter two lessons, exploring relevant system innovations and strategies, provide a major role in the eventual framing of the transition. Their role is particularly relevant for distinguishing between different phases of the transition and describing the patterns and pace of change underlying these phases accordingly.

7.6.2. How the development of transition scenarios can influence cognition and behaviour

Many insights resulted from the open interview (See Box 7.4) in terms of perceived cognitive and behavioural processes that were initiated throughout the development process. Sometimes these provided new insights that led to new process criteria underlying TRANSCE or a further refinement of already existing ones, and in other cases these lessons provided valuable empirical evidence for initial theoretical assumptions. Based on the richness of the information resulting from the interviews, we were now, unlike

before, able to distil a generic ordering framework consisting of five categories that each address a different type of process learning:

1. Reflectivity
2. Reframing
3. Social learning
4. Network creation
5. Internalization and transition speak

We outline the lessons corresponding to these categories below but, more importantly, used them as a frame of reference in Chapter 3 to classify the process criteria and differentiate between them. A final notable remark relates to the fact that we held the interviews two months after the last session had finished. Hence, lessons related to more behavioural or action-related aspects were formulated in a hypothetical sense by the respondents. They truly believed, however, that the development process will play a major role in the actions they plan to perform in the near future. Accordingly, we e-mailed the participants six months later and asked them if they had recently initiated actions that were the result of the outcomes of the project. These responses will also be outlined below as an underpinning of the interview results. All lessons have been incorporated in the theoretical concept of transition scenarios in terms of process criteria (See Chapter 3).

1. Reflectivity

a. The significance of the future images is that they provide focus and direction which give you the courage to explore novel directions for change.
b. Understanding the complexity and nature of structural change stimulates alertness for and awareness of the societal environment, leading participants to pick up more easily on spaces for renewal, possibilities for cooperation and potential new initiatives.
c. Perceiving the societal environment of a system as a constellation of different types of drivers for structural change leads to the awareness that weak signals and uncertain developments are a starting point for initiating a transition process and need to be approached anticipatively.
d. Paying thorough attention to describing and unravelling the pattern underlying a structural change process raises the awareness and confidence that one can seize the momentum for structural change.

2. Reframing

a. A sense of urgency is closely related to the conviction and the belief that we ourselves can pro-actively initiate structural change.

b. A sense of urgency is strengthened by unravelling and pointing out the momentum for structural change in the transition scenarios. This provides insight into the necessary changes and gives participants an idea of their required contribution.
c. Insight and understanding of the transition pathways gradually changes the anchor from which participants perceive the feasibility of structural change. It changes from an avoidance-oriented attitude to a more pro-active attitude.

3. Social learning
a. The development process stimulates collective learning and thereby aligns differences in perception and boosts the imaginative capacity of the group to the level of the most visionary participant.
b. The eventual transition scenarios provide a memory and appreciation for each others' perspectives and the relation between them.

4. Network creation
a. The pathways of the transition scenarios are perceived as an important vehicle for initiating joint action since they reveal the integration between actions of different actor groups. Accordingly, the method underlying TRANSCE provides levers for actually realizing practical results.
b. Becoming acquainted with TRANSCE and the techniques it offers to facilitate a structural change process, helps participants to operate more strongly in practice and to inspire confidence that the current persistencies can be jointly tackled.
c. When participants with complementing viewpoints are engaged throughout the development process, it stimulates trust and confidence to jointly explore strategies that can onset a transition process in practice. The reason for this is that participants believe they moderate each others' pitfalls or shortcomings in expertise. Hence, their potential outcome is expected to be more successful and counterbalances their efforts in terms of time and money or the risk to fail.

5. Internalization and transition speak
a. The pattern underlying a transition process offers a cohesive ordering framework for adding loose fragments of thought or practical experiences of the participants engaged. This enables a process of interpretation in which one can begin to master, get a grip on and internalize the theoretical concepts and definitions from a practical perspective.
b. Throughout the process participants gradually become acquainted with the transition approach and the underlying ordering frameworks and conceptualizations. They start expressing their knowledge verbally as the process unfolds by using transition speak in their reasoning.

Six months later the participants could indeed point to examples of actions and implementation strategies that were initiated (partly) due to their experiences with the development of the transitions scenarios. Some of these examples underpin the impending learning experiences just mentioned. This case study was a pilot study at a regional level with the aim of broadening it eventually to a more national level. This is now planned to become a 10-year research approach of MAAT in which they will use this case and method as a starting point and example. The practical aim is to carry out TRANSCE for different regions throughout The Netherlands and then draw lessons regarding national policy for care and housing. The final document meanwhile serves as a means of communication, explaining the transition approach to other relevant parties with which they cooperate and hope to onset a movement in the region of Nijmegen. In that respect it has already been used in various meetings with external parties and is presented at national conferences as part of long-term policy. Hence, Peter Weyers is busy working on a petition in which long-term vision and short-term policy are intertwined. Transition thinking and associated terms and concepts will be used as a leading paradigm herein. The report is furthermore used in meetings to align care and wellness organizations with housing corporations. Moreover, in ongoing projects of MAAT they continuously try to use the findings as an aid in framing other projects and linking them to the ambitions of a transition. They learned that the process is just as important as the results in initiating a take-off. In that sense, they not only use theoretical lessons in guiding other projects, but practical ones even more.

Overall, the participants have experienced the development process as inspiring and enlightening. During the development process they felt as if they were in another world. A world where everything is possible and different values rule. It stimulated an open mind and triggered freedom of speech which resulted in constructive discussions. They believe that these conditions, accompanied by facilitation, method and techniques, enabled them to develop exceedingly imaginative, creative and original scenarios which reflect on essential and radical perspectives of future change. The participants wanted to learn from and internalize the innovative strength of mind that emerged. The most important conclusion for the participants is that they feel and believe they have become a personified transition stimulator. They have gradually come to understand, recognize and use the transition approach in a practical sense. Even six months after the development process, their experiences are still a starting point for debate about long-term sustainability and motivation for short-term actions.

7.6.3. How to practice TRANSCE: valuable lessons

The lessons outlined below are the result of the propositions to which the participants had to respond (See Box 7.5). It did not really lead to fundamental changes in TRANSCE, instead it led to confirmation. Some refinements were suggested, however, which we will outline below.

- Different steps in TRANSCE require different types of techniques, some of them novel. The steps that capture the development of desirable future system images are supported by using imaginative techniques that stimulate a different mindset. These techniques stimulate the capacity to leap into the future and break with existing paradigms. They enable the development of future images that move beyond current structure, culture and practices. The steps that include the development of the pathways are best supported by more analytical techniques. These provide a systemic structure based on which the nature of transformative change in time can be deduced and integrated in the eventual transition scenarios.
- There is a difference between the flow of discussion activities throughout the development process which accounts for the more general advancement of the process and the subsequent reciprocal fine-tuning of the outcomes of the different discussions into a consistent whole. The former is sequential and determines the rhythm and pace of the development process while the latter has a more iterative character and ensures the integration between the steps. The difference between these two flows, progress and fine-tuning, should be made explicit in TRANSCE.
- From a theoretical deductive perspective the steps in TRANSCE have a logical and constructive order. However, when carrying out the method great care should be taken that the ideas and discussions in subsequent sessions are not confined and restricted to the line of reasoning put forward in the first or following session. It decreases creativity to try and fit subsequent discussions in analytical ordering frameworks that resulted from foregoing sessions. This implies that a creative setting is sometimes served by disregarding the format and structure provided by the method in order to extend the discussions within the sessions, after which the results are built in the established structure again. It stimulates contradictive ideas that enhance and enrich the eventual transition scenarios.
- Two participants were very positive with regard to the fact that throughout the case study, the intended process of development was univocally clear, but the expected outcomes were unknown and open for deliberation. They implied that the facilitators and the steps in the method restricted their role to the highly necessary which stimulated ownership amongst the participants and a stronger commitment to the end result.

Finally we want to illuminate several points of attention that crossed the minds of the participants in responding to the propositions, but which did not lead to concrete suggestions for modification of TRANSCE. They can be a relevant starting point for future research however.

- The participants were all convinced that the end result was to a large extent dependent on the method followed and the techniques used. However, they wonder if this result could have been established otherwise, using other methods and techniques.
- Most of the participants were undecided about the proposition that the sessions could have been carried out in a different order. When asking them to come up with ideas for changes in the order of the steps of TRANSCE they could not formulate concrete suggestions.

7.6.4. How to behave as a facilitator: rules of conduct

The interviews we held to evaluate the changes in cognition and behaviour also provided information regarding process facilitation. Some of the points mentioned below underpin what was already revealed in Chapter 6 as significant, other points refer to new insights with respect to the possible role of process facilitation.

- The balance between the richness of the eventual transition scenarios on the one hand and the consistency and integral character on the other hand is maximized when alternating roles in facilitation are pursued. There needs to be variation between openness, broadening discussions to incorporate different viewpoints, and focus, framing and integrating the discussions in an analytical ordering structure.
- To encourage the mobilizing capacity and practical implementation of the eventual transition scenarios, the facilitators should focus on stimulating the willingness of participants to initiate structural change in practice. The development of the transition pathways is a valuable aid in this respect. These pathways provide insight into how a transition can be realized and what specific role participants can play in this. It provides them with practical levers that make the consequences of their actions in the entire transition process perceptive, which legitimizes and encourages their willingness to act.
- With regard to a possible resistance to constructive participation in the development process, a facilitator should be able to inspire trust and create confidence in an emergent and unpredictable process. In this respect it is valuable to provide practical examples of comparable problem situations to the one the participants engaged are dealing with and explain how that situation benefited from the development of transition scenarios.
- Processing the outcomes of a session is time consuming and may even take more time than the organization and facilitation of a session itself. The team that facilitates

the process will be required to do most of this work as a means to ensure dynamic interplay, analytical structure and integration of the developments played out in the transition scenario. Hence, the participants can freely devote as much time as possible to the interaction with each other, reflection on emerging documents and drawing the attention to fresh viewpoints and novel discussion subjects.

- It is important to organize sessions frequently. In the beginning of every session, participants have to try and let go of their daily work and current barriers for change that can block their imagination. They feel as if they step into another world for the time being with different values, assumptions and language. This takes some time for people to get used to and acquainted with. When a session comes to an end and people step back into the real world again, it is difficult to hold on to these feelings and ideas that have come across. Hence, it is crucial that the time between two sessions is not too long. Only then can the participants still relate to the ideas and pick up the momentum.

Now that we have illuminated all the lessons learned with regard to the conceptual foundation and methodological basis underlying TRANSCE, it is time to draw some general conclusions about the added value of this case study in relation to the main aim of this thesis.

7.7. General conclusions: "freedom of thought" and future challenges

Besides theoretical refinement of the conceptual foundation of transition scenarios (See Chapter 3), the lessons outlined above resulted in a new and adjusted version of TRANSCE (See Figure 7.6). This is the 'final' version of TRANSCE, at least for the time period of

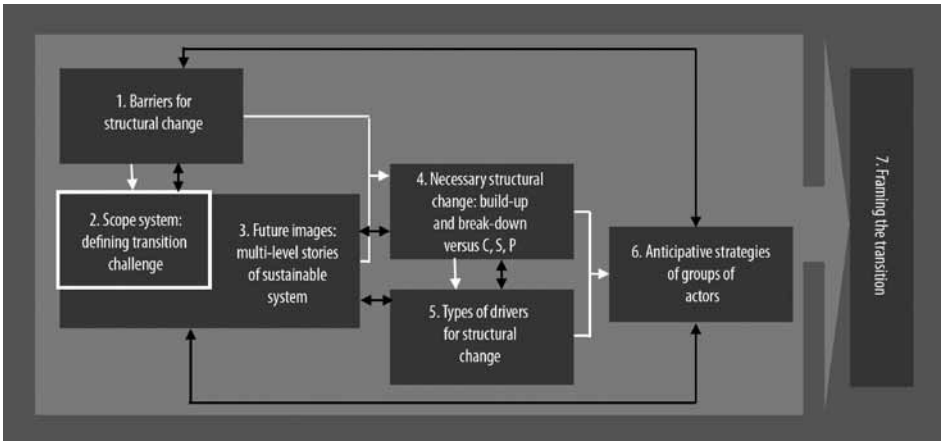

FIGURE 7.6 - *Adjusted and 'final' version of TRANSCE (Version 3.0).*

this research. It is captured in Chapter 4 which provides a detailed description of this version of TRANSCE. It illuminates the various generic steps, paying explicit attention to the dynamic interplay and iteration between relevant discussion activities in light of increasing consistency, synthesis and integration in the eventual transition scenarios. Furthermore, the underlying types of techniques that can be used are identified. The suggested adjustments and modifications for the methodological basis of transition scenarios in this chapter have led to a reconfiguration of the version of TRANSCE as visualized in Chapter 6. These adjustments are outlined below, together with the underlying reasoning for doing so.

- We added a first step in which barriers for structural change are explored, also known as persistencies. Throughout the development process we often relied on this information which was enclosed in the problem sketch that was created based on the interviews. We used it e.g. for deducing structural change and establishing the transition-stimulation-profile.
- We combined the formulation of the transition challenge with the description of the future stories since the latter extend, broaden and enrich of the former.
- The step in which the structural change is defined is positioned after, but following on, the steps in which the future images and the barriers for structural change are explored. This is because the necessary structural change is defined based on comparing the current state of the system to the future state of the system.
- We separated the 'drivers for structural change' from the 'strategies of groups of actors', formerly combined in one step. Simultaneously, we related the former to the 'necessary structural change'. The reason for this originated in the fact that these are both static values which jointly portray the climate for structural change. 'Static' implies that the momentum for change is present but that the actual initiation of the transition is dependent on the pro-active and anticipative capacity of actor groups.
- Resulting from this, the step in which the strategies of groups of actors are defined is positioned after, but following on the static values we just mentioned. They anticipate the climate for structural change, thereby influencing the development direction and the dynamic character of the transition.
- We modified the *actions* of groups of actors into *strategies* of groups of actors. It is particularly the integration between actions and insight into the way various actions strengthen each other in one and the same direction which provides insight into processes of scaling up and modulation.
- We differentiated between white arrows and black arrows as a means to link the generic steps. The white arrows indicate the sequence of the steps; the black arrows indicate the mutual alignment between specific steps to ensure consistency.

To conclude this chapter, some general observations resulting from the obtained learning experiences are addressed. The focus of this case study emerged based on the lessons and recommendations pointed out in Chapter 6. Our ambition was to realize integration between the various parts that constitute a transformative change process in time, thereby visualizing the pattern underlying complex systems change. In doing so, we focused primarily on the roles of techniques and facilitation in assisting the generic steps of TRANSCE.

This case was promising in various respects. It was the first case in which the operational method for transition scenarios was used in a real-life setting in which the ambitions were supposed to affect "society at large" and thereby outreach the context of the case itself. Gradually, along with long-term oriented governance strategies that were deduced, a shared sense of urgency for radical change was felt by relevant actors in the region, albeit a limited number, and a change in thinking from reactive to more proactive was achieved. The learning experiences additionally revealed that, provided that certain conditions are met (e.g. timeframe, participants involved, societal aim etc.), TRANSCE has the potential to let participants experience "freedom of thought" and develop extraordinary creative scenarios which both fuel a continuing debate and a further operationalization of sustainability in terms of exciting initiatives. The transition scenarios provide the participants with levers to feed this debate and these initiatives. The scenarios would not have resulted without the well thought-out methodological basis. The societal and explorative approach underlying TRANSCE has thus constituted an exceptional process and results.

It was during this development process that the initial ideas on transition scenarios as summarized in TRANSCE were actually refined, given meaning and linked to (new) operational techniques and facilitation skills. We demonstrated the usefulness and necessity of the dynamic interplay between method, techniques and facilitation, each having their own function in the process and the eventual transition scenarios. In doing so, we extended the method with additional attributes that support and enable the full potential of TRANSCE. The generic method ensures a constructive and logical flow of subsequent discussions. In addition, the discussions initiated reflect the elements inherent in a transformative change process. The techniques stimulate creativity and the imaginative capacity of the participants involved. They provide analytical structure which frames and integrates the discussion activities. It supports the eventual transition scenarios in envisioning the uncertainty and complexity inherent in transformative change. The facilitators use this structure to provide direction and overview, indicate the relation and synthesis between the discussions and their contribution to the eventual transition scenarios. In a sense, these competences relate to 'transitionizing' the development process, the conveyance of information as well as the mindset of the participants engaged.

More importantly perhaps in light of our primary ambition, the project resulted in transition scenarios in which the underlying pattern of complex structural change was visible: i.e. the transformative change was expressed in terms of fundamental changes in culture, structure and processes, uncertain developments and weak signals were employed to initiate processes of build-up and break-down that underlie this transformative change process, system innovations and strategies were considered that anticipated the drivers for structural change and attention was paid to the reciprocal strengthening of the strategies in light of modulation. The case as a whole demonstrated that the basic principles underlying TRANSCE were valid and useful, as a source of inspiration as well as participatory policy-making based on transition theory and complex systems thinking. As a case for this thesis it has therefore been promising in terms of enhancing concept and method, as well as in terms of achieving concrete results that differ from what can regularly be expected from mainstream scenario methods.

We should, however, be cautious by only claiming success. Although we tackled the challenge of developing transition scenarios that unravel the complex pattern of structural systems change in time, new challenges and questions have been raised as a result of this and previous cases. First of all, based on the comparison between the results of the previous case and this one, we claim that techniques and process facilitation are undeniably aspects in support of TRANSCE for reaching fully-fledged transition scenarios. In light of the generic use of TRANSCE, it is therefore advisable to experiment with and explore more thoroughly various roles of a facilitator and different types of techniques. Secondly, although it is difficult to fully 'claim' the above-mentioned results regarding the influences that outreach the case itself, it is clear that the case had an impact on individuals, networks and institutions in the region. Most notably, the transition scenarios, and especially the pathways that propose various forms of alignment and cooperation between actor groups, are used by MAAT to attract and link actors in the region as a means to create a mobilizing network in light of initiating a transition. In that sense the case can be seen as a major success and as a strong case for the use of TRANSCE in such a context. However, the follow-up process could have benefited even more by allowing for more time, energy and money to be invested. In future cases it seems advisable to reserve substantial time and funds for activities besides the core process. The feeling is that this could have led to even better scientific support of bold statements and ideas included in the transition scenarios, materialization of these ideas into practical actions, diffusion of ideas and forming of actor networks, involvement of more actors with differing perspectives and initiation of a larger number of concrete short-term projects. Hence, to enable all these efforts, it seems advisable for following cases to embed the development of transition scenarios in the TM-Cycle. The TM-Cycle has the specific aim to materialize long-term futures into short-term practices, and experiment with (link-

ages between) system innovations as a means to create the willingness to jointly initiate movement. Finally, although the participants were all convinced that the end result was to a large extent dependent on the method followed and the techniques used, it is worth experimenting with different methods as well as with rearrangements in the existing order of the steps in TRANSCE.

In conclusion, this case resulted in outcomes that are encouraging, at least in two different ways: In terms of the quality of the transition scenarios and their practical implications, and also as a motivation to keep advancing and developing the concept and method of transition scenarios. Again, we took some notable steps in approaching to practice what we theoretically believe defines transition scenarios as 'ideal'. We gave meaning to several theoretical claims of third generation scenarios that are believed to be crucial but are rarely reflected in practice (Gallopin et al., 1997; Raskin et al., 2002; Kasemir et al., 2003; Kates et al., 2001; Van Notten, 2005; Marien, 2002; Mannermaa, 2000; Millett, 2003). In particular, we developed scenarios that are conducted at all scale levels using a systemic approach, that are comprehensive, participatory and anticipative, that stress integration, recognize uncertainty, appreciate irreducible normative aspects and engage participants in discourse on sustainable development. In addition, we succeeded in practicing what theory suggests as being innovative in relation to more mainstream scenario methods.

PART FOUR

Synthesizing

CHAPTER 8

Synthesis and future outlook

8.1. Summary of result

We started off this research by mentioning that a *new type of scenario method* is needed in the context of transitions and sustainability. In taking this axiom as a basis for our research, we tried to build on the most recent developments in the world of scenario development as captured in third generation scenarios. On the one hand, the added value of this research lies in the enhancement of the third generation scenarios. On the other hand we tried to define transition scenarios as a distinctive type of scenarios as opposed to more conventional scenario methods. Two specific research aims are addressed in this respect, a theoretical and methodological one:

With regard to the former, when in 1992, during the Rio de Janeiro Conference, the need for sustainability was addressed, the need for transition scenarios was implicitly emphasized. It became relevant for scenario development efforts to capture pathways in which the pattern of transformative change is unravelled, thereby providing insight into short-term anticipation on long-term future sustainability. This implies that scenarios need to capture trend breaks and discontinuities, which is rather challenging since most conventional scenario efforts have an incremental nature with a focus on extrapolations. Although third generation scenarios already revealed various innovative theoretical assumptions for the envisioning of transitions, several challenges were still to be tackled. In light of contributing to a more complete theoretical basis for the development of transition scenarios, two of these challenges were further developed in this specific research. The first challenge was the theoretical grounding of transition scenarios in accepted scenario practice; the second was the support and enhancement of initial theoretical assumptions put forward by third generation scenarios through the development of a clear-cut conceptual foundation in which analytical and process-oriented criteria for transformative change are elucidated.

With regard to the latter, in practice, the development of transition scenarios had already been experimented with (i.e. by ECN, the COOL project, the backcasting-experiments of Quist (2007) and the VISIONS project). However, transition scenarios still remain niches in the scenario world since a solid methodological approach for their systemic development is lacking. Third generation scenarios emphasize the need for new scenario methods in the context of transformative change towards sustainability. It is argued that the basis should lie in combining previous methods and blending them into a more comprehensive methodology. At the centrepiece of this research we aimed to develop a consistent methodological basis for the development of transition scenarios, providing insight into the pattern of transformative change inherent in the multi-analytical transition approach. Although the basis lies in existing strains of thought through its necessary integration with novel guiding principles in light of envisioning transformative change efforts, it constitutes a fundamentally new scenario approach. The added

value of a methodological basis is that it enables transition scenarios to be developed at a larger scale and in a more consistent fashion. Accordingly, with this research we aimed to contribute to the maturing of transition scenarios.

Thus, central in this research was the development of both a conceptual foundation and a methodological basis for transition scenarios. Throughout this thesis several case studies have been conducted to allow for a reflexive evaluation of both, ultimately supporting their empirical validation. This was and will be an ongoing process, accounting for a repetitive cycle of confirmation and refinement. As we learned from practice, we further developed the theoretical concept and method, which was subsequently used as a starting point for empirical evaluation. Accordingly, nowadays the method for transition scenarios differs significantly from the one we initially developed in the beginning of this research. Describing this evolution and maturing it was at the centrepiece of this research. It illustrates the dynamic status of TRANSCE in the sense that what has been learned has been incorporated and led to the adaptation of the underlying concept and method. It is therefore useful to reflect here upon theoretical and operational progress made in this thesis based on the empirical findings obtained from the case studies, while drawing conclusions and formulating synthesizing insights regarding the future of transition scenarios in the context of scenario development and transformative change processes. In accordance with the explorative character of this research, we do not presume to be able to draw finite conclusions regarding the overall question whether TRANSCE is generically applicable. Instead of providing clear-cut answers to our research questions, which has been central in this research and thoroughly dealt with in preceding chapters, we chose to use this specific chapter to reflect on the research questions from a more contemplative perspective. Accordingly, we address the methodological progress and accomplishments of this research and ask whether TRANSCE has achieved, within the context of this research, an adequate and promising level of validity, robustness and utility to support further improvement of the method in the future. In doing so, we reflect on three major contributions of this research: [1] grounding of transition scenarios in accepted scenario practice [2] development of a conceptual foundation for transition scenarios and [3] development of a methodological basis for transition scenarios.

8.1.1. Grounding transition scenarios in accepted scenario practice

Overall, the major challenge undertaken in this thesis was whether we could develop a methodological approach that would realize our theoretical claims about transition scenarios. Our ambition was to align theory and practice, resulting in the development of a distinctive type of scenario development which provides an imaginative framework for looking one or two generations ahead, reflecting on recurring patterns of societal

change in culture, structure and practices while enlightening us with development directions to achieve them.

Taking this notion as a starting point for this thesis, Chapter 2 first explored what a transition scenario should be. A literature review about the complexity and dynamics of transitions - covering complexity theory, the integrated systems perspective and sustainability literature – was conducted. This led to a number of basic notions, analytical as well as process-related, which characterized this specific type of scenario. The distinctiveness of transition scenarios as opposed to more conventional scenario methods was deduced from insights into the scientific field of scenario development. A comparative and inter-disciplinary literature review embedded transition scenarios in a typology of prevailing third generation scenario methods. This led to a systemic identification of shortcomings in the more mainstream scenario methods in the context of transformative change. Simultaneously, it illustrated existing third generation scenario efforts we could build on.

In this first phase of the research, an attempt was made to combine the best of both worlds by characterizing a distinctive type of scenario development in the context of sustainability and transitions while simultaneously building on conventional scenario development efforts. We have shown that, although the concept of transition scenarios was at this moment still in a relatively early stage of development, it is possible to ground transition scenarios in accepted theory of future thinking. It was revealed that a coherent and well-founded characterization of a distinctive type of scenarios is possible by systemically and deductively identifying insights that relate to describing the complex pattern underlying structural change. We contrasted our theoretical understanding of how transitions unfold with theoretical knowledge about how conventional scenarios are being developed. The basis for what is termed 'conceptual foundation of transition scenarios' was developed here.

8.1.2. A conceptual foundation for transition scenarios

A first classification of criteria underlying the conceptual foundation of transition scenarios was defined in Chapter 3. These criteria embrace the distinctive character of transition scenarios in terms of content and process, identifying desirable outcomes of the development process. The former relate to the analytical structure of the complex pattern underlying the nature of transformative change which addresses the necessary constituents of the transition scenarios itself. The latter refer to desirable cognitive and behavioural processes initiated by participants engaged in the development process. The concept is used throughout this thesis as a starting point for constructing the

methodological basis of transition scenarios and as frame of reference for its subsequent repetitive empirical evaluation and refinement. It ensures that theoretical claims are reflected in practice.

The conceptual foundation of transition scenarios emerged by building on the results of the comparative interdisciplinary literature review described above (Chapter 2), complemented with empirical insights from a first case study (Chapter 5). For the description of the process criteria we had thus far mainly leaned on theoretical insights from transition (management) literature. With respect to the content criteria, the theoretical characterization of transition scenarios we had developed thus far was perceived in light of the transition scenario that we empirically developed in Chapter 5. Based on this, it was possible to disentangle how analytical notions concerning transformative change were represented in the transition scenario. We could discern necessary theoretical requirements for transition scenarios, jointly covering the pattern of structural change. The first initial theoretical concept that resulted hereof was repetitively tested and refined based on practical insights from subsequent case studies (Chapters 6 and 7). The results of these efforts are integrated in Chapter 3. Initially, the intention was to take on a more sequential approach: to develop a concept and method based on theory and validate it repetitively based on practice. The early-on iteration between theoretical research and empirical contemplation provided, however, a more rich and legitimized starting point for practical validation.

In Chapter 3, a compromise had to be made. On the one hand, transformative change can be recognized by various underlying patterns of structural change. On the other hand, we were limited in time with regard to the implementation of these patterns in the eventual development of transition scenarios. Hence, we chose to focus the content criteria in Chapter 3 primarily on one specific pattern: the empowerment path of structural change, dominated by bottom-up dynamics. This restriction was partly inevitable since theoretical progress concerning patterns of transformative change was ongoing during this phase of our research, and not mature enough to extensively use for scenario purposes. In the end, it did not hinder the main purpose of this thesis of developing methodological levers for representing the complexity of a transition process in an unscrambled fashion. However, although this has been an unavoidable and conscious choice for this thesis, it seems clear that the content criteria sketched in Chapter 3 (and the related method in Chapter 4) could be subject of further study, elaborating on and underpinning our initial content criteria through the use of other patterns of transformative change.

This phase of the research (after research efforts concerning Chapters 1, 2, 3 and 5 had been carried out) illustrated that a first characterization of transition scenarios, supported by deductive theoretical insights and inductive empirical lessons, can transform into a more legitimate and comprehensive conceptualization of transition scenarios. Throughout this thesis, it provided the groundwork and foundation of this research, to be empirically tested, validated and refined in subsequent cases (Chapters 6 and 7) and leading for the design of a method for transition scenarios (Chapter 4).

8.1.3. A methodological basis for transition scenarios

In making the development of transition scenarios operational, a solid methodological basis was explored and developed. Based on the dynamic interplay between theory (Chapter 3) and practice (Chapter 5), a first rudimentary version of TRANSCE emerged. It consisted of a methodologically based sequence of essential design and discussion activities, specifically focused on addressing the imaginative as well as the analytical character of structural systems change, with a derivative role for associated techniques to address how these discussions could be initiated. Several case studies were carried out to validate this first rudimentary version of TRANSCE within the various contexts offered by this research (Chapters 5, 6 and 7). The 'final' version of TRANSCE is captured in Chapter 4. Below, each case study conducted within this thesis will be elucidated, associated with relevant empirical insights which contributed to the theoretical maturity and methodological underpinning of transition scenarios.

The relation between the cases was constructive. The empirical findings of the first case study were built on in the subsequent case study, and so forth and so on. It enabled the gradual maturing of TRANSCE. Based on the MATISSE case in Chapter 5 we were able to develop a first consistent though rudimentary version of a conceptual foundation and methodological basis for transition scenarios. These were both, however, still too weak in consequence to test in real-life practice. Accordingly, the master students of the University of Tilburg in Chapter 6 provided the necessary precautionary step in-between by providing a context in which TRANSCE could safely be experimented with in many groups. Based on the quality of the transition scenarios that resulted we decided that with some additional adjustments TRANSCE would be ripe enough to implement in practice. Hence, eventually TRANSCE was tested in a real-life context with Stichting MAAT. Various insights regarding the use of TRANSCE have resulted from this entire empirical research phase.

During the MATISSE case in Chapter 5, we were given the opportunity to compare baseline scenarios with a transition scenario and empirically reflect on the underlying

grounds why the more conventional scenarios have shortcomings in the context of sustainability transitions. In view of that, we could deduce what the additional requirements within scenario development are for anticipating long-term transformative change towards sustainability in the short term. Perceived shortcomings of the baselines were translated into required innovations for the development of transition scenarios. Most remarkable was our experience that when trying to develop a narrative associated with the baseline, hidden assumptions were revealed at which the storyline could branch into various directions. The reason for this was the over-simplistic focus of the baseline on individual developments at the expense of introducing integration and complexity. Our conclusion was that for a scenario to be of use for practical purposes in the context of transitions, a more reality-based description of sustainability-oriented change is necessary. Accordingly, our learning experiences with regard to requirements for transition scenarios pointed out the relevance of capturing the pattern of transformative change and using uncertain developments (as a counterbalance for making the hidden assumptions in the baseline perceptive and dynamic) as a starting point for anticipating sustainability and changing the course of direction. These learning experiences provided the basis for developing a concept and method for transition scenarios.

In Chapter 6 we first implemented the version of TRANSCE that was put forward by the MATISSE case. The resulting transition scenarios reflected and revealed the streamlined process design of the method. Although the transition scenarios incorporated all ingredients necessary to portray a transformative change, the integration and dynamic interplay between them was lacking, whereby the pattern underlying the nature of a transition process was not discernable in the narrative description of the transition scenarios. We could have anticipated this result beforehand, however. Since the context did not allow for process facilitation, we consciously chose for what seemed to be a balanced solution: trying to let the students work independently with TRANSCE but providing them with a sufficiently tangible assignment, counterbalancing the lack of guidance along the way. Accordingly, we had to rely on a rather reductionistic method. In view of that, we possibly set our hopes too high in expecting students to work independently with a simplistic method on the one hand while realizing integral scenarios on the other. Nevertheless, since this case did not deal with real-life implications, it was a true breeding ground for experimentation with TRANSCE, which led us to take this restriction for granted. Although this did not prove to be a satisfactory solution in terms of the transition scenarios that resulted, some valuable lessons were learned regarding TRANSCE, which were a starting point for exploration and testing in the following case. First of all, we concluded that the eventual transition scenarios, and specifically their capacity to reflect the complex pattern inherent in the nature of transformative change accurately, would benefit from a more fluent and iterative approach underlying

TRANSCE, leaving more room for creativity and consistency in integration. Accordingly, TRANSCE was transformed into a method which merely renders the constructive flow of discussion activities throughout a development process. Secondly, in line of the foregoing, based on student reactions we presumed that the context in which TRANSCE is applied is considerably more important than contemplated in advance. We concluded that TRANSCE would prosper best when implemented in a participative context where close process facilitation and techniques received strict attention. Thirdly, we further focused the applicability of TRANSCE by inferring other context-specific requirements, related to things like the timeframe within which TRANSCE is practiced, the target group and relevant background knowledge and expertise of participants involved. Ultimately and intentionally, TRANSCE is practiced in a timeframe of at least half a year, with participants that are engaged in a vision development process, having the ambition to learn more about short-term implications of long-term societal transitions, and possess knowledge about the system that is dealt with.

When implementing TRANSCE for a second time (Chapter 7), a context was 'created' which took the above considerations into account. On top of that, it was the first case study which allowed for an empirical evaluation of the process criteria underlying the theoretical concept of transition scenarios. Although the research setting was not optimal in this regard, changes in cognition and behaviour which related to processes of reframing were distilled based on participative observations in combination with interviews. These subsequently formed the basis for the development of theoretical implications regarding process criteria. Despite the efforts that were made in this thesis, it seems obvious that future research should explore the role of reframing in the context of TRANSCE more systematically (See Section 7.3.). However, based on this case study we were able to define more accurately the contextual guidelines within which TRANSCE blossoms most effectively, which we only assumed could be true in the preceding case study. Accordingly, we explored and clarified the role and function of process facilitation and techniques in relation to the integrative pattern underlying the nature of structural change in the eventual transition scenarios. The latter accounts for creative imagination and analytical rigor throughout the development process which enhances the integrative and holistic envisioning of complexity and discontinuity in the eventual transition scenarios. The former uses this analytical rigor to provide direction and overview, indicate the relation and synthesis between the discussions and their contribution to the eventual transition scenarios. Both competences contribute to 'transitionizing' the development process: they convey and elaborate on the rationale of a different perspective on long-term future change while providing levers for its subsequent anticipation.

When scrutinizing the three case studies of this thesis, a relevant insight stems from the fact that although we consciously selected case studies with fundamentally different

contexts as a means to test and validate the generic use of TRANSCE, the results of the cases varied. Of course, the method matured along the way which partly accounted for the differences in outcomes. However, it definitely also implied that the success of TRANSCE depends on a large number of contextual factors. It was despite the use of TRANSCE in a variety of practical contexts, combined with theoretical development, that we have been able to specify more precisely the context in which TRANSCE is most successful. Provided that this 'ideal' context exists, TRANSCE has proved to enable the conditions under which participants are stimulated to develop exceptionally imaginative and artistic scenarios which form the basis for continuing debate and implementation of sustainability on the short term. It has become clear that the foundation of TRANSCE, in terms of the generic steps underlying the method, was a rather steady factor throughout this research, and therefore we state that these steps have emerged as building blocks for any visionary project which intends to develop transition scenarios. TRANSCE offers in this respect a solid basis and a mirror for reflection during implementation. Although the method underlying transition scenarios is undoubtedly subject to further evolution and maturing, we do claim to have established a very innovative, noteworthy and promising result, which will hopefully be further improved by future research. Following this reasoning, the ultimate question posed in the beginning of this chapter returns: Has TRANSCE achieved, within the context of this research, an adequate and promising level of validity, robustness and utility to support further improvement of the method in the future? We started off with a rudimentary version of TRANSCE which we iteratively refined and adjusted based on repetitive case studies. After each case study, we fed the theoretical and empirical learning experiences back into the method, strongly focusing on theoretical alignment with the conceptual foundation of transition scenarios and reactions from participants engaged to enhance its practical application. After the final case study, the suggested refinements were far less fundamental than in the previous case studies, which implied that we had reached the stage of consolidation. We presumed that in this respect additional case studies would not contribute to further fundamental changes in TRANSCE. In addition, we reasoned that we had, throughout this research, further developed TRANSCE into a method which was more mature than in the beginning, since various learning experiences that had emerged were captured in the eventual version of TRANSCE. In view of this, we conclude that TRANSCE is valid and robust enough for further improvement of the method in future research. This research has gone through a repetitive cycle of evolution and reverts to the initial idea that a distinctive type of scenario development is necessary in the context of societal systems change and can be developed based on a thorough and combined understanding of conventional scenario development and transition theory.

8.2. Synthesis and reflexivity

It is clear that over the past four years our definition of transition scenarios in relation to a concept and method for practice has matured. Within this thesis we tried to take transition scenarios to the next level of maturity in contributing to its theoretical grounding, its more specific characterization as a distinctive type of scenario development and its methodological underpinning. In due course, we have become more critical and accurate with regard to the method for transition scenarios: in terms of the analytical structure underlying the scenarios, in terms of the context in which TRANSCE is preferably carried out and in terms of the format of the method. At first we operated rather intuitively in developing transition scenarios, but currently we are able to define and execute generic process steps in a confident sequence, offering underlying techniques in relation to the different phases of the development process and providing assumptions regarding supportive skills and roles of facilitators. The method underlying TRANSCE, for example, is now prescriΩptively structured based on generic steps and techniques, whereas at first it more or less resulted from and depended on the gradual emergence of the development process itself, thereby risking to miss the intended purpose as the process progressed in another direction. The concept and method underlying TRANSCE have thus been refined and enhanced over time based on lessons learned in practice and vice versa.

Furthermore, several aspects were underestimated beforehand and only appeared during the various scenario development efforts throughout the cases. Examples of these aspects are the importance of defining a common problem sketch, the role of defining a transition challenge in relation to deducing the necessary scope of the system going through transition, the contra-intuitive insight that a less fixed and predetermined method realizes a more integral perspective on the complexity of a transformative change, the insight that triggering the right mode of thinking through the use of techniques supports the imaginative and analytical capacity of the eventual transition scenarios and, finally, the strength and added value of short-term strategies and synchronizing system innovations inherent in the pathways in relation to the visionary capacity of the future outlook, This is relevant for actually initiating the mobilizing capacity of the inspiring perspective on the future.

In view of our aim of this thesis to take the first methodological steps on the road to discovering a method for transition scenarios and pave the way for its blossoming accordingly, this research accounts for various positive experiences and relevant insights, accompanied by promising results. In its core, TRANSCE has increasingly become a means to inspire a stimulating and radical way of thinking about the long-term future from a complex systems perspective that is concrete enough to inform short-term ac-

tion for initiating structural change, while simultaneously leaving enough room for various actor perspectives to relate and actively commit to. In this respect, we experienced that the balance between, on the one hand, providing analytical rigor to support the development process and, on the other hand, offering participants engaged substantial freedom in terms of content is crucial. Provided these conditions are met, we assume that TRANSCE has the potential to allow for rich and broad explorations in terms of imagining long-term sustainability from a radical perspective on change, while maintaining a certain closeness to the perspectives of the participants involved, relevant for translation to their own short-term daily practice. The transition scenarios that resulted based on our first experiences with TRANSCE fell short in adequately describing the pattern underlying this radical perspective on transformative change. This demonstrated that the analytical structure throughout the process design should receive considerably more attention than we anticipated in advance. Thereof, in our final case study we started experimenting with the role of techniques and process facilitation to frame the complexity inherent in the transition scenarios. If we had known this sooner, we could have reached more convincing results with respect to the required balance between analytical structuring and contextual freedom. In terms of validity, it is therefore advisable to explore this balance further in order to maximize the interplay inherent in TRANSCE between long-term imagination and short-term practice.

Above we touched upon the 'inspiring capacity' of TRANSCE, in terms of fuelling a mindset change and initiating short-term action. Before we implemented TRANSCE, we assumed that this capacity is triggered by the long-term, far-reaching and utopian nature of the transition scenarios. However, reflection on the development process with participants engaged, provided us with the insight that the inspiring capacity of a transition scenario actually emerges from the *fundamentally different perspective on the nature of a future change process.* Participants mentioned that the transformative perspective on sustainability-oriented change stimulates a better understanding of the necessity and implications of structural change. Simultaneously, it provides insight into anticipative levers and required competences for individual contribution to the transition process on the short-term. Hence, the leap between long-term imagination and short-term action was made sensible, which formed an inspiration to act. Comparable to the foregoing insight mentioned, this one also came in a rather late stage of the research and was primarily based on impending actions instead of on true actions. Accordingly, we suggest to explore these notions further in longitudinal research. However, to synthesize, based on positive experiences throughout this thesis we presume that the premise holds that the influence of transition scenarios on short-term practice depends on the relation between method, content and process: the method enables the development of 'ideal' transition scenarios which make short-term governance strategies *discernable;* it is the

process, however, which fuels a mindset change necessary to account for its actual *mobilization*. The insistent emphasis on processes related to reframing at the expense of giving priority to the plausibility of the actual scenarios that result, set transition scenarios apart from conventional scenario methods. Whether or not these assumptions will persist when further research is conducted, in its core we can say that TRANSCE is already valuable in making transition theory operational in scenario development. Moreover, it is a means to integrally apply the various concepts underlying a transition process (multi-level, multi-phase, multi-pattern), which accounts for making the pattern of structural change insightful and approachable.

In addition to the various issues for further research that we already touched upon in this section, the following section describes additional coordinating themes for future research.

8.3. Issues for future research

Although this research has led to some promising results in the context of third generation scenarios and has taken the first steps on the road to the maturity of scenario methods in the context of transitions and sustainability, the challenge for future research lies in trying to make TRANSCE more generally applicable to a variety of contexts. Only then can TRANSCE develop beyond the experimental phase and evolve into mainstream practice. Hence, the method can and should be developed and underpinned further, theoretically as well as empirically. This is true for the conceptual and methodological basis described in this thesis, but certainly also for related applications. Both will be outlined below.

8.3.1. Conceptual and methodological challenges

An interesting conceptual issue related to TRANSCE touches upon the mindset change that is supposed to result from the engagement in the development process of transition scenarios. This phenomenon is captured in the process criteria underlying the theoretical concept described in this thesis (Chapter 3). Although we managed to deduce empirically some notions about what this process of reframing could imply (Chapter 7), underpinned by theoretical grounding, more systematic, detailed and longitudinal scientific research is needed to address this rather intangible concept further. It would be appealing to focus an entire research setting on this matter specifically. Our advice would be to start off by trying to address what a mindset change actually entails and how it can be defined. Only then can research evolve into questions that relate

to how a mindset change can be initiated and measured. From our point of view and based on our experiences with measuring processes of reframing, both these aspects would require a different scientific research setting than conducted in this thesis. For instance, the setting should allow for more and regular measuring moments at selected intervals, enabling to follow and depict the evolution in mindset change more closely while distinguishing its causal determinants; other scientific methods should be used that enable more accurate and isolated measuring, eliminating determinants of reframing other than the development process itself; a research setting would prevail which differentiates between temporary differences in mindset, merely ongoing during the development process, and its continuation afterwards; finally, the outcomes should be underpinned by disciplines that relate to changes in cognition and behaviour such as psychology and sociology, this to ensure theoretical nesting and enhancement.

Then there are at least two main methodological issues for further research. The first is the pattern of transformative change related to the generic steps in TRANSCE. Earlier in this chapter we mentioned that we chose to focus TRANSCE, and thus the transition scenarios that result, on one specific pattern that accounts for the initiation of a transition (the empowerment pattern), mainly because in that stage of our research other possible patterns lacked a clear-cut theoretical basis for translation in methodological assumptions. However, the pattern underlying a transformative change determines to a large part the substance and order of the generic steps in TRANSCE. At the end of this research, however, the subject of pattern recognition in transition theory has caught up with this research and a variety of transition patterns currently exist. Accordingly, in future research TRANSCE should try to catch up and incorporate other patterns of societal systems change, possibly leading to the development of different variants of TRANSCE.

The second relates to the techniques associated with TRANSCE which need to be explored, developed and tested further. TRANSCE would benefit from the availability of something like a toolbox which distinguishes between various types of techniques and links their use to specific steps in TRANSCE, making the use of techniques in TRANSCE more considered and conscious. Only the last case within this thesis enabled the purposeful experimentation with a variety of techniques. Although we managed to distinguish between the relevance of different types of techniques in relation to different phases of TRANSCE, the specific techniques used were often chosen randomly and intuitively and needed to be adapted to our specific context. Furthermore, from a scientific viewpoint, these techniques have so far been only loosely defined and are scientifically underdeveloped. Not only from a scientific viewpoint, but also from a practical viewpoint, a lot of methodological research is needed in this area.

8.3.2. Related applications

The method underlying TRANSCE has, with a view to practical relevance, primarily been developed for providing an inspiring long-term future in relation to informing short-term societal-oriented actions. In view of that, the method could be valuable and applicable in a variety of settings. The challenge for future research would then be to analyse how these different settings lead to necessary adjustments in the current format and use of TRANSCE. Several of these applications are illuminated below.

First of all, TRANSCE could be used to apply within a regime-based company instead of in a network-related and niche-based setting like the case of Stichting MAAT. Taking these regime players as a starting point for a moment, it could be interesting for such a company to envision how they can become more flexible in light of changing societal conditions in their environment. A necessary adjustment in TRANSCE stems directly from the difference in participants engaged: regime players versus niche players. Since the existing format of TRANSCE starts from the empowerment path, the transition scenarios pay a substantial amount of attention to the role that bottom-up initiatives play in initiating the transition. Accordingly, for regime players these transition scenarios would provide far less insight for deducing levers for short-term action. A different underlying pattern of transformative change would be required when applying TRANSCE in a company setting. Other thinkable examples of necessary adjustments can relate to the required group composition, the restricted timeframe and the types of strategies that result.

Second of all, within the MATISSE case we experimented with the use of transition scenarios in relation to modelling. Models are still often used to inform short-term policy, in light of the ongoing economic crisis for instance. However, their projections and implications are only valid within certain restricted intervals. More specifically, models lack the capacity to deal accurately with assumptions related to long-term or extreme and trend-breaking conditions, which are in fact increasingly perceived as common circumstances in the context of realizing sustainability. Transition scenarios have shown throughout this thesis not only to describe these non-linear and radical patterns of structural change but also to deal with them in an anticipative manner. Hence, research can be initiated to explore how transition scenarios can be applicated to develop new types of models, or at least change the basis on which models are developed, thereby stretching their use beyond the linear and extrapolative.

Thirdly, because of the explicit role of TRANSCE in providing inspiration (instead of plausibility) and space for a fundamentally different future development path, the method would be valuable in times of crises. This is because such a situation needs practical levers for how to overcome a crisis in the short-term while progressing into

more sustainable future development paths in the long-term. Additionally, according to the transition theory, a crisis situation implies that the climate for structural change is optimal: the regime of a system is destabilized and out of balance with its environment while the potential for niches to scale up is increased. Hence, a transition scenario could not only assist in providing inspiring fruitful pathways of transformative change wherein niches are central in influencing a more sustainable system, its potential for short-term materialization is also enhanced in these kinds of situations. In view of that, additional research could for instance address how the use of TRANSCE needs to be extended (i.e. embedded in the TM-Cycle, Chapter 3) in order to develop beyond the phase of policy preparation and evolve into the phase of policy implementation.

Finally, scenarios are the foundation of basically every policy exercise. A policy exercise uses the narrative of a scenario as an environment and context for interactive and experiential learning based on complex systems thinking. This is essential for initiating processes of reflexivity, social learning and awareness, ultimately fuelling a process of reframing. In view of this, the potential exists of reciprocity between transition scenarios and policy exercises. On the one hand, the use of transition scenarios as a basis for policy exercises could introduce the use of the latter into situations that ask for more long-term, far-reaching, sustainable and transformative solutions. On the other hand, a policy exercise could support TRANSCE in realizing a mindset change and could be used as an underlying technique or mode of process facilitation. From our perspective it would be very interesting to explore their mutual reinforcement further in a research setting that combines the use of both.

We started this section by articulating the ambition for transition scenarios to evolve into mainstream practice. As a first step, we provided in this section ideas to realize this aim by touching upon several research efforts which could jointly support TRANSCE in becoming more generically applicable. The suggestions for future research thus provided a strategy to scale up the use of TRANSCE to a variety of different contexts and applications. In spite of these attempts, a prerequisite for a method to become mainstream is its *validity* in a variety of contexts. Here, 'validity' means that theoretical expectations and practical outcomes match. Translated to this research context it suggests that practicing TRANSCE should result in transition scenarios that reflect the underlying theoretical concept. A rather interesting additional question for future research that arises in view of that is, how many cases are necessary to reach convergence between theory and practice in a variety of different contexts, accounting for its mainstream use.

8.4. Rising to the challenge: does TRANSCE fill the void?

To close off this thesis, the ultimate question returns: does TRANSCE contribute to the distinctive requirements of third generation scenarios in the context of sustainability transitions? The underlying question here refers to our main research question as posed in Chapter 1: what characterizes transition scenarios and which method can be exercised to develop such scenarios? In this respect, it is relevant to reflect on the fact if we did indeed develop a method which can describe the underlying pattern of transformative change.

With regard to the first question, when perceiving the overall thesis in relation to the ambitions mentioned in the beginning of this chapter, we contributed to the enhancement of third generation scenario efforts in various ways. [1] In terms of content and process, we have taken the first steps in developing a conceptual foundation for transition scenarios which contributes to the theoretical grounding of sustainability-oriented scenarios in accepted conventional scenario practice. [2] Furthermore, the theoretical concept accounted throughout this research for a more precise and explicit formulation of the distinctive character of this type of scenario. Based on literature reviews in the fields of scenario development and transition theory, as far as we know there have as yet been no well-founded initiatives that scientifically explored and integrally developed required characteristics for transition scenarios while making these concrete in the context of transition theory. The conceptual foundation of transition scenarios aims to contribute to this effort prescriptively. Moreover, since the concept of transition scenarios was used as an instrument for testing and refining the method, concept and method became gradually more and more aligned. Accordingly, the drawback of third generation scenarios, i.e. that novel theoretical claims of transition scenarios were not operationalized in practice, was increasingly dealt with. [3] Subsequently, the concept has been linked to a method for the development of transition scenarios. Based on a comparison between former developed transition scenarios (e.g. the VISIONS project, the COOL project, the backcasting-experiments of Quist (2007), the transition scenarios portrayed in the book *Great Transitions* and the energy transition scenarios developed by ECN) and the transition scenarios that resulted based on the use of TRANSCE, we presume that TRANSCE contributes to a more systemic development of transition scenarios. In anticipation of answering our main research question, this results in more accurate and analytically structured descriptions of a transformative change process towards sustainability. For instance, throughout the case studies we perceived that transition scenarios describe the dynamic interaction between various functional scale levels in relation to the environment, use structural uncertainties as a starting point for initiating societal systems change, frame the transition process according to phases of hamper-

ing and accelerating change, describe the mutual strengthening of system innovations inherent in processes of scaling up, and so on and so forth. Besides this optimistic undertone, we have also demonstrated in this thesis that the practical implementation of TRANSCE ultimately depends on the presence of techniques and process facilitation, for which we made various suggestions. In light of what is said above, our conclusion is that TRANSCE is assumed to be a valuable but not a sufficient or necessary recipe for the development of transition scenarios, but that at least it offers the building blocks. In particular, it is better to develop transition scenarios with TRANSCE, than without using any method at all.

With regard to our main research question, this thesis has contributed to both the fields of scenario development and transitions, in a theoretical and practical sense. It shows that TRANSCE starts from a complex systems perspective and, in combination with the anticipative role of discontinuities, leads to significantly different scenarios than would result from conventional methods. In this respect, we presume that TRANSCE not only leads to more radical and trend breaking scenarios but that practical experiences also show that it is possible to use TRANSCE as an approach for developing transition scenarios that provide an imaginative framework which unravels recurring patterns of transformative change and designates practical levers to achieve them, while reframing societal perspectives and discourse on short-term action in light of long-term futures. Thus, besides providing analytical insight into the pattern of transformative change, TRANSCE uses this altered perspective on change, contrary to conventional scenario methods, to fuel a process of reframing during the participative engagement of participants. In doing so, TRANSCE aspires to increasingly favour the function of inspiring motivation to act, instead of plausibility. In practice, promising results have been reached in terms of this, as the final case study showed that alterations took place in participants' perspectives concerning the kinds of changes necessary, the orientation and time span within which actions should be carried out, the importance of mutual reinforcement between various niche parties and their own perceived role in the transformative change process. Overall, one could say that TRANSCE offers the building blocks for explorative and anticipative future thinking in the context of sustainability transitions.

To close off, the advancement in theory development over the past four years, together with the established results based on practical experiences are promising. Although TRANSCE and the associated concept for transition scenarios are still in an early stage of development and we seem to have taken only the first few steps in discovering this distinctive type of scenario, we believe this research has contributed to the evolvement of TRANSCE beyond the experimental phase. We have developed a method which is mature enough to be picked up by others, to be further developed in terms of more broad

diffusion and extension with related applications. Our hope for the future is that many others will be motivated to get involved and bring the concept and method underlying TRANSCE to the next level of maturity, maybe even develop it into mainstream practice. We hope that this thesis will offer a basis and foundation for further exploration, learning and development and will contribute to a new mode of scenario development.

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Samenvatting

Dit boek presenteert een nieuwe scenariomethode (TRANCE: TRANsition SCEnarios) voor de ontwikkeling van transitiescenario's. Transitiescenario's worden in dit boek gedefinieerd als participatieve exploraties van mogelijke lange termijn ontwikkelingstrajecten waarbij de beschrijving van een structurele systeemverandering in de richting van duurzaamheid als uitgangspunt wordt genomen.

In **hoofdstuk 1** wordt aangegeven dat we met de ontwikkeling van TRANSCE proberen voort te bouwen op de meest recente ontwikkelingen in de scenario wereld, welke besloten liggen in 3e generatie scenario's. Tegelijkertijd proberen we met de ontwikkeling van een conceptuele basis voor transitie scenario's het onderscheidende karakter ten opzichte van meer conventionele scenario's (1e en 2e generatie scenario's) aan te geven.

De 3e generatie is ontstaan naar aanleiding van de Rio de Janeiro Conferentie in 1992 waar de noodzaak voor het realiseren van duurzaamheid op globale schaal expliciet onder de aandacht werd gebracht. Tegelijkertijd ontstond de noodzaak voor het verkennen van een specifiek type scenario, waarbij patronen van transformatieve verandering worden beschreven om zodoende korte termijn anticipatie op het realiseren van lange termijn duurzaamheid inzichtelijk te maken. *De aanleiding voor dit onderzoek komt concreet voort uit het gebrek aan een methodische ondersteuning voor het ontwikkelen van dergelijke transitiescenario's.* Het inzichtelijk maken van duurzaamheid vraagt namelijk om het beschrijven van een structurele omslag in het huidige systeem waarbij trendbreuken, discontinuïteiten en verassingen een grote rol spelen. Aangezien conventionele scenariomethoden in de praktijk nog vaak uitgaan van incrementele veranderingen en trendextrapolaties, en dus niet in staat zijn om de complexiteit van een transformatieve verandering inzichtelijk te maken, is de noodzaak ontstaan voor innovaties in bestaande scenariomethoden in de context van transities en duurzaamheid.

Binnen deze ambitie wordt de specifieke focus ten aanzien van dit onderzoek mede bepaald door de ontwikkelingen op het gebied van transitiescenario's in de afgelopen jaren. Vanaf de jaren negentig zijn er een aantal initiatieven geweest om transitiescenario's te ontwikkelen, voorbeelden hiervan zijn het VISIONS project, het COOL project, de backcasting-experimenten van Quist (2007), de transitiescenario's zoals beschreven in het boek *Great Transitions* en de energie transitiescenario's van ECN. De ontwikkeling van deze transitiescenario's geschiedde echter op een experimentele en deels intuïtieve manier, leidend tot variërende uitkomsten. Mede om die reden zijn transitiescenario's tot op heden nog steeds een niche in de scenariowereld. Dit onderzoek heeft tot doel de eerste stappen te zetten om transitiescenario's de experimentele fase te laten ontgroeien en ze als meer volwassen vorm van scenario-ontwikkeling op de kaart te zetten. De ontwikkeling van een solide methode als basis voor de ontwikkeling van tran-

sitiescenario's staat hierbij centraal. Zodoende probeert dit onderzoek bij te dragen aan de mogelijkheid om transitiescenario's systematischer en op grotere schaal te kunnen ontwikkelen. *De centrale onderzoeksvraag hierbij is: wat karakteriseert transitiescenario's en welke methode kan uitgeoefend worden om dergelijke scenario's te ontwikkelen?*

Voor beantwoording van deze hoofdvraag focust dit boek zich op twee sporen die elkaar voeden en parallel ten opzichte van elkaar worden ontwikkeld: [1] Ten eerste wordt een *theoretisch concept* ontwikkeld.Dit bestaat uit analytisch inhoudelijke en procesgerelateerde criteria voor de ontwikkeling van transitiescenario's. Om hiertoe te komen wordt enerzijds geput uit karakteristieken van geaccepteerde scenariomethoden. Door transitiescenario's hiermee te vergelijken, blijkt anderzijds ook de noodzaak voor vernieuwing in de meer conventionele scenariomethoden. Tevens komt het onderscheidende transformatieve karakter van transitiescenario's naar voren. Om de noodzakelijke vernieuwingen en het patroon van transformatieve verandering verder vorm te geven, wordt geput uit literatuur betreffende de transitietheorie. Tezamen leidt dit tot een theoretisch onderbouwd en veelomvattend conceptuele basis voor transitiescenario's [2] Ten tweede wordt een *methodische aanpak* voor de ontwikkeling van transitiescenario's geconstrueerd. Alhoewel op basis van het voorgaande wordt aangetoond dat er voor de ontwikkeling van transitiescenario's innovaties nodig zijn in bestaande scenariomethoden, wordt tegelijkertijd benadrukt dat de basis moet liggen in het integreren van bestaande scenariomethoden. Dit zijn beide uitgangspunten voor dit onderzoek. Ondanks het feit dat de basis van TRANSCE ligt in een combinatie van bestaande stromingen, draagt de integratie met nieuwe scenariomethoden, noodzakelijk voor het beschrijven van transformatieve verandering, bij aan de ontwikkeling van een fundamenteel nieuwe scenario aanpak.

Voor het realiseren van bovenstaande ambities, contrasteert dit onderzoek herhaaldelijk de bevindingen van theoretisch literatuuronderzoek met empirische case studies. Alhoewel het theoretische onderzoek in de praktijk deels parallel is verlopen met het empirische onderzoek, komt het erop neer dat het concept en de methode voor de ontwikkeling van transitiescenario's 'op papier' zijn ontwikkeld, waarna beide meerdere malen zijn getest in verschillende contexten en vervolgens zijn aangepast op basis van de leerervaringen die hieruit voortvloeiden. Door dit ontwikkelproces transparant te maken in dit onderzoek, geeft dit boek inzicht in de geleidelijke totstandkoming van het concept en de methode voor de ontwikkeling van transitiescenario's, zowel theoretisch als praktisch. Dit proces heeft uiteindelijk geresulteerd in een 'definitieve' versie van TRANSCE.

In **hoofdstuk 2** start dit onderzoek op basis van de assumptie dat de noodzaak voor een nieuwe scenariomethode voorvloeit uit het gebrek van conventionele scenario-methoden om de complexiteit onderliggend aan het patroon van een transformatieve verandering te beschrijven. Deze assumptie komt voort uit vergelijkende literatuurbevindingen op het gebied van duurzaamheid, scenario-ontwikkeling en transitie theorie. Transitieliteratuur, en specifiek de concepten multi-level, multi-fase en multi-patroon, verschaft vervolgens een eerste inzicht in dit onderliggende patroon van transformatieve verandering op basis waarvan transitiescenario's worden gekarakteriseerd. Wanneer deze karakterisering wordt ingebed in de scenariotypologie van Van Notten, welke een state-of-the-art van verschillende scenariomethoden verschaft, wordt een rijker beeld van transitiescenario's verkregen. Niet alleen wordt duidelijk dat de basis van transitiescenario's in conventionele scenariomethoden ligt, ook blijkt de noodzaak voor vernieuwing en integratie van bestaande scenariomethoden. Met betrekking tot integratie komt in het bijzonder het belang van het combineren van proces en inhoud en van exploratief en normatief aan de orde. De noodzakelijke vernieuwing zal zich moeten richten op dimensies die relateren aan scope, tijdsschaal, complexiteit en lineariteit. Dit hoofdstuk vormt de basis voor volgende hoofdstukken waarin, door continue iteratie tussen theorie en empirie, deze bevindingen steeds verder worden uitgewerkt en uiteindelijk resulteren in een conceptuele - en methodologische basis voor transitiescenario's. Alhoewel dit concept en deze methode pas aan het einde van het onderzoek tot stand zijn gekomen, liggen ze besloten in hoofdstuk 3 en 4. Voor de logische opbouw van deze samenvatting geven we hier kort aan wat eronder wordt verstaan. Vervolgens zullen de empirische leerervaringen worden besproken op basis waarvan deze resultaten tot stand zijn gekomen.

In **hoofdstuk 3** ligt de focus op de beschrijving van het conceptuele basis voor transitiescenario's. Het omvat het onderscheidende karakter van transitiescenario's ten opzichte van conventionele scenario's en draagt tegelijkertijd bij aan de verdere vormgeving van 3^{e} generatie scenario's. Het concept bestaat uit vereiste inhouds- en procescriteria voor de uitkomsten van het ontwikkelingsproces van TRANSCE. Inhoudscriteria beschrijven de analytische structuur van het complexe patroon onderliggend aan de aard van transformatieve verandering. Zonder hier al te diep op in te gaan, kunnen de volgende voorbeelden worden genoemd: onzekerheden als anticipatief uitgangspunt om duurzaamheid te beïnvloeden, noodzakelijke transformatieve verandering duiden in termen van cultuur, structuur en werkwijzen, beschrijving van de transitie op systeemniveau etc. Procescriteria refereren aan processen van reframing en beschrijven de gewenste cognitieve – en gedragsgeoriënteerde veranderingen welke geïnitieerd worden bij participanten als gevolg van deelname aan het ontwikkelingsproces. Voorbeelden hiervan zijn: het ontwikkelen van een gezamenlijke nieuwe kennisbasis voor duurzaamheid

als gevolg van sociaal leren, het stimuleren van een reflectieve houding ten aanzien van de omgeving op basis van internalisatie van het transitieraamwerk, het verbinden van koplopers om beweging te initiëren etc. Het concept wordt binnen dit onderzoek toegepast als middel voor toetsing en evaluatie van de methode TRANSCE, op basis waarvan aanpassingen in concept en methode worden voorgesteld. Het garandeert dat concept en methode gaandeweg worden verfijnd en steeds meer convergeren. Dit waarborgt dat theoretische claims ten aanzien van transitiescenario's praktisch worden toegepast.

In **hoofdstuk 4** ligt de focus op de beschrijving van de methode voor transitiescenario's. Kenmerkend aan TRANSCE is dat de prioriteit niet ligt, zoals bij veel conventionele methoden, in het verschaffen van realistische en waarschijnlijke scenario's. Echter, TRANSCE geeft prioriteit aan het stimuleren van inspiratie en een sense of urgency voor het realiseren van lange termijn duurzaamheid. Zodoende is het proces van ontwikkeling, welke kan leiden tot reframing, belangrijker dan de daadwerkelijke scenario's die resulteren. Desalniettemin heeft TRANSCE tot doel transformatieve verandering voor het realiseren van lange termijn duurzaamheid inzichtelijk te maken. TRANSCE is een iteratieve methode en bestaat uit een benadering waarin verschillende generieke stappen worden onderscheiden die als bouwstenen gelden voor het uiteindelijke transitiescenario. Deze stappen omvatten relevante discussie-activiteiten en zijn bedoeld als basis en leidraad voor het participatief realiseren van transitiescenario's. Onderwerpen die logischerwijs aan bod komen zijn: barrières voor transformatieve verandering, de scope van het systeem en de transitieopgave, duurzame toekomstbeelden en de noodzakelijke transformatieve verandering, klimaat voor transformatieve verandering en anticipatieve strategieën van groepen actoren. Voor het in een participatieve context daadwerkelijk stimuleren van discussies rondom deze onderwerpen presenteert dit boek aandachtspunten in relatie tot proces facilitatie en technieken, welke TRANSCE ondersteunen in de praktische uitvoering. Deze aandachtspunten komen voornamelijk voort uit empirische bevindingen en zullen aan bod komen bij de beschrijving van de casushoofdstukken (hoofdstukken 5, 6 en 7).

In **hoofdstuk 5** wordt de MATISSE casus benut om op basis van de bevindingen van hoofdstuk 2 een eerste rudimentaire versie van concept en methode voor transitiescenario's te ontwikkelen, met een expliciete focus op het inzichtelijk maken van het patroon van transformatieve verandering. Deze casus verschafte de mogelijkheid om te experimenteren met de ontwikkeling van transitiescenario's en de onderliggende methode daarvoor. Het doel van MATISSE bestond onder andere uit het op Europese schaal ontwikkelen van nieuwe tools en methoden en het beter benutten van bestaande tools en methode voor ISA (Integrated Sustainability Assessment). MATISSE was een mandaat om methodologisch te innoveren aangezien de onderliggende assumptie was dat

tools en methoden voor ISA benut moeten worden om transformatieve verandering te stimuleren. Binnen MATISSE werden zowel business as usual scenario's alsook transitiescenario's ontwikkeld. Beide hebben een fundamentele bijdrage geleverd aan de ontwikkeling van concept en methode voor transitiescenario's. De business as usual scenario's hebben inzichtelijk gemaakt dat conventionele scenario's verborgen assumpties bevatten welke duiden op spanningen binnen het scenario. Elk van deze spanningen duidt op een onzekere ontwikkeling waarbij het verhaal meerdere wendingen kan aannemen. Juist hierin ligt de complexiteit en het onderliggende patroon van een transformatieve verandering besloten. Een transitiescenario heeft tot doel deze verborgen assumpties expliciet te maken en erop te anticiperen om zodoende de ontwikkelingsrichting van de lange termijn toekomst te beïnvloeden en te oriënteren op duurzaamheid. Op basis van deze leerervaringen is vervolgens een transitiescenario ontwikkeld met het doel, bij vergelijking met het business as usual scenario, hier onderscheidende kenmerken van het patroon van transformatieve verandering empirisch mee vast te stellen. Deze empirische bevindingen zijn vervolgens, door contrastering met de theoretische bevindingen over de transitietheorie van hoofdstuk 2, vertaald in een concept voor transitiescenario's. De methode TRANSCE is vervolgens tot stand gekomen door de inhoud van het transitiescenario te ontrafelen en te vertalen in een logische sequentie van discussie-activiteiten die achtereenvolgens aan bod zouden moeten komen om het patroon van transformatieve verandering integraal te kunnen beschrijven. Het concept voor transitiescenario's is vervolgens gebruikt om additionele analytische criteria toe te voegen aan de methode.

In de volgende twee hoofdstukken staat het testen en verfijnen van deze rudimentaire versie van TRANSCE centraal met het doel de methode verder te ontwikkelen tot een meer generiek toepasbare scenario aanpak. TRANSCE wordt zodoende in twee uiteenlopende contexten toegepast voor het ontwikkelen van transitiescenario's. Aangezien TRANSCE na de MATISSE case nog steeds in een beginnend stadium van ontwikkeling is en er rekening moet worden gehouden met het risico van tegenvallende uitkomsten, wordt in **hoofdstuk 6** besloten TRANSCE allereerst te testen met studenten. Deze ondervinden namelijk geen negatieve consequenties wanneer de uitvoering van TRANSCE tot minder succesvolle resultaten zou leiden. Tevens verschaft ons dit de mogelijkheid om te leren door te doen en draagt de grote pool van studenten (23 groepen die TRANSCE elk in op een ander domein toepassen) bij aan de validiteit van dit onderzoek. Deze casus heeft echter een aantal beperkende omstandigheden waardoor het niet mogelijk is het proces van ontwikkeling te faciliteren. Om die reden wordt de initiële versie van TRANSCE vertaald in een meer gestroomlijnd en simplistisch stappenplan waarmee studenten zelfstandig aan de slag kunnen. De voornaamste bevinding tijdens de evaluatie is dat de methode alle ingrediënten bevatte om transformatieve verande-

ring te beschrijven, maar het reductionistische karakter de creativiteit heeft beperkt en de studenten heeft belemmerd om de verschillende ingrediënten te integreren tot een verhaallijn waarin de complexiteit en dynamiek van een transitie in naar voren komen. Kortom, in de transitiescenario's kwam het patroon van transformatieve verandering niet goed tot zijn recht. Op basis hiervan is TRANSCE omgevormd tot een meer open en vloeiende methode welke enkel de bouwstenen en de rode draad van het ontwikkelproces weergeeft. Dit biedt veel ruimte voor creativiteit en iteratie. Ter ondersteuning van de praktische toepassing hiervan is geconcludeerd dat technieken en proces facilitatie meer aandacht behoeven. Een andere belangrijke bevinding is dat juist door de beperkingen in deze casus de context voor TRANSCE verder kon worden gespecificeerd, bijvoorbeeld ten aanzien van de doelgroep, het tijdsbestek, de gewenste achtergrond en expertise van participanten etc.

In **hoofdstuk 7** worden al deze aannames als uitgangspunt genomen en verder onderzocht. Centraal daarbij staat het inzichtelijk maken van de rol van technieken en proces facilitatie ten aanzien van het analytisch meer accuraat beschrijven van het patroon van transformatieve verandering in transitiescenario's. In andere woorden, dit hoofdstuk probeert de contextuele randvoorwaarden waarin TRANSCE het meest tot zijn recht komt, nader te definiëren. Aangezien de vorige casus tot veel constructieve aanpassingen heeft geleid in de initiële versie van TRANSCE, gaan we ervan uit dat TRANSCE in deze fase rijp genoeg is om te testen in een context waarin de participanten feitelijke doelstellingen hebben ten aanzien van het praktisch realiseren van duurzaamheid. TRANSCE wordt zodoende geïmplementeerd in samenwerking met Stichting MAAT. Zij willen graag transitiescenario's ontwikkelen om het noodzakelijke veranderingstraject voor het realiseren van duurzaamheid inzichtelijk te maken, om vervolgens op basis van deze lange termijn oriëntatie, partijen op de korte termijn met elkaar te verbinden om een beweging in gang te zetten. Bij de evaluatie blijkt dat de resulterende transitiescenario's steeds meer overeen blijken te komen met het theoretische concept, en het patroon van transformatieve verandering dus analytisch steeds beter beschrijven. Deels kunnen we dit toekennen aan de rol van technieken en proces facilitatie, welke we op basis van de bevindingen in deze casus nu ook expliciet kunnen maken. Twee verschillende typen technieken zijn relevant, afhankelijk van de ontwikkelingsfase van TRANSCE: verbeeldende - en analytische technieken. Het eerste type draagt bij aan de verbeeldende capaciteit van participanten tijdens de fase waarin toekomstbeelden worden ontwikkeld. Het tweede type draagt bij aan de analytische structurering van de paden die naar de toekomstbeelden leiden en waarin het patroon van transformatieve verandering wordt beschreven. In die zin worden technieken binnen TRANSCE gebruikt om discussies te framen en te integreren. De facilitatoren benutten deze technieken om overzicht te scheppen over het gehele ontwikkelproces, de relatie aan te geven tussen

de discussies en deze te synthetiseren in de uiteindelijke transitiescenario's. Daarnaast bood deze casus, voor het eerst in het gehele onderzoek, de mogelijkheid om de procescriteria onderliggend aan het concept voor transitiescenario's empirisch verder te exploreren. Hoewel de onderzoekssetting niet ideaal was voor deze vorm van evaluatie, zijn er op basis van participatieve observaties in combinatie met interviews veranderingen in cognitie en gedrag geconstateerd die duiden op een proces van reframing, welke vervolgens de basis vormden om de theoretische implicaties ten aanzien van de procescriteria verder vorm te geven.

In **hoofdstuk 8** keren we terug naar de uitgangspunten die in beginsel van dit boek zijn benoemd en proberen we aan te geven in hoeverre dit onderzoek erin is geslaagd voort te bouwen op en bij te dragen aan de verdere ontwikkeling van 3e generatie scenario's. Impliciet wordt daarmee een antwoord gegeven op de hoofdvraag in dit onderzoek: wat karakteriseert transitiescenario's en welke methode kan uitgeoefend worden om dergelijke scenario's te ontwikkelen? In relatie tot deze hoofdvraag wordt beschouwd in hoeverre dit onderzoek in staat is gebleken een methode te ontwikkelen welke resulteert in transitiescenario's die het patroon van transformatieve verandering beschrijven.

Als aanloop op de beantwoording van deze vraag wordt allereerst vastgesteld dat dit onderzoek in beginsel heeft bijgedragen aan de theoretische gronding van duurzaamheidsgeoriënteerde scenario's in conventionele en geaccepteerde scenariomethoden. Het theoretische concept voor transitiescenario's dient daarbij tevens als een meer precieze, omvattende en expliciete formulering van het onderscheidende karakter van transitiescenario's ten opzichte van conventionele scenario's. Gebaseerd op literatuur over scenario-ontwikkeling en transitietheorie is er volgens ons nog niet eerder een initiatief geweest dat criteria voor transitiescenario's wetenschappelijk heeft verkend, integraal heeft ontwikkeld en concreet heeft gemaakt in de context van transitietheorie. Binnen dit onderzoek is dit concept vervolgens gekoppeld aan een methode voor de ontwikkeling van transitiescenario's. In eerste instantie is dit onderzoek gestart met een rudimentaire versie van TRANSCE, welke we herhaaldelijk en op basis van iteratie tussen theorie en empirie steeds verder hebben aangepast en verfijnd. Na de laatste casus waren de gesuggereerde aanpassingen duidelijk minder fundamenteel dan in voorgaande cases, wat impliceert dat de fase van consolidatie nadert en een volgende casus niet meer zou leiden tot fundamentele aanpassingen in TRANSCE. Bovendien is duidelijk geworden dat de basis van TRANSCE, de generieke stappen onderliggend aan de methode, gedurende dit onderzoek een stabiele factor is geweest. De aanname is vervolgens dat door het herhaaldelijk inpassen van nieuwe en uiteenlopende leerervaringen in de uiteindelijke methode er binnen de context van dit onderzoek een versie van TRANSCE ontstaan is welke een meer solide basis vormt voor de ontwikkeling van

transitiescenario's dan in beginsel van dit onderzoek. Er wordt tevens voorondersteld dat de generieke stappen beschouwd kunnen worden als bouwstenen voor elk scenarioproject dat de intentie heeft om transitiescenario's te ontwikkelen en dat TRANSCE in dit opzicht een spiegel van reflectie is tijdens implementatie. Mits er voldaan is aan bepaalde contextuele condities, heeft TRANSCE de potentie om participanten buitengewoon verbeeldende en creatieve scenario's te laten ontwikkelen welke reflecteren op essentiële en radicale perspectieven van toekomstige verandering. Tevens vormen ze een blijvende motivatie voor debat en acties betreffende lange termijn duurzaamheid. Kortom, TRANSCE is valide, bruikbaar en robuust genoeg gebleken voor verdere ontwikkeling in toekomstig onderzoek.

Ter beantwoording van de hoofdvraag worden de volgende punten aangehaald. Bij vergelijking met de meer experimenteel ontwikkelde transitiescenario's (e.g. het VISIONS project, het COOL project, de backcasting-experimenten van Quist (2007) en de energie transitiescenario's ontwikkeld door ECN) wordt geconcludeerd dat TRANSCE bijdraagt aan een meer systematische ontwikkeling van transitiescenario's, resulterend in een meer analytisch gestructureerde en meer accurate beschrijving van het patroon van transformatieve verandering. Ondanks deze positieve notie, demonstreert het hoofdstuk tevens dat het succes van de praktische implementatie van TRANSCE afhankelijk is van de aanwezigheid van technieken en proces facilitatie. In dit opzicht wordt aangetoond dat TRANSCE een waardevolle, maar zeker geen voldoende of noodzakelijk recept is voor het ontwikkelen van transitiescenario's. TRANSCE biedt de bouwstenen voor de ontwikkeling van transitiescenario's en de aanname is dat het analytische karakter van transitiescenario's beter tot zijn recht komt bij gebruik van TRANSCE dan zonder gebruik van een methode. Bij vergelijking met conventionele scenario's wordt geconcludeerd dat TRANSCE start van een complex systeem perspectief en in combinatie met de anticipatieve rol van discontinuïteiten resulteert dit in meer radicale en trendbrekende scenario's. TRANSCE maakt dit perspectief op transformatieve verandering niet alleen inzichtelijk, maar benut het tijdens het ontwikkelingsproces om reframing te stimuleren bij betrokken participanten. In dit opzicht biedt TRANSCE de mogelijkheid voor exploratief en anticipatief toekomstdenken in de context van transities naar duurzaamheid.

Samengevat sluit dit boek af met de conclusie dat de bijdrage aan theorie en praktijk veelbelovend zijn, maar dat er nog heel wat uitdagingen in het verschiet liggen. Te denken valt aan het generiek toepasbaar maken van TRANSCE in uiteenlopende contexten en de toepassing van TRANSCE in relatie tot modellering, gaming of crisissituaties verder onderzoeken. Alhoewel het concept en de methode voor transitiescenario's zich nog steeds in een vroege fase van ontwikkeling bevinden en we slechts de eerste stappen hebben gezet om deze vorm van scenario-ontwikkeling te verkennen, wordt voorondersteld dat dit onderzoek heeft bijgedragen aan de ontwikkeling van TRANSCE voorbij

de experimentele fase. Dit boek introduceert een methode die volwassen genoeg is om door anderen verder verkend en onderzocht te worden in termen van verspreiding en toepassing. Onze hoop voor de toekomst is dat vele anderen geïnspireerd zullen zijn om betrokken te raken bij het verder ontwikkelen van TRANSCE in de volgende fase van volwassenheid. We hopen dat dit boek de basis vormt voor verdere verkenning en uiteindelijk bij zal dragen aan een nieuwe modus van scenario-ontwikkeling.

About the author

Saartje Sondeijker (1982) obtained her Master of Science degree at the University of Tilburg, where she followed her academic study Policy- and Organisational Sciences. This interdisciplinary study had a strong focus on societal complexity and network dynamics. She graduated in 2004 with a specialization in the design of policy games. Her professional career started at the Institute for Social – and Policy Scientific Research (IVA) where she was involved in the development of these kinds of games. Here, she was first introduced to systems analysis, change management and scenario development. Although gaming has always remained a true fascination for her, the curiosity for societal transitions in relation to sustainability issues and scenario methods inspired her in 2005 to start a PhD research about transition scenarios at the Dutch Research Institute for Transitions (DRIFT), vested at the Erasmus University Rotterdam. Other activities during her doctoral research included educating at the University of Tilburg and the Erasmus University Rotterdam. Furthermore she was involved in various projects in which policy games were designed, all with a strong orientation on issues related to building and urban planning. Besides work-related interests, she has an intense passion for photography.

This book reports on the explorative search of a new scenario method for the development of transition scenarios. This type of scenario has already been practiced on an experimental basis, but as yet there was no solid conceptual and methodological basis. Nevertheless, this type of scenario development is becoming increasingly important in light of reaching future sustainability.

The rationale behind transition scenarios is that we are facing persistent societal problems of high complexity and uncertainty. For anticipating these developments and influencing future sustainability, we have to be aware of the need for a more radical type of change process that differs significantly from the trend-based ones envisioned in the more conventional scenario approaches. This is because sustainability suggests that prospects for disruption, discontinuities, surprises and shocks are increasingly in evidence. Subsequently, the claim is made that new and better scenario approaches need to be developed that can merge in with this new perspective on foresight.

Against the background of these developments, this book introduces a new scenario method (TRANSCE) for visualizing transformative change patterns towards sustainability. TRANSCE builds on existing scenario methods but adds new elements. Through this integration it provides a new concept for scientific research and a method for scenario practice in the context of sustainability. By taking discontinuities as a starting point, TRANSCE offers a generic method to create and visualize desirable and inspiring images of sustainable future systems accompanied by guiding pathways of structural change. With this method we aspire to combine the best of several worlds and to develop scenarios that possess and balance multiple features: long-term and short-term, realistic and desirable, process and content and explorative and normative. Contrary to the conventional scenarios, the design objective of TRANSCE does not lie in being plausible or realistic. Instead, it lies in trying to inform and inspire sustainability-oriented short-term action by generating a sense of urgency and fuelling a mindset change.

This book offers insight into five years of development of theory and practice of transition scenarios as a new type of scenario method in sustainability-oriented foresight activities. It is highly relevant for science and policy related to transformative change and sustainable development.

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