Co-Creating Innovation

A Systemic Learning Evaluation Of Knowledge And Innovation Programmes

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Co-Creating Innovation

A Systemic Learning Evaluation Of Knowledge
And Innovation Programmes

Co-creëren van innovaties

Een systemische lerende evaluatie van kennis-
en innovatieprogramma's

Thesis

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Content

Chapter 1

Reinventing knowledge development in developed societies

Knowledge development is traditionally seen as a quest for facts and measurable data. Sometimes knowledge is factual and tangible, something it is more invisible, more intangible. Knowledge development efforts can also be motivated by a desire to support already made decisions. However multifaceted knowledge is as a construct, it goes without saying that knowledge development is a crucial part of any attempt to address serious problems and challenges and prepare for the future. While knowledge development can occur in many ways, this thesis is fundamentally interested in the knowledge development process as it occurs through the cooperation of experts and stakeholders: the co-creation process. Co-creation can occur on ad hoc basis, but also in more structural forms, such as deliberately designed public-private partnerships and knowledge and innovation programmes. This thesis will investigate the impact of these more structured forms of knowledge and innovation co-creation and is part of a larger effort to develop more adequate means of evaluating such multi-actor programmes. It aims to assess the impact of two particular programmes, and also provide insights for the further improvement of the programmes' outcomes. This will be done through shared learning and with a systemic perspective, in which the dynamics of the context the programmes operate in play an important role. This Chapter One starts by discussing the development of programmes for knowledge and innovation co-creation in general before outlining the approach this thesis will take in evaluating them.

1.1 A quest for innovation and innovative knowledge

Knowledge development is a cornerstone of any attempt to realise massive societal changes, whether in a business, a specific sector of an economy, or in the whole society. Knowledge development is, however, not a simple fix for reducing risks and uncertainties (Koppenjan & Klijn 2004: 5), as it can also lead to new uncertainties and risks. Knowledge can contribute to development of ideas, changes and innovations. Furthermore, important experiments often arise from knowledge development efforts, through which innovative ideas are implemented and explored, thus clearing the path for these innovations to grow and bloom. In a complex system many different types of knowledge play a role (Van Buuren 2006). Knowledge, in particular, can lead to innovation if it is developed within interaction (Leydesdorff 2006: 17), for instance the interaction between science and economy (ibid.: 18). Tacit knowledge (i.e. intangible and informal knowledge) can be made more concrete through this interaction (see for instance Kogut & Zander 1992).

But what exactly is innovation? Innovation concerns ideas, products or practices that are perceived to deviate from standard ideas, products and practices (Rogers 2003: 12; Korteland 2010; 11; Hofman 2005: 15). There is some overlap between the concepts of knowledge and innovations. Overall, however, the distinction lies in the directness of ap-

plicability: knowledge is an instrument for realising change, whereas innovation concerns the changes themselves. In this sense, knowledge can be viewed as 'knowing what to do', whereas innovation is more about 'doing'.

It is important to be aware that innovation itself is more than product innovation. Product innovation is important, but it is increasingly complemented by process innovations that include new forms of cooperation, new types of management, and much more. When combined with product innovation, and aimed at realising system change, process innovations become what is now called *system innovations*. System innovations are innovations for changes in the entire architecture or structure of socio-technical systems, developed through multi-actor processes, with substantial effects on both supply and demand actors (Geels et al. 2004: 5). System innovations are of great importance when dealing with persistent and complex problems, as they address many aspects of the system at once.

Knowledge and innovation can therefore be instrumental in guiding societal change processes, by providing actor integration, problem definitions, and solutions directions. **Knowledge and innovation programmes** (or: **KAIPs**) attempt to stimulate societal change by providing problem definitions, and by developing the knowledge and innovations necessary for desired change in a cooperative structure of actors. KAIP's thus effectively facilitate the *co-creation* of knowledge and innovation through a necessarily strong network of cooperating actors who are willing to disseminate the knowledge and innovations to others in their own networks. From this perspective, the knowledge and innovation programme has three primary functions: the development of knowledge and innovation, stimulating desired societal changes, and realising a strong and vital network. An effective knowledge and innovation programme will be successful in performing these functions, and will evolve during its duration towards a more and more successful programme through a continuous process of *learning* that allows for ongoing improvement and steering.

1.2 Knowledge and innovation development in an increasingly complex environment

Western-European society increasingly depends on knowledge development and knowledge dissemination to compete in international markets, as manufacturing has been transferred in large part to lower-wage countries (Wenger & Snyder 2000). An example of this type of knowledge-based advantage is the international recognition of the Dutch water management practices (Van Buuren et al. 2010: 37). For many centuries, the Netherlands fought against intruding water because of its fear of losing land and the desire to reclaim more land. Over the years, the knowledge and expertise it built in the areas of land reclamation, flood protection, and inland damming became a hallmark of Dutch engineering.

The combination of technological skills and management practices that evolved in the Netherlands is now coveted by many other countries with similar challenges and desires.

But knowledge development is not always a straightforward matter. Today's society is ever increasing in complexity, fragmentation and in dynamism (Teisman et al. 2009; Gerrits 2008; Torfing 2007; Diepenmaat 1997), and so is the organisation of that society (for instance Bovens et al. 2001). Efforts at knowledge development and innovations must incorporate and embrace such complexity if they are to be suitable for addressing future challenges. The cooperation of multiple actors and stakeholders is a way of incorporating this complexity, because it allows for the inclusion of a variety of perceptions, interests and beliefs and facilitates the creation of relevant and significant innovations (Geels et al. 2004; Wenger & Snyder 2000; Agranoff & McGuire 2001: 296). This effect is seen especially when actors from the often diverging fields of science and practice work together to develop knowledge and innovations. The outcomes of such cooperation are potentially high in quality (Klijn et al. 2010a), relevance, and popular support.

Co-creation can be especially helpful in aligning ideas and developing mutually beneficial coping strategies when addressing very complex problems for which no single solution exists (the so-called wicked problems). Wicked problems exist on boundaries between social and physical systems, where great uncertainties exist (Dryzek, in: Van Bueren et al. 2003: 193; Koppenjan & Klijn 2004: 2). These problems are of a deeply systemic nature - they relate to physical and social systems and know great complexity.

Because they integrate actors from several spheres for the achievement of a shared objective, knowledge and innovation programmes are in many ways similar to governance networks and public-private partnerships. Such networks and partnerships do not typically replace existing structures or governance arrangements entirely (Marcussen & Olsen 2007: 286), but instead alter the way the structures are organised, and they increase the level of horizontal decision-making at the expense of vertical decision-making (Koppenjan & Klijn 2004: 3). Due to their integrated multi-actor nature, these networks have the potential to realise massive societal change.

1.3 Cooperation for knowledge and innovation development

Participation in a knowledge and innovation programme is risky. Participating actors need to invest capital (financial as well as human or physical capital) in the enterprise, and although these programmes have the potential to influence society, it is not guaranteed that they will realise this influence. The participating actors therefore do not know for sure whether their investments will create benefits for them. Governmental agencies can play an important role in reducing this risk by partially financing the programme and by supporting the recommended changes arising from the knowledge and innovation devel-

opment efforts. With governmental involvement, an important support base for the shared objective is created and the financial burden on other actors is also reduced.

This thesis will look into a joint financing arrangement from the Netherlands organised by ICES/KIS: Interdepartmental Commission Economic Structural empowerment/ Knowledge InfraStructure[1]. The joint financing arrangement consisted of three generations of financing programmes, designed to stimulate the development of knowledge and innovation through co-creation consortia of supply and demand actors. The arrangement's ultimate purpose was to strengthen the (national) knowledge infrastructure. The money for the arrangement came from the natural gas revenues, and was distributed by national government through the FES (Fund for Economic Structural empowerment). This accounted for approximately half of the programme's funding, with the remaining money coming from participating actors. Although the idea of the initiative and financial impetus was well appreciated by many actors, the first two generations of the arrangement were not without their problems, as was concluded in evaluations about these generations. Money appeared to be assigned in an ad hoc or random manner, resulting in high investment and maintenance costs (Meijerink et al. 2010: 3). Some commented that these joint financing rounds smacked of 'horse trading' rather than solid allocation procedures (ibid.: 13).

Each generation involved a set of knowledge and innovation programmes that had to be co-created by a variety of demand and supply actors, each with their own objectives, preferences and resources. This made them *multi-object programmes*. Demand actors included executive businesses (e.g. contractors and construction businesses looking for new sources of profit and ways to secure their future existence) and governmental agencies (seeking to keep the Netherlands competitive and effective). Supply actors included universities (keen to find new sources of financing for their research in exchange for the production and distribution of societal relevant data and publications) and consultancy firms (active in developing and disseminating demand-driven knowledge, with a clear profit orientation). This thesis will investigate two programmes that were part of the third generation of programmes, namely sustainable mobility programme *Transumo* and innovative water management programme *Living with Water*. Details of how the cases were selected are presented in Chapter Four (§4.3), and more detailed information on the joint financing arrangement can be found in Appendix 1. The cases will be elaborately discussed in Chapters Five-Nine.

1 http://www.senternovem.nl/bsik/algemeen/achtergrondinfo/index.asp

1.4 Evaluating knowledge and innovation programmes

Measuring the impact of complex networks has often been deemed impossible, and even undesirable as it is impossible to quantify or objectively assess the impact of complex networks in a complex environments (Sørensen & Torfing 2009: 240; Noordegraaf & Abma 2003: 856). By design, the knowledge and innovation programmes include many actors, perceptions and interests, which together create high levels of complexity in the inner cores of the organisation and beyond. Further, potential adopters of the knowledge and innovations have their own rationales, their own conclusions and ideas, and their own timelines for adoption. Decisions to adopt knowledge and innovations might not always be conscious or traceable. In other words, the system in which the KAIPs function is a complex dynamic system, which does not readily allow for standard impact measurements.

Outcomes cannot be assigned to individual actors, but arise out of interactions among many actors (Stacey 1995: 283; Noordegraaf & Abma 2003: 854). Initial decisions only partially determine outcomes and the evolvement of processes (Teisman 2008: 342). Standard measurements, based on pre-set objectives, might conclude that nothing has changed as a result of the programmes, but more implicit, less visible and tangible changes may very well have occurred. These networks are unlikely to be guided by pre-existing accountable objectives (Nooteboom 2006: 11). Traditional impact measurements do not suffice to measure organisations such as communities of practice or governance networks that exist in complex systems (Sørensen & Torfing 2009: 241; Wenger & Snyder 2000: 140; Sanderson 2000; Anderson 1999: 217). At the same time, monitoring, evaluating and auditing has increased rapidly over the last decades (De Kool 2007; Power 1994). This development is closely related to the increasing focus on control and accountability in society (see Teisman 2005: 152-157 and Noordegraaf & Abma 2003 for a discussion on increasing focus on accountability in society). A network consisting of many actors may not always be (democratically) accountable for their actions and expenditures (see for a discussion on democratic accountability of multi-actor networks for instance Koliba et al. 2011: 35-36; Van Kersbergen & Van Waarden 2004; and Sørensen & Torfing 2005).

In the joint financing arrangement the programmes were monitored. This monitoring served to assess the success of the programmes, and therefore the success of the governmental investment. This monitoring occurred based on quantifiable measurements, such as measurements of amount of participants and amount of deliverables. The joint financing arrangement itself was satisfied with their monitoring method. The programmes, however, felt that the monitoring failed to include aspects of their impact. Especially the indirect, soft and intangible impact was not taken into account. Furthermore, in classic, audit-like, evaluations there is little room for learning and improvement (Edelenbos & Van Buuren 2005: 607).

Because the programmes were designed to provide an impulse on knowledge and innovation development in highly complex sectors, the programmes feared that this monitoring would be unable to retrieve their entire impact. The complexity of the programmes and their environment required a more interactive and open evaluation (Wadsworth 2001: 56). The monitoring did not help the programmes to learn about their progress and the actions they needed to undertake to improve their impact. They desired an impact evaluation approach more strongly oriented on learning, and including intangible and indirect impact as well – an evaluation approach with a clear systemic component, acknowledging the interaction between programmes and their environment. This created a quest for a systemic learning evaluation of knowledge and innovation programmes.

1.5 Aim and research questions

The first aim of this thesis is to *develop a systemic and learning evaluation approach*. While the author acknowledges that exact measurement of impact is not possible for this type of programmes, it is still critically important to assess programmatic impact as complete as possible. The evaluation approach that will be developed to carry out this assessment will include a strong learning component, will be carried out ex durante (in the programme's duration), and will be interactive and adaptive in order to adequately address the complexity of the programmes and their environment. This comprehensive method with which specifically to evaluate complex knowledge and innovation programmes will then be applied to the two selected programmes of the joint financing arrangement. The second aim of the study therefore is to *provide answers about the impact (potential) of these two cases*. In developing and applying the evaluation approach, the third aim of the study is to *contribute to the ongoing scientific debate on impact evaluation studies*. The research question for this thesis will be as follows. *How did the knowledge and innovation programmes evolve in relation to their objectives and their changing circumstances, what were their outcomes, and how can their impact be explained?* This research question primarily focuses on the second aim of the study (providing answers about the impact of the two cases), but contributes to the other two aims through the process of developing the evaluation method, applying it to the cases, and then reflecting on the meaning of the outcomes.

This thesis will be organised along the lines of the following subquestions.

a) *Which theoretical concepts are required for analysing impact of complex knowledge and innovation programmes in a complex dynamic system?* [Chapter Two]
b) *What framework is adequate for assessing the impact of complex knowledge and innovation programmes?* [Chapter Three]

c) *Which methods and techniques are required to carry out impact evaluation?* [Chapter Four]
d) *In which environment did the programmes in our case studies originate and how did this environment affect the way the programmes were organised?* [Chapters Five and Seven]
e) *What was the impact of the programmes on the (un)intended recipients of their knowledge and innovations?* [Chapters Six and Eight]
f) *Which lessons on the impact potential of knowledge and innovation programmes can be discovered from an examination of the two cases?* [Chapter Nine]

The concluding chapter, Chapter Ten, will relate the findings of this study to the three aims of this thesis, and discuss the implications for the scientific literature on impact evaluation. It will provide also an overall assessment of the impact of the knowledge and innovation programmes that were examined, and put forth a refined method for evaluating knowledge and innovation programmes in complex and dynamic systems based on the findings of this thesis.

Chapter 2

Assessing impact – an applied systemic programme evaluation

This chapter discusses evaluation literature and the implications of this literature for the impact evaluation of knowledge and innovation programmes. Section 2.1 will discuss the characteristics of a classic evaluation and the advantages and disadvantages of this approach. Section 2.2 will introduce characteristics of the knowledge and innovation environment and its implications for evaluating a KAIP's impact. Section 2.3 will continue this exploration by focusing on the characteristics of co-creating knowledge and innovation programmes. Section 2.4 discusses alternative evaluation approaches, paying particular attention to those used for learning and systemic assessment. Together, these sections answer the research question: *Which theoretical concepts are required for analysing impact of complex knowledge and innovation programmes in a complex dynamic system?*

2.1 Evaluation: what is it?

Evaluation is not the hallmark of a single discipline, but is applied in virtually all disciplines, professions and fields (Patton 2008: 14). Patton (2008: 5) writes that "to evaluate something means determining its merit, worth, value, or significance". His view is consistent with that of other evaluation authors, such as Scriven (1991) and Alkin (2011). Bressers & Hoogerwerf's definition of evaluation (1995: 19) corresponds as well, by stating that evaluation is "an assessment or, formulated otherwise, an appreciation or determination of value"[2]*. Assessing and determining the value of the evaluated subject is something that both these definitions have in common. Bressers & Hoogerwerf also discuss how this evaluation valuation entails a judgement on positive versus negative valuation (ibid.).

Evaluation in the social sciences often concerns evaluation of (policy) programmes (Rossi et al. 2004; Stufflebeam 2004; Stufflebeam et al. 2000; Weiss 1997). As these programmes are part of the complex context discussed in the previous chapter these programmes are complex wholes of different actors. As a result of this, virtually all evaluation scholars acknowledge that evaluation is a matter of observations and perceptions (Bressers & Hoogerwerf 1995: 21). While the evaluator observes intensively, he remains aware that truth is as it is perceived, and does not exist outside of subjective observations and perceptions (Flood 1999). Some evaluation researchers attempt to take this into account by making the evaluation process as objective and transparent as possible. They base their evaluations on measuring the achievement of predefined, tangible, objectives (see for instance, Hoogerwerf 1983: 18). This is the classical approach to evaluation that has seen several decades of wide adoption. The main advantages of this approach are that it allows for an orderly process of evaluation, that it focuses on visible indicators of policy effective-

2 * Translation from Dutch by author of this thesis.

ness and that it allows for the repeated assessment of the same success indicators over time to demonstrate the level of progress.

However, the classic evaluation approach also has severe disadvantages, the most serious of which is that it assumes traceable causality. Information and causality may not always be present in such a way that an evaluation can use it in evaluating programmes in complex dynamic systems (see Koppenjan & Klijn 2004: 120 and Noordegraaf & Abma 2003: 854 on causality in complex systems).The complexity of the patterns makes it almost impossible to attribute particular changes to particular feedback loops caused by particular agents (Gerrits 2008: 37). Few systems work in a strictly linear fashion (Byrne 1998: 19) and therefore the evaluation of simple, linear causal patterns of impact is often irrelevant. More simply put, it is difficult to assign outcomes observed to the policy plan, as many other forces may have similarly impacted the outcome (see for instance, Pel & Teisman 2009: 3, 12; Mastop & Faludi 1993: 77-78).

Mintzberg and Waters discuss different types of decision making strategies and demonstrate how intended strategies are not always the same as the realised strategies, due to the interference of patterns and actions which occur despite or in absence of intentions (Mintzberg & Waters 1985: 257-258). Strategies are formed by environmental circumstances and bureaucratic momentum just as much as by deliberate decisions and ideas (Mintzberg 1978). Decision-making, is thus not a straightforward process. Especially in fields such as mobility and water management, there is a plurality of decision-making and steering organisations including travellers, entrepreneurs, and many more (Pel & Teisman 2009: 3). However, this complexity is not necessarily problematic, as creative and innovative actions and outcomes are more likely to stem from complex systems with both negative and positive feedback loops, than from stable, non-changing systems (Stacey 1995: 478). It does mean, however, that it is not possible to state with certainty that the success or failure of a policy plan or programme is the direct result of the actions of the evaluated actor, plan or programme.

This position on causality in evaluation is reflected in the work of several impact scholars.A group of authors studying 'doorwerking'[3] have explicitly stepped away from the idea that there is a simple linear causal relationship between the content of a policy plan and perceptible outcomes of it after time (Mastop & Faludi 1993: 72). Mastop and Faludi in particular, made a plea for impact evaluations to include attention to communication processes, particularly the interpretations of participating actors. These interpretations and communications lead to effects that are not always straightforward (ibid.: 74, 77).The authors note that their approach corresponds also with Barrett and Fudge's idea of 'per-

3 A Dutch word for impact, although it has a slightly different connotation – it refers to a more active process than the English word 'impact': from the initiating and development phases towards the adoption and application.

formance' differing from 'conformance'. Performance, in their view refers to the workings or the effects of a plan, while conformance refers to the level of agreement between the plan and its ultimate result (Mastop & Faludi 1993: 79; Barrett & Fudge 1981; Williams 1971;Anthony 1965). Performance therefore rather concerns what the plan 'does': whether it is used and appreciated. The causality problem is acknowledged by classic evaluation scholars (see for instance Hoogerwerf 1983: 19). However, it continues to play a role in classic evaluations that focus on goal-reaching.

Another problem with classical evaluation methods is that they do not take into account the fact that impact can assume many different patterns. One example of this is found in the study of isomorphism, which is used in institutional theory to address different patterns of diffusion of new organisational routines (Boons et al. 2000: 31).The establishment of new routines can occur through intentional mechanisms. For example, in the case of coercive isomorphism, it occurs through top-down steering, while in the case of normative isomorphism, it occurs through processes of professionalisation. However, new routines can also be established through more emergent mechanisms. These include competitive isomorphism which arises from the competition between firms, and mimetic isomorphism which occurs because of uncertainty and the resulting desire to homogenise (ibid.: 32-33). Any of these four patterns can occur in the context of a KAIP (see for instance Bouma & Bressers 2008 for an application).

Another categorisation of potential patterns can be found in the work of impact scholars Bekkers et al. (2004: 24-25), who identify four distinct types of impact by examining outcomes after policy advice is offered by advisory councils.The first form of impact they identified is instrumental impact, in which the receipt of advice leads directly to a related change in the individual's or organisation's behaviour. This process corresponds largely with the classical view of policy effectiveness and impact. The second form of impact is conceptual impact, in which the receipt of advice leads to a change in knowledge, beliefs or causal reasoning. The third form, agenda-setting impact, occurs when the receipt of advice leads to a new topic or policy theme becoming the subject of societal or political debate. The fourth form is the political-strategic form of impact which occurs when the advice is used to strengthen the power position of one or more players in the service of their political goals.

Impact is therefore not a straightforward process that can be measured with a simple or linear evaluation approach.Along with the problems listed above, it is important to note also that the programme's objectives may not always be clear or well-defined at the start. While policy plans are often seen as to have more clearly specified goals from the start, this may not always be the case (see Teisman 2000: 947). Further, the impact of policy or programmes may not always directly visible, especially if evaluated within a limited time frame. Impact takes time, and many years may pass before outcomes come to full bloom (Rogers 2003;Valente 1995: 2; Hall 2004: 2; Rosenberg 1976). Other prominent disadvantages of the

classic evaluation method are that it is rather static in its focus on pre-set objectives, and that it focuses on aspects of the system instead of on the multiple relations in the entire system that influence development. The method leads evaluators to ignore the complexity of the system both in the fact that it involves multiple actors, and in that it involves the interaction between social and physical systems. A final disadvantage of the classic evaluation approach is that it tends to focus overwhelmingly on evaluating success or failure, and does not adequately incorporate a focus on learning development which would increase the chances of future success.

The classic evaluation approach is thus inadequate in assessing complex programmes of knowledge and innovation with often intangible and continuously evolving objectives. A better approach would be one that takes a *systemic perspective* on the evaluation and the evaluated programmes (Wadsworth 2001: 48), and that recognises that the programmes are intertwined with their environment and with their potential recipients. Developments in one system (whether physical, social or network) influence developments in the other systems. The physical system concerns the natural environment in all its facets: for instance nature, water, infrastructure, urban and rural areas (see for instance Levin 1998; Folke et al. 2005 on complex adaptive physical systems and their connections with social systems). The social system consists of the actors and their interactions in that physical system. The social system is made up of businesses, governmental agencies, scientists, inhabitants, interest groups, and many other individuals and organisations. The third system component is the network directly involved in the KAIPs, and the interactions between the actors, including the relational dynamics and perceptions. The result is a *nested structure of physical, social and network systems*.

Second, this new evaluation approach needs to stimulate learning in order to increase the potential of success in the knowledge and innovation programme (see Edelenbos & Van Buuren 2005; Van der Knaap 1995). Learning can occur in several ways (cognitive, strategic, institutional), each of which can greatly affect the chances of success and failure in an organisation (Koppenjan & Klijn 2004: 125). Team learning and shared learning is a fundamental component of 'groupware', or network thinking (Agranoff & McGuire 2001: 303) which allows participants both to share basic knowledge as well as to develop new ways of thinking (Innes & Booher, in: Agranoff & McGuire 2001: 303) that stimulate innovation and innovative knowledge development. Learning is also related to systemic thinking (see Senge's work on learning organisations). This capability allows organisations to assess their problems in a complete and thorough manner, instead of fixing many smaller problems without understanding the bigger picture (Senge 1992). Senge highlights five important characteristics of organisations which are able to identify and cope with problems as a whole, rather than in separate aspects: system thinking; personal mastery; awareness of mental models; development of shared visions; and team learning (ibid.: 12-15).

Third, this evaluation should take *interaction* as an important point of departure. It is through interactions that connections are made between programmes and their environments. This position is reflected in literature on innovation diffusion. Rogers defines diffusion as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers 2003: 5). Interaction is crucial for diffusion, and therefore should be included in the evaluation. He further sees diffusion as a kind of social change affecting both the structure and function of a social system (ibid.: 6). Although interaction is crucial, Teisman and Klijn (2002) acknowledge that complexity arises out of the such interaction (see also Teisman 2008: 345; Griffin & Stacey 2005: 4; Anderson 1999: 218) and the negotiation processes between different actors, who all bring their own perceptions and strategies (Teisman & Klijn 2002: 191; Noordegraaf & Abma 2003: 861). This makes decision-making and knowledge development context-dependant (Van Hulst 2008: 37), but interaction does foster openness and contact between the programme and its environment.

2.2 Evaluating with a systemic perspective

Following from the perspective outlined above, this study adopts a systemic perspective, in that it assumes that the system cannot be known simply by its parts, but that it must be studied holistically (Leezenberg & De Vries 2001: 246). "*Researchers and evaluators analyzing qualitative data strive to understand a phenomenon or program as a whole. This means that a description and interpretation of a person's social environment, or an organization's external context, is essential for overall understanding of what has been observed during fieldwork or said in an interview*" (Patton 2002: 59).

The study is premised also on the ideas of *critical realism*, in which it is assumed that reality exists independent of the knowing subject (Buijs et al. 2009: 42). One recognises the difficulties in generalisation of research outcomes to a large set of cases, without concluding there is no generalisation at all possible (ibid.). The reason for this is the assumption that causality is local in time and place: hence the relations and influences between variables in one case can be different in other cases. Reality is not a fixed setting, but rather it is how actors perceive their circumstances to be; how they interpret the situation around them. This interpretation is influenced by their values, perceptions, beliefs and norms (ibid.).

This systemic perspective is inspired by the complex nature of the environment in which the knowledge and innovation programmes operate and evolve. This complexity is brought about by two main trends (Teisman 2000: 937). First, globalisation (Held 2000) and the increased uncertainty about global systems, such as the global economy is an important cause of complexity. Uncertainties as a whole play an important role in the existence of complexity and wicked problems (Koppenjan & Klijn 2004: 6). And second, the increase in

power-sharing in 'network societies' (Koppenjan & Klijn 2004: 3) creates complexity. On a more tangible, perhaps regional, level, complexity is caused by economic and quality issues, the dispersion of authority, and other region- or area-specific characteristics (Van der Bol 2010: 51).

Central to complex systems are erratic, non-causal and sometimes unpredictable developments (Teisman 2005: 27). This means that a large degree of uncertainty exists in complex systems (ibid.: 30). Uncertainty is often addressed by increasing interaction. This interaction is also necessary because in a complex system nobody is directly in charge (see for instance Crosby & Bryson 2005). Interaction can be discussed in terms of feedback: the agents respond to each other, thereby creating an ever developing interaction, created by reactions of agents on each other (Gerrits 2008: 17). Through these interactions and reactions on each other changes are set in motion. The feedback loops between elements can be both positive and negative. In a negative feedback patterns the effects on system change will be dampening and stabilising, whereas positive feedback consists of loops that spur change and allow small actions to lead to larger consequences (ibid.). These system changes result from complicated patterns of reciprocal selection, causing a mutual process between elements of that system (Gerrits 2008: 36-37).

Interaction processes can lead to a certain 'lost in translation' effect, where, despite cooperation, the outcomes are not always corresponding to the shared objective. Think, for instance, of the school game in which children sit in a circle and have to whisper a sentence in the ear of their neighbour, which the child then has to pass on to its neighbour. When the circle is completed, and the last child has to publicly state the sentence he received, it rarely is the same sentence as with which the game was started. Aside from this 'lost in translation effect' other processes can also influence complexity through interaction, for instance the desire to achieve (secret) objectives by actors, or the interest some actors may have in failure of the entire process. Think back of the school game: was there not always a child in your group who said a different sentence on purpose to mess up the entire game? This is just one of the ways complexity is introduced by interaction. On the other hand, interaction might be the key in dealing with complexity, because wicked problems cannot be solved by individual actors (Koppenjan & Klijn 2004: 9). Cooperation and co-creation among actors, such as the case in knowledge and innovation programmes, can therefore be seen as a means of structuring and stimulating this desired interaction.

2.3 The nature of the knowledge and innovation programmes

Much like in today's policymaking, knowledge and innovation development is a multi-actor process. Policymaking has become more and more multi-actor, and less top-down and governmental over the last decades. This development has been framed as the development

from government to governance (Kooiman 1993, 2003; Klijn & Koppenjan 2000). Governance is the interaction of public and private actors aimed at solving societal problems or creating societal opportunities in an institutional context and with a normative foundation (summarised from Kooiman 2003: 4). The advantage of such an arrangement established through the KAIPs is that when many relevant and committed actors are involved, the support, quality and legitimacy of the outcomes of network actions increases (Van Schie 2010: 33; Termeer 2009a: 300), as does its organisational adaptivity (Teisman 2008: 358). This adaptivity is useful because it helps the KAIP to adapt to its environment, and thus increase its success potential.

A good way to begin to develop an understanding of the KAIPs is to understand the key stakeholders who both structure and stimulate interactions. However, it is not always easy to tell who is 'inside the programme' and 'who is outside' (Koliba et al. 2011: 169) as stakeholders are mutually recognised rather than formally appointed or announced (Kenis & Schneider 1991: 42). A KAIP is therefore not an entity with set boundaries outside of an individual's viewpoint, and maintaining a systemic and holistic perspective is therefore crucially important.

The work of Ashmos et al. sheds further light on the way KAIPs function by differentiating between complexity reducing organisations and complexity absorbing organisations (2000: 577). A complexity absorbing organisation has 'multiple and conflicting goals, a variety of strategic priorities, increased connectivity among people, as well as structural variety intended to maximise the flow of information and meaning in the organisation' (ibid.). A complexity reducing organisation, on the other hand, places 'a higher value on control, predictability, and the pursuit of equilibrium even in the midst of complexity, chaos and change' (ibid.: 578). The complexity absorbing organisation performs better in a complex environment than the complexity reducing organisation, because, instead of fighting the complexity, they integrate it into their system. In doing so they also incorporate all the potential benefits of complexity and multi-actor representation, such as increased support for decisions, improved quality of decisions and increased access to resources (ibid.: 590). Summarised, the fittest parties in the game manage to combine power and strength with adaptivity and openness to context (Teisman 2008: 344) provided they have the possibility to be so adaptive (see Hrebiniak & Joyce 1985).

The inclusion of complexity into the very nature of the network corresponds with ideas on tripartite organisations, also known as *triple helix organisations* (Etzkowitz 2003). Triple helix, in Etzkowitz's definition, concerns university-industry-government interactions. In such organisations, the interaction amongst institutional spheres functions as a way to initiate a self-sustaining innovation dynamic (Etzkowitz 2003: 300). Actors often assume new roles and activities as an effect of this interaction. Universities increasingly act as entrepreneurs, working on the employment of their developed knowledge, while business actors engage in knowledge sharing and training activities. Last, governmental actors

serve as public venture capitalists, instead of just carrying out their regular activities of rule-making and upholding those rules (Etzkowitz 2008: 1; Etzkowitz 2003). Actors become increasingly intertwined as they carry out tasks that originally belonged to one of the other players while maintaining their own primary functions (Etzkowitz 2008: 1).

Triple helix research has several strands, with the most notable differentiation being that between qualitative triple helix research (for instance Etzkowitz 2003; 2008) and the more quantitative approach (for instance Leydesdorff & Sun 2009). The latter approach attempts to map triple helix networks using advanced computer tools. The former approach, which this thesis will follow, discerns four phases of the triple helix: 1. internal transformation in each of the helices such that they start playing a new role in society, 2. the growth of the influence of one helix upon another, 3. the creation of a new overlay of trilateral networks and organisations from the interaction among the three helices, and 4. a recursive effect of triple helix networks both on the spirals from which they emerged and on the larger society (Etzkowitz 2003: 301).

The ideas of the complexity absorbing organisations and triple helix organisations are just two of many strands in the recent scientific literature on public administration. 'Governance networks' and 'policy networks' (see for instance Kickert et al.1997; Klijn & Skelcher 2007; Sørensen & Torfing 2007; Klijn & Koppenjan 2000) are also frequently discussed. Such networks can be defined as "a set of relatively stable relationships which are of non-hierarchical and interdependent nature linking a variety of actors, who share common interests with regard to a policy and who exchange resources to pursue these shared interests acknowledging that co-operation is the best way to achieve common goals." (Börzel 1998: 254; see also Kickert et al. 1997: 6).

In these networks, actors have a shared objective, but they also have their own perceptions, norms and interests, which creates heterogeneity (Börzel 1998: 258). The existence of non-hierarchical relationships between these actors further means that much of the network's interaction is informal in nature (Börzel 1998: 260). Participation and cooperation in these networks is voluntarily, which means that trust is one of the most important assets (Rhodes 1996: 652; Börzel 1998: 262, 264; Bovaird 2005: 223-224; Sørensen & Torfing 2005: 198; Koppenjan & Klijn 2004: 82-87). Trust is a means of coping with complexity, as not everything can be controlled in complex decision-making (Klijn et al. 2010b).

The insights presented in this section indicate that interaction is of vital importance to the evaluation of any knowledge and innovation programme. The evaluation has to be dynamic enough to incorporate the evolving nature of these interactions, and it has to incorporate the complexity of the nested structure of physical, social and network systems.

2.4 Developments in the evaluation literature: from classical to applied systemic methods of programme evaluation

There is a need for a more interactive approach to evaluation that incorporates the features outlined above, and the classical method does not lend itself to such a perspective. For instance, Lulofs (1995: 71) writes about the assessment of goal achievement, based on more than primarily formal objectives. "It goes too far to normatively state that establishing the achievement of objectives always needs to occur at the hand of official policy objectives. (…) In the first place it is often not *possible* to establish objective achievement at the hand of official policy objectives from the policy programme. (…) Aside from that there are arguments that make it *undesirable* to choose official policy objectives as evaluation criteria without hesitation.[4]" (Lulofs 1995: 71).

Lulofs proposes to apply the 'stakeholder approach' (ibid.: 72). By involving stakeholders into the evaluation, the usage of the evaluation results is likely to increase, and stakeholders are likely to better accept and support the outcomes of the evaluation (Van Schie 2010: 38; Van der Meer & Edelenbos 2006: 211). Lulofs positions Guba and Lincoln (1989) as proponents of this approach with their 'fourth generation evaluation'. This approach sees evaluation as a joint and collaborative process, in which the evaluator and the evaluated work together to execute the evaluation. It is a learning process, which occurs in a continuous and recursive way, without a 'truth claim' (Guba and Lincoln 1989: 9; 19). In keeping with the systemic perspective, the outcomes of this evaluation are unpredictable, just like the evaluation process itself (ibid.: 255). Flood argues that truly systemic thinking should acknowledge the unknown aspects of the world because we are part of that world – our knowing determines our understanding of wholes (Flood 1999: 82-83).

This interactive evaluation is consistent with ideas on responsive and participatory (programme) evaluations (see for instance Cousins & Whitmore 1998; Abma 1996; Stake 1983). In responsive evaluations, the evaluated objects and their stakeholders are involved as part of the evaluation process (Edelenbos & Van Buuren 2005: 593). These actors could include just participants for the evaluated object, but could also include a broader range of actors, such as related societal organisations and individuals (ibid.: 594). Corresponding with later work from Wadsworth (2001) these responsive and participative evaluation approaches believed that evaluation outcomes and the actions of the evaluated object are what give meaning to the world the object participates in; i.e. evaluation becomes a quest for finding agreements between perceptions and beliefs, rather than a quest for a knowable truth (based on Edelenbos & Van Buuren 2005: 594). Thus, this interactive evaluation approach can be a source of feedback for the improvement, development and success of the evaluated object. In this sense, it serves as what other authors have described as an 'early

4 Translation from Dutch by author of this thesis

warning evaluation' (Gooren 1985: 188) which is explicitly aimed at providing evaluation results in early stages of policy implementation to make sure corrections can take place in the implementation process if necessary. Because the evaluation can be carried out during the execution of a programme (ex durante), it has the potential of steering policy implementation or programme execution. This has prompted other authors to discuss similar evaluation types as 'learning evaluations', in which the ability and competence to learn play an important role in the evaluation, especially when this evaluation occurs in a complex multi-actor setting (Van der Meer & Edelenbos 2006: 203). This evaluation approach "is not so much an effort to achieve an objective that was set previously, according to a set track, but it is pursued from an open attitude, departing from general research goals and being creative with insecurity and unpredictability in a continuously changing environment (concerning both the existing and desired situation)" (Edelenbos & Van Buuren 2005: 605).

The dynamics of a learning-oriented ex durante evaluation diverge from assessments of pre-set objectives. In this sense it corresponds more closely again with ideas on network governance (Klijn & Koppenjan 2000: 137). This evaluation does not look at the achievement of predetermined objectives to decide whether a policy or a programme can be considered successful. Instead it researches whether the policy or programme has demonstrated the ability to learn along the way, and the effects this learning process have had on the outcomes. The evaluation is carried out by including stakeholders into the evaluation process, and the satisfaction of these stakeholders with the process is important in assessing programme success (Teisman 2000: 947).

This thesis attempts to translate the ideas discussed above into an assessment instrument applicable to KAIPs from the joint financing arrangement. The conceptual framework for this method should accept and incorporate complexity in dynamic systems by including learning, flexibility and reflexivity. It needs these elements to allow for the new objectives and opportunities that will present themselves in the dynamic system in a process of continuous development (see for instance Buijs et al. 2009: 51-52; Edelenbos et al. 2009a: 173; Teisman 2008: 357). Building on the abovementioned evaluation perspectives (most notably the learning evaluation), the resulting evaluation approach will be called an *applied systemic programme evaluation* (ASPE), which will be carried out to increase programme learning. The rest of this thesis will discuss this evaluation approach. The next chapter will use the insights of this Chapter Two to construct an evaluation framework with dynamic variables and indicators for the application to the two selected knowledge and innovation programmes.

Chapter 3

Towards a framework for impact evaluation

This chapter will develop a framework for assessing the impact of knowledge and innovation programmes. The research question for this chapter is: *What framework is adequate for assessing the impact of complex knowledge and innovation programmes?* In the first section (3.1), a framework for impact evaluation is constructed. In the second section (3.2), the core concepts will be explained and conceptualised. Variables are operationalised into a number of core indicators that will allow application of the framework onto two selected cases (section 3.3). The last section of this chapter (section 3.4) provides reflection and sets conditions for lesson drawing in later chapters.

3.1 A framework for impact evaluation in complex dynamic systems

Assessing the impact of knowledge and innovation programmes in an *applied systemic programme evaluation* implies a strong focus on interaction and learning. Interaction within the programme in the co-creation process, but also interaction between programme and environment is vital here. Programme and environment have to be open to each other, capable of working together and adopting each other's ideas, willing to accept and change these ideas, and active in applying these ideas. In other words: programme and environment need to be receptive to each other.

Several years ago Jeffrey and Seaton (2004) constructed a *receptivity framework*, based on work of other scholars in the field of receptivity. They discussed receptivity as a concept in evaluating water policy instruments. In this research they wrote about the implied importance of learning in the concept of receptivity (2004: 282-283).

"Another important feature of the Receptivity model is the implied importance of learning. One of the fundamental tenets of this paper is that it is not possible to properly understand the response and behaviour of people to an artefact, situation or policy instrument without also understanding their perceptions, attitudes and the agendas for change that are relevant to them."

The concept of receptivity thus provides space for focussing on more tacit aspects of policy instrument acceptation and implementation. Learning is incorporated in this concept (see also Gilbert & Cordey-Hayes 1996), as it can be created through (receptivity-increasing) interaction (see for instance Sabatier 1988). Learning also requires receptivity itself, for instance by empowering participating actors (see Avelino 2009). The receptivity model is developed to create results on policy instrument effectiveness. The clear assessment component in this objective of the receptivity model demonstrates how receptivity and impact go hand in hand.

It appears to be the case that receptivity can function as an intervening variable in impact evaluation. The word 'intervening variable' here refers to a variable which affects the evaluation's dependent variable (KAIP impact) significantly, and therefore becomes the

core process through which the dependent variable (impact) is realised. By studying this intervening process we can evaluate the impact of KAIPs, without the disadvantages of looking at impact directly. By focussing on receptivity space will be created for reflexivity and flexibility and a focus on learning and interaction. The outcomes of this analysis will say much about impact, as the receptivity towards innovations and knowledge is an important determinant of innovation adoption (Rogers 2003; Jeffrey & Seaton 2004). Jeffrey and Seaton discuss the receptivity of receivers in their model of water policy instrument acceptation and implementation. This means that the potential *receivers* should be aware of the instrument, should accept the instrument as beneficial for themselves, should be able to learn about the instrument, and ultimately should adopt the instrument and apply it in their day-to-day practices (2004: 282).

However, although this receiver receptivity is very important, one could argue that the *sender* of the instrument should be receptive towards the needs, desires, and possibilities of the receivers as well (see for instance Edelenbos & Van Buuren 2005 on adaptive capacity). Without receptivity of senders towards receivers they might not meet the requirements receivers have, which might result in little adoption (Wadsworth 2001: 56). Furthermore, receptivity is more than the sum of sender and receiver receptivity; the real receptivity lies in their interrelation, their interface (see also O'Toole & Meier 1999: 508). Receptivity research (when designed to result in outcomes on impact) should incorporate both senders and receivers and their interface into the analysis.

Hence, two axioms will form the backbone of this thesis' conceptual framework:

1. Receptivity is an adequate intervening variable for impact evaluation
2. Receptivity research should incorporate both senders and receivers of innovations and knowledge.

When senders and receivers become more and more one, when an interface starts to grow between them, impact will be realised. To assess the chances of interface creation this thesis will assess the receptivity of senders and receivers towards each other. The figure below demonstrates the resulting conceptual framework for an applied systemic programme evaluation.

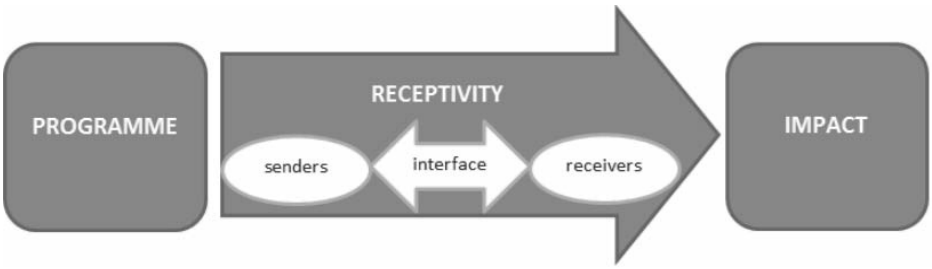

Figure 3.1: Conceptual framework for applied systemic programme evaluation

Three primary variables make up this framework: KAIP (programme), impact and receptivity.The three core variables are each dynamic in nature and do not represent a static point in time. Rather, they continually influence each other, either stimulating or hampering conditions that impact the outcomes of the KAIPs.This impact develops as *time* progresses (see also Teisman 2008: 342 on the importance of including the time dimension). Furthermore, this process of receptivity on programmes and their impact in continuously influenced by the *context* in which they operate (see Teisman 2008: 343). Consistent with the claim that today's assessments and evaluations of complex networks such as the KAIPs can no longer be simple in nature, this conceptual framework therefore proposes a dynamic assessment of the impact process of KAIPs.

3.2 Exploring the framework

This section will start with a definition of impact for this thesis, and continue with an exploration of literature on receptivity and the meaning of this for this thesis.

3.2.1 Conceptualising impact

Impact has been discussed as a process that occurs in a complex environment, which has an effect on how impact should be assessed. Chapter Two discussed the Dutch concept 'doorwerking', a concept that focuses on interaction and active processes in impact. Hence, impact becomes more than simple an outcome or an effect at the end of the entire process, and evolves towards a concept in which the entire process from knowledge and innovation development towards knowledge and innovation application and usage is concerned.This leads to the following definition of impact, based on the discussion of impact in Chapter Two. *Impact is an evaluation criterion of the KAIPs, where effectiveness is assessed under the assumption that impact is a social process, hence non-linear, and impact may therefore occur in both planned and non-planned ways, at targeted and non-targeted stakeholders. Impact has occurred when a degree, any degree, of change at the stakeholders is perceived to exist by both KAIPs themselves as well as the stakeholders, due to the actions of the KAIPs.*

Impact thus is, just like other processes in complex systems, non-linear and unpredictable. It can be both intentional and emergent (Boons et al. 2000: 31). No single actor's actions are likely to lead to a fixed intended effect. Rather, the system functions as a whole: a dense network of actors, relations, and connections, which each have their influence on the potential outcomes.

3.2.2 Tracing the origins of receptivity

To assess this type of impact receptivity was proposed as an intervening variable. *Receptivity as a concept encompasses the complexity of the system well, leaves room for flexibility and reflexivity, and has an explicit focus on interaction and learning*. In the social and environmental sciences receptivity is a relatively unexplored phenomenon. In medical, psychological and economic studies receptivity is a more common concept, and it has also been explored in the field of technology studies. Jeffrey & Seaton (2004) apply it from this latter field to the social and environmental sciences, in their application to consumers' receptivity to water policy instruments.

Their research on receptivity has a background in studies of technology transfer. The receptivity model as Jeffrey and Seaton describe it stems from a publication by Seaton and Cordey-Hayes (1993) in which they proposed receptivity as a third component in the research on limitations of technology transfer. The other two components were accessibility and mobility. The linkage this publication made with technology transfer closely related to the approach Rogers has on innovation adoption (Rogers 2003). Seaton and Cordey-Hayes discuss receptivity as "an organisation's overall ability to be aware of, to identify, and to take effective advantage of technology" (1993: 48). This publication led to a series of other publications on receptivity. In the same year Trott wrote a PhD thesis on technology transfer, in which he proposed a "4A model as a framework for inward technology transfer ('receptivity')" (1993: 27). In a later publication (1995) Trott et al. summarise this model.

Trott et al. (1995: 27-28) formulate *four stages in technology transfer*.

1. Awareness: search and scan for information which is new to the organisation
2. Association: recognise the potential benefit of this information by associating it with internal organisational needs and capabilities
3. Assimilation: communicate these to and assimilate them within the organisation
4. Application: apply them for competitive advantage

This conceptual tool should enable the study of inward technology transfer. Although many elements of it will inspire this thesis, there were also several major differences. First of all, the focus was on internal organisational changes due to technology transfer (inward process), instead of societal changes due to knowledge and innovation transfer (outward process). Second, it focussed on changes at the recipient of technology, whereas this thesis includes receptivity of the senders as well.

Gilbert and Cordey-Hayes (1996) further developed receptivity towards the ideas and concepts of this thesis. They focussed on both technology literature and organisation literature, in order to incorporate change and knowledge management in the model. They discuss the characteristics learning organisations need to possess in order to be successful. The learning organisation needs to be adaptive and able to respond to both the internal and external environment, and be open and able to communicate (ibid.: 302). The skills mentioned are necessary for handling uncertainty, risk and change (Gilbert & Cordey-Hayes

1996: 302), and are therefore crucial for senders and receivers in a complex society. Still, the authors look primarily at inward change (the effect of innovations on the receiving organisation).

The publication by Jeffrey and Seaton changes the focus to outward change. Jeffrey and Seaton define receptivity as: "the extent to which there exists not only an association (or disposition) but also an ability (or capability) in different constituencies (individuals, communities, organisations, agencies, etc.) to absorb, accept, and utilise innovation options" (Jeffrey and Seaton 2004: 281-282). They use the phases developed by Trott (1993) in a slightly revised form. These phases do not necessarily occur linearly. The first phase is *awareness*. Here, 'knowing' is central. The second phase is *association*, where 'wanting' is essential. The third phase is *acquisition*, which revolves around 'being able to'. Fourth, and last, Jeffrey and Seaton define *application*, which is about 'doing' (Jeffrey & Seaton 2004: 282; presentation of project Transities DSW April 2009).

3.2.3 Conceptualising receptivity

Based on the receptivity model of Jeffrey and Seaton (2004), it can be concluded that four aspects need to be realised in order to successfully achieve impact. The receiver needs to know about the innovation, needs to desire the innovation, needs to be able to implement the innovation and last, needs to actually go ahead and do it. Senders need to be aware of the needs and desires of receivers, they need to be willing to adapt to these needs and desires, they need to be able to construct their knowledge and innovation in such a way that they meet receiver requirements, and they need to produce and diffuse applicable knowledge and innovations. Through these phases receptivity is created. Learning processes are required to create the receptivity needed for impact. In de awareness receptivity phase learning concerns the possibilities and demands of programme and environment. In the association phase learning concerns the positive effects for programme or environment of becoming receptive towards each other. In the acquisition phase the learning processes concern lessons about the barriers and chances and the road through these. In the application phase learning concerns the practical side of adopting knowledge and innovations and what is need to come to application and usage.

The initial receptivity, needed for entering these phases, often arises out of a shared sense of urgency or a shared objective. This can, for instance, concern the shared desire to create water safety for future generations, or the shared objective of maintaining traffic flow and possibilities for the future without congestion. This shared problem definition or shared objective creates a process of opening up towards potential allies in these problems or objectives, and seek cooperation and shared learning processes. These ideas are in line with scientific strands such as transition management (see for instance Rotmans 2006), in which shared problem definitions and ideas about the future are required for building arenas of actors in which these shared goals are pursued.

For a complete shared receptivity both senders and receivers need to demonstrate *awareness*, *association*, *acquisition* and *application*, albeit sometimes in different ways and for different reasons. Application is a difficult variable for the assessment of sender and receiver receptivity, in the case of the KAIPs, as application sometimes takes many years. This thesis will therefore look at 'application perceptions' rather than factual application examples. The operational definition adopted in this thesis for receptivity is as follows: "*Receptivity concerns sender-receiver interaction on awareness of innovations and needs, association of these innovations and needs, the ability to incorporate these innovations and needs, and the application of the innovations and needs. Complete receptivity is realised when these phases have all been fulfilled. Partial realisation of phases leads to lesser but not non-existent degrees of receptivity.*"

Based on Figure 3.1 an expanded conceptual framework for impact evaluation can be constructed. Figure 3.2 below shows this assessment conceptual framework.

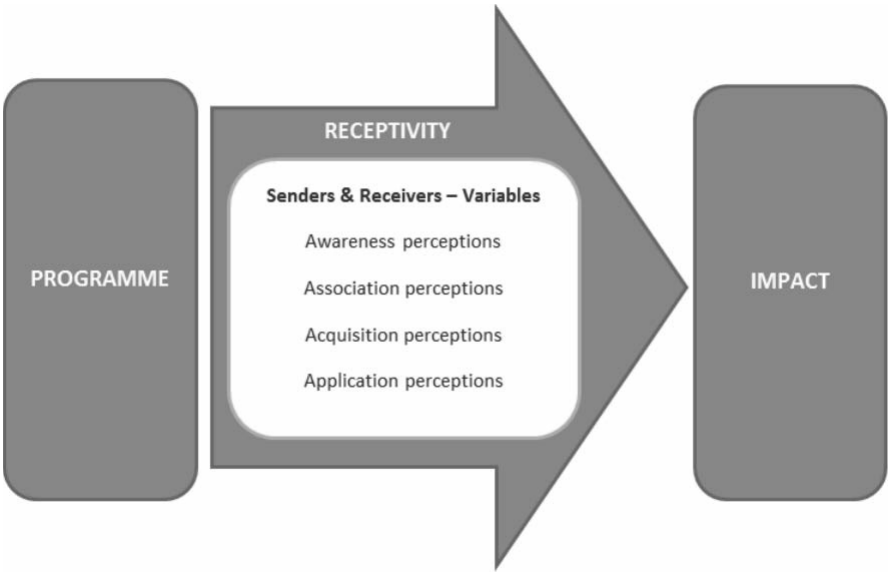

Figure 3.2: Assessment variables for applied systemic programme evaluation

3.3 Exploring the framework: variables and indicators

This section will discuss the variables from the ASPE framework, in the light of and relevance for this thesis' research. This will be the first step towards operationalisation of the variables. Indicators are developed based on this discussion, which are presented in tables

at the end of each subsection. Remember that in all cases these indicators refer to the perceptions of either senders or receivers on that particular matter.

3.3.1 Awareness perceptions

Awareness perceptions of senders

Senders will be required to demonstrate awareness about the system they operate in. During the initiation and construction of a knowledge and innovation programme the senders will have considered their options in the environment in which they work. The desire to realise changes and innovations usually stems from a lack of satisfaction with the environment, or a compelling future perspective that beckons senders to work ahead towards this. This awareness of senders of their environment and their potentials creates opinions on the *satisfaction with their role in the societal context*. Each participating actor has his or her own problem perceptions, creating diverging and sometimes conflicting ideas on what constitutes the problem (Koppenjan & Klijn 2004: 31). A certain amount of support for these changes will thus be required (Rotmans 2006: 48). This support base is necessary to realise agreement between senders and receivers on their current situation and the need for change. A *fit between problem perspectives* of senders and receivers will thus need to be created (see also Teisman 2000; Hafkamp & Geerlings 2002: 219). Many urgent problems exist in the complex systems of today's society, as previous sections of this thesis shortly discussed. Urgent problems, or wicked problems (Rittel & Webber 1973; Koliba et al. 2011), are an important incentive for societal change, since standard approaches to known practices no longer suffice (Van der Bol 2010: 77). Any initiation of innovation and change will thus require adequate formulations of problem perceptions (Rotmans 2006: 56). Furthermore, not only the to-be-changed situation needs to be discussed between stakeholders. The *future images* require attention in the early awareness phases of a knowledge and innovation programme as well. In such a future vision (Rotmans 2006; Hafkamp 2006) stakeholders need to become aware of each other's objectives and reach at least a certain degree of agreement between these objectives. Furthermore, they need to reach agreement of the directions of the solutions they work on (Teisman 2000).

Awareness perceptions of receivers

Because the senders are in this situation the initiators of the proposed innovations and changes their task encompasses the facilitation of agreement between senders and receivers. The receivers themselves, however, equally need to demonstrate openness towards the basic principles of the senders. Because the organisation type of the senders is not standard they need to be aware of and open towards the idea of the community of practice, triple helix organisation, governance network, or any other term directed at the sometimes unorthodox organisation structure of the KAIPs. Receivers need to believe in the *use and necessity of the programmes* to create some awareness receptivity. Although new organisa-

tion forms are growing in frequency and acceptation (see for instance Wenger & Snyder 2000) receivers might not be open to the idea. Whether they are aware of and open to the programmes or not, receivers also need to demonstrate awareness of the urgent problems and therefore the *need for change*. The urgent problems thus need to be shared between senders and receivers. Senders will attribute names and concepts to the ideas they work on. The concepts they choose might influence the awareness of receivers of the knowledge and innovations. A certain degree of *added value of the concepts*, as perceived by the receivers, is thus required. When the receivers do perceive added value from the chosen concepts they might also value this *concept to be important in their own organisation*. In this phase the receivers have to be open to the ideas of the senders, and show first indications of acceptance of these ideas into their own organisation.

Table 3.1: Awareness perceptions indicators

AWARENESS PERCEPTIONS indicators	
Senders	**Receivers**
Satisfaction with own role in context	Use and necessity of programmes
Fit problem perspectives	Need for change
Future images	Added value of the concepts
	Importance of concept in organisation

3.3.2 Association perceptions

Association perceptions of senders

In the association phase senders will need to demonstrate the potential benefits of their ideas, innovations and knowledge. In order to do so they need to be open to critique from receivers and from (other) senders. The *presence of learning* is thus crucial in this phase, as it enables senders to increase receptivity to feedback and critiques. The importance of learning was already brought forward by Jeffrey and Seaton (2004: 282), and is reinforced by publications from organisation sciences, which connect learning closely to innovation (Brown & Duguid 1991) or to receptivity (Larsson et al. 1998). Learning appears to be of vital importance in processes of social change (see for instance Loorbach 2007: 70; Van Eijndhoven 2007: 32). When senders learn about the needs and desires of the stakeholders, however, they also have to incorporate the lessons learned in their work. Although in most cases of innovation and knowledge development it will be the case that a certain degree of disagreement will exist between senders and receivers, a *fit with official views* of for example governmental actors and businesses needs to be realised as much as possible. This 'cross-over of ideas' between senders and receivers needs to be a two-way street. This realisation of fit has to be developed between ideas, but also between methods. A *dissemination fit* will need to be realised between the chosen methods of the senders and the desired methods of the receivers. Senders will need to adapt their methods as much

as possible to relate as much as they can to the channels used by receivers. The chosen communication channels are one among four vital ingredients for successful innovation diffusion (Rogers 2003: 18). Senders will thus need to adapt their strategies and input facilitation in this phase; allowing receivers to insert their needs and desires into the innovation and knowledge development process.

Association perceptions of receivers

In order for receivers to see the benefits of the innovations and knowledge in development they need to *accept the importance of change for their sector*. The perceived importance of the changes enlarges the acceptation of risks and potential decrease in profits. To increase this acceptation a certain amount of perspective is required. 'Transition pathways' (Rotmans 2006), or strategies to connect today's actions to long-term societal changes, enable receivers to do this. When short-term actions are connected to long-term objectives a cognitive frame is developed that allows receivers to participate in such intangible processes (Loorbach 2007: 90). This does not mean that costs cannot become a hampering factor. The *cost-benefit consideration of change* is very important in making the benefits visible to receivers. Cost-benefit ratios in knowledge and innovation development for societal change processes are not just about money. It is important to include more tacit, social, matters into the analysis (Van Schie 2010; Rotmans 2006: 47). In order to increase the acceptation of receivers for the innovations and knowledge they need to be involved in this process of valuation of costs and benefits (Van Schie 2010: 12). Involved decision-makers will be more likely to value the *concepts important for themselves and other decision-makers*. Receivers thus need to see a need for changes and they need to be connected to the senders in their actions to tackle the problems in society to score well on receptivity in this phase.

Table 3.2: Association perceptions indicators

ASSOCIATION PERCEPTIONS indicators	
Senders	**Receivers**
Presence of learning	Importance of change for sector
Fit with official views	Cost-benefit consideration of change
Dissemination fit	Importance of concept for themselves

3.3.3 Acquisition perceptions

Acquisition perceptions of senders

In this phase senders will need to be able to connect to the receivers. In order to do this they need to have a diverse and strong network, which will provide them with the required input of the needs and desires of the receivers. The *diversity and strength of the connections* determine the chances receivers have at incorporating the values and ideas of receivers into

their innovation and knowledge. The idea of incorporating receivers, or stakeholders, into the development process is not new. It has been discussed as the formation of a 'transition arena' (Rotmans 2006; Loorbach 2007), 'co-production' (Van Schie 2010; Edelenbos et al. 2009b) and many more. Connecting between stakeholders is essential in an effective tap of new sources of knowledge (Teisman 2005: 55). In order to create these connections it is important no potentially hampering factors stand in the way of cooperation and if barriers arise senders are capable of dealing with these barriers. *Handling external conditions*, whether this is a setback in terms of financing, organization, content development, or anything else, is important in the ability of senders to connect. The way senders handle these conditions is strongly related to their *competencies* as project leaders and programme managers. Being able to understand the context you function in, being able to communicate, and being able to understand where your own position is are all crucial competencies for actors in complex systems (Teisman 2005: 139). A selection of skills and resources is thus required for senders to demonstrate a high degree of receptivity in this phase.

Acquisition perceptions of receivers

In order for receivers to be receptive in this phase they need to be able to adopt and implement the developed knowledge and innovations. In order for this to be possible the innovations must not diverge too much from their everyday business (although certain deviation is natural considering the nature of innovations and innovative knowledge). Receivers need to consider the *innovations to be realistic and feasible* in their environment. An often heard criticism of innovations in papers and online is that they are not realistic or impossible to implement, even if the innovations are technically (or factually) suitable for implementation. Receivers thus need to feel that they can implement it, which touches upon the desirability of innovations (Rogers 2003: 442). This will determine whether they *use the innovations*. Rogers calls this the decision stage and the implementation stage (2003: 177; 179). This usage does not have to be extensive or definite (then it would concern the application phase), but can involve first indications of usage, such as testing and experimenting. In this phase the interaction between senders and receivers needs to become visible; a certain degree of *influence of the senders on the receivers* is thus required. This will predict the chance of the receivers becoming able to adopt the innovations and knowledge.

Table 3.3: Acquisition perceptions indicators

ACQUISITION PERCEPTIONS indicators	
Senders	**Receivers**
Diversity and strength connections	Realism and feasibility of innovations
Handling external conditions	Usage of knowledge and innovations
Competencies	Influence of senders on receivers

3.3.4 Application perceptions

Application perceptions of senders

As substantial and definite application may take many more years to be realised this variable will discuss the perceptions at the senders of their application potential. This can be assessed by examining the *position the programme attributes to itself* in society. Do they view themselves as a central hub or a remote point of the network? And do their project leaders perceive their *projects as having impact potential*? And do programme managers and project leaders view the overarching entity of the *programme as having impact potential*?

Application perceptions of receivers

Whether the senders attribute impact potential to themselves may not tell us everything. After all, they would be judging themselves. When asking receivers about the application chances of the senders the following questions might be relevant. Is the sender considered *notorious* in the field? Is the sender *appreciated* by the field? Is the receiver *acquainted with similar types of innovation and knowledge development senders*? Is the receiver *familiar* with the programmes? Does he also have *contact* with them? Do the senders have any *influence* at all according to the receivers? And how do receivers *estimate the familiarity of their colleague-receivers in the field* with the senders?

Table 3.4: Application perceptions indicators

APPLICATION PERCEPTIONS indicators	
Senders	**Receivers**
Estimated positioning of programme	Notoriety of programme
Estimated impact potential of projects	Appreciation of programme
Estimated impact potential of programme	Acquaintance with KAIPs in general
	Familiarity with the cases
	Contact with the cases
	Influence of the cases
	Familiarity of others with the cases

3.4 Connecting the dots: reflection and evaluation conditions

The cases of this thesis will be evaluated based on the ASPE framework. In order to draw lessons about KAIPs after the application of the framework to the cases key elements of Chapters Two and Three will be used. The characteristics of the triple helix organisation, as it was discussed in section 2.3 serve as the *conditions* against which Chapter Nine will draw lessons on KAIP impact. These ideas correspond with the discussions on complexity

and governance networks. In triple helix organisations the participating institutions and their communications and interaction function as feedback mechanisms on each other (Leydesdorff 2006: 212).

Because of these interactions tensions may arise between functions and objectives in each helix and each actor (ibid.). These interactions are the source of innovation (ibid.: 214). Hence, in order for KAIPs to become successful in developing and disseminating innovations and innovative knowledge they need to realise an as complete as possible interaction between the entangled elements of their network, while remaining open to their environment (the sender-receiver interaction). This means that the conditions for the lessons of Chapter Nine, based on the concepts of Chapters Two and Three, will be as follows. *A good KAIP with high impact potential involves the entire triple helix (business, governments, knowledge actors), is flexible and adaptive to changing circumstances, has an interactive nature in which perceptions, interests and ideas are openly discussed, and is well intertwined between and among the helices*.

Table 3.5: Conditions for lesson drawing on KAIP impact, based on concepts Chapter 2 and 3

Conditions for successful KAIP impact
KAIP involves the entire triple helix (businesses, governments, knowledge actors)
KAIP is flexible and adaptive to changing circumstances
KAIP has an interactive nature with space for actors' perceptions, interests and ideas
KAIP is well intertwined between and among the helices

Chapter 4

The art of assessing immeasurable impact

This chapter will start with a discussion of the position of the researcher vis-à-vis the two cases under research in this thesis (*section 4.1*). After this it will discuss the methods and techniques applied (*section 4.2*), and the characteristics of the used sample (*section 4.3*). The operationalisation of the variables presented in the previous chapter will follow after this (*section 4.4*).

4.1 Doing impact evaluation: the role of the researcher

The researcher was asked to carry out the thesis research as a part of the external financing received for a research project. This financing was supplied by the case studies of this research. In exchange for their money the two cases took part in a broader monitoring project, in which the networks were monitored to see whether they contributed to the realisation of societal change (*transition monitoring*[5]). This transition monitoring project was executed for six networks, and the author of this thesis was the prime executor for two cases. The results of the project were published in reports, which the networks could use to improve their functioning in such a way that they would contribute more to societal change. These cases were also the cases for this thesis. They were evaluated based with the framework developed in the previous chapter, in an interactive process between researcher and programme.

This means that the research closely relates to research approaches such as action research (see for instance Wadsworth 2001; Argyris et al. 1985) and mode-2 science (see Gibbons et al. 1994). Mode-2 science is more appliance oriented, transdisciplinary, heterogeneous, variable, broader than just academia and accountable to society than mode-1 science (Rotmans 2006: 87). Action research involves a researcher who participates in the research object, with the intention of improving the matter at hand by the execution of the research. Mode-2 science concerns the co-production of knowledge, in which the research objects take part in the research to learn from their opinions. The framework presented in the previous chapter creates this appliance-oriented, interactive, and co-productive evaluation.

The transition monitoring project was an example of action research, albeit with its own characteristics. As the approach of the project research was continually improved in interaction with the research objects, a mode-2 science approach could also be clearly distinguished. Both approaches have as advantage that the science resulting from the research process is often practice-oriented, applicable, and societal relevant, as it is carried out in close interaction with the people that might use the knowledge. On the other hand,

5 More information about the transition monitoring approach can be found in Taanman *forthcoming* and Diepenmaat & Taanman 2009

especially action research faces critique on its normative approach to the carried out science. Action researchers run the risk of finding themselves in a position where they tell the research object how the situation ought to be, thereby interfering in the research object. Mode-2 scientists are less at risk in this regard, but do face the fear of conclusions being weakened and mitigated due to the inclusion of practice.

Several precautions have been taken in order to avoid any of these potential pitfalls of these approaches. First, the monitoring project research was kept partially separate from the thesis research. Aside from it being research on the impact of themselves, and similar programmes, the programmes had little knowledge about the specific content of the thesis. Although they did assist in setting the conditions for the execution of the applied research techniques[6], they were not informed directly about the meaning of this for the thesis conclusions on their impact. This meant no direct influence could be exerted.

This still leaves indirect or more intangible influence. Although a very limited share of influence cannot be ruled out completely, the author feels as certain as reasonably possible it did not affect the outcomes of the study, due to several factors. First, the programmes demonstrated a very open attitude towards the outcomes. They were relatively open to critique, and accepted the fact that their impact might have been limited. Both programmes were interested in finding out what their impact had been, and especially how this impact had occurred. Learning was an important objective for both programmes. In that sense, the thesis study was welcomed, no matter what the outcome would be. Second, although the researcher did participate in many network events and cooperated intensely with the network management, some distance was kept. This meant the researcher had no personal interest in seeing the programmes succeed: in terms of viable thesis results every degree of impact would have been fine.

The observation carried out was therefore both direct and indirect (i.e. based on primary and secondary sources/ observations), participative in nature, overt towards the evaluated objects and both structured and unstructured in approach (see also Buttolph Johnson & Reynolds 2005: 189-190). The interviews and other data collection methods reflected this stance as well. In this interactive but autonomous research process the researcher was granted access to all programme processes, which ensured a dynamic and interactive perspective on programme impact, instead of a static measurement.

6 For example by making their email lists available for a web-based survey, and by asking their project leaders to participate in the researcher's interviews.

4.2 How to: methods and techniques

This research employs an iterative approach to carrying out research (see for instance Eisenhardt 1989). As section 4.1 discussed the researcher did not keep large distance between herself and the evaluated object, and rather engages in interaction about at least several aspects of the evaluation. The iterative approach is situated between inductive and deductive research, and encompasses a continued interaction between theory and empirics as the research progresses. This iterative process also takes place in the interaction between research objects (KAIPs) and the evaluator. Although many methods and techniques would be imaginable for this type of research, it is important to preserve the focus on interaction in the method and technique selection as well. Furthermore, the analysis is best carried out in a limited set of cases, to ensure interaction possibilities. This leads to a case study design.

The cases of this thesis are recent programmes, which attempted to influence society by developing knowledge and innovations. They integrated their environment into their own network. To address the inherent complexity caused by this integration between senders and receivers, and between programme and societal change, a case study design is the most suitable research method for investigating their impact (see for instance Yin, in: Buttolph Johnson & Reynolds 2005: 85). A case study design allows the researcher to assess the impact of the programmes in a dynamic, iterative and interactive way. Other research methodologies would be less suitable for this. Gerring describes several types of case studies, differing from each other in amount of cases, spatial variation and temporal variation. As this thesis employs two cases, compares spatially both cross-case and within-case, and has no variation over time, the case study type used here is the 'comparative method' (Gerring 2007: 28). The comparative case study method is very suitable for describing complex events (King, Keohane & Verba 1994: 44; Gerring 2007: 3). Case study research is traditionally associated with qualitative research, but this does not mean a case study cannot be (partially) quantitative (Gerring 2007: 10).

Combining several methods and techniques creates increased relevance and reliability of the data. In this thesis interviews will form the backbone of data collection, because of their natural characteristic of including nuance, interaction and in-depth information. Observations, document study and surveys provided input for the interview questions, but were also directly used in the discussion of the indicators in the case studies. Important to note here is the way this data was collected. As section 4.1 discussed, the author of this thesis participated in a larger project (the transition monitoring project) for which data was collected. A large share of the data of this thesis was therefore not collected just for purposes of this thesis' research, but also for the project. Because the data was often primarily used for project purposes the thesis research methods and technique resemble

a *secondary analysis of existing data material*, even though the data collection always occurred with this thesis' objectives in mind[7].

Interviews are pre-eminently suitable for carrying out research on complex networks in complex dynamic systems, as they allow the researcher to connect to trends, specific issues that matter for the interviewee, and create an opening for incorporating changes occurring in and around the programme into the research. Furthermore, interviews provide nuanced and meaningful data. There are various ideas on interviews and how they should be carried out. The interviews in this thesis are semi-structured in nature. This interview type is pre-informed and semi-organised, yet flexible and allows the interviewer too take up on remarks of the interviewee and continue asking questions about that matter. The supplementing with surveys, observations and document study helps to broaden the scope of the data collection, check interview answers, and provide the desired pre-information for the interviews.

Several techniques were used in gathering data from the **receivers**. In the receiver interview, individuals not directly involved in the programmes were asked to reflect on their views of the institutional arrangements made for fostering knowledge and innovations – knowledge and innovation programmes Transumo and Living with Water. They were asked also about their views on the presence (or lack thereof) of high-profile support for the innovations and ideas of these KAIPs. A list of interviewees is available in the appendixes. They consisted of five receivers specifically for Transumo, four specifically for Living with Water, and one who responded in relation to both programmes. The interviewees were selected based on their roles and involvement (for example, with a governmental agency or a business), and these half-hour interviews were carried out via telephone.

These receiver interviews are an important source of data for the receiving end. The selected respondents were generally not involved with the programmes, although in some cases, the dividing line between not involved and involved was rather thin. One respondent had been involved with a similar type of knowledge and innovation programme and another respondent had had several contacts with the knowledge and innovation programme being carried out in his professional sector. In trying to find non-involved actors, the author found that many actors were somehow involved with one of the two cases. Especially in the field of science most actors appeared to be involved. Nonetheless, the final selection of respondents were deemed appropriate as they knew the two programmes in question well enough to discuss them in an interview, without being a part of the programmes themselves.

7 Exceptions are the two network analysis surveys and the receiver interviews, neither of which were used in the projects.

Apart from the interviews, two surveys were conducted in early 2009 - one for the water management sector (KAIP Living with Water) and one for the mobility sector (KAIP Transumo). These surveys[8] sought to elicit respondent's views on propositions on the sector, and included questions pertaining to their familiarity with the KAIPs and their appreciation of these programmes. Participants were individuals who received newsletters and updates for one of the programmes as they represented a good cross section of relevant actors. This made it by far the best address file available. The newsletter recipients were actors from inside and outside the KAIPs. Some of them were part of the projects of the programmes, for instance project leaders, participants, related experts and principals. Some were not involved with projects or programme level, but had attended a workshop, meeting, or discussion of the programme and had left their address information at that occasion. Others were not part of the programme and had not attended meetings but had been included in the newsletter address file because of their relevance for the topics the programme worked on.

In general, therefore, the recipients list of these newsletters files was very varied, ranging from involved to non-involved actors. In this thesis, the data from the surveys is used to analyse the perceptions of the receivers of the KAIPs. However, as became clear in the above explanation of the address file inhabitants, senders were also included in the list. This is not optimal, but as stated: it was by far the best address file available for conducting a large-N survey. As the dividing line between senders and receivers is thin anyway, the surveys can still serve as receiver information, because they shed led on the circles around the programmes: from the directly-involved circle, to a very non-involved and distant circle of non-participants. To broaden the relevance of the answers from individual opinions to data about entire organisations, the survey included some control questions. In these control questions respondents were asked to answer whether their opinion about KAIP impact reflected the general opinion in their organisation. This was done by asking the respondent first to answer a question for himself, and then for his organisation.

The survey for Transumo was sent to approximately 4500 people and the survey for Living with Water to approximately 1000 people. The Transumo survey received 303 completed responses, or a response rate of 6.7%. The Living with Water survey received 186 completed surveys, or a response rate of 18.6%. The rather low response rate is a bit disappointing, yet understandable if one is aware of the length of the survey (which took 20-30 minutes to answer) and the abstract nature of many of the questions. To ensure adequate response rates, a reminder was sent to participants several weeks after the initial request. The response was determined to be adequate for the purposes of this thesis, especially because in absolute terms the number of completed surveys was in order (186 and 303 completed surveys). Furthermore, the address files had been in use for several years, which

8 Which were carried out in Dutch

means a degree of the included email addresses would not have been in use anymore, leading to a higher actual response rate.

The surveys were not executed solely for the purposes of this thesis. As discussed in section 4.1, the researcher participated in a project for which data collection efforts were combined. Because of this, some differences exist between the surveys conducted for Living with Water and Transumo. Although the same questions were asked in both, the former had more questions than the latter. The Transumo survey was developed prior to the Living with Water survey, and the Living with Water survey therefore included the same questions as well as additional ones that came up along the way and that programme management found too interesting to exclude.

For the **senders** other research techniques were applied. Despite this, the above discussed survey served to check the answers of sender respondents in some of the indicators in the senders category (see section 4.4 for more information about these indicators). However, the primary data source for the senders was, just like the receivers, the conducting of interviews. Interviews were conducted were project leaders of both programmes, as well as with programme managers from the programme level. The project leader interview sample consisted of 14 respondents interviewed in relation to Transumo (about 15 projects), and 38 respondents interviewed in relation to Living with Water[9] (about 46 projects). In both cases this accounted for about half to two-thirds of the total amount of projects at the programmes, as Living with Water had more projects than Transumo. The Living with Water interviews were also conducted for other purposes than thesis research (namely programme monitoring activities and workshop organisation). As the sample still covered almost all significant projects[10] this did not impact the validity of the data. The Transumo sample was more deliberately selected based on the current thesis, and a representative sample of all Transumo projects was selected.

9 In the case of Living with Water a selection of 16 interviews has been made to keep oversight over the amount of data. This selection was carried out with great precision, and the researcher deliberately selected the 16 interviews that were the best representation of the total 46 interviewed projects. The non-selected projects did continue to play a role in the research, but rather as a check of the LwW results than the prime source of these results.

10 Most of the projects that were not interviewed were much smaller or only concerned the organisation committee of one workshop afternoon or something similar to that.

Table 4.1: Selection criteria for project samples

Transumo sample criteria	Living with Water sample criteria
Diversity in size of projects	Diversity in size of projects
Diversity in success of projects	Diversity in success of projects
Diversity in science/practice orientation	Diversity in science/practice orientation
Programme theme coverage	Programme theme coverage
Diversity in duration of projects	Usability of interview conversation[a]

[a] Due to the relatively open nature of the LwW interviews not all interview conversations provided the required data for carrying out receptivity analysis.

Each programme's sample was created in interaction with programme managers. The researcher believed that the sample created as a result would fully represent the diverse range of projects. In general, the interviews lasted somewhere between one and two hours. No interviewee refused to be interviewed, although one interview was cancelled due to time issues. The interviewing process was supported by the KAIPs themselves, and in the case of Living with Water, the interviews were made a (semi-)obligatory part of the project as necessary for monitoring purposes. Virtually all interviews relating to Living with Water took place at programme's offices, while interviews for Transumo took place at the respondent's own working environment. The Living with Water interviews were carried out by a team consisting of Eveline Maris, then from NOK-n, and the author of this thesis. The Transumo interviews were solely carried out by the author.

Another source of data on the senders was the programme management interview. One such interview was carried out in October 2009 with Transumo's business director and one of Transumo's programme secretaries (both of whom this thesis calls 'programme managers'). The programme management interview for Living with Water was conducted in February 2010 with its general director. The reproduction of this interview was checked and topped up by the interviewee and a programme manager of LwW, to ensure accuracy. These interviews took about two (Living with Water) to three hours (Transumo).

Three more data collection methods were used to collect information from both **the senders and the receivers**. First, the technique of participatory observation was applied. The researcher participated, albeit at various levels of intensity, during different phases of the programmes. She attended many meetings, and gained an important inside perspective on the functioning of KAIPs. This participation took place between February 2007 and November 2009 (Transumo)/ January 2010 (Living with Water). Second, two network analysis surveys were carried out early in 2010. These surveys were inspired by an existing network

analysis survey[11], and served to shed light on the involvement of actors in the programmes and their interactions (see also Koppenjan & Klijn 2004: 151). The Transumo network survey received 13 responses from a total of 34 project leaders and programme managers, or a response rate of 38.2%. The Living with Water network survey received 17 finished responses, from a total of 45 potential respondents, giving it a response rate of 37.8%. Third, and last, documents were studied in order to complement, and, if necessary, challenge findings. These documents mostly provided information on the creation and development of the programmes, and the steps that had to be taken in order to be granted subsidies.

4.3 Identifying informative cases

Both case studies are tripartite KAIPs. Transumo operated in the field of sustainable mobility, and Living with Water operated in the field of innovative water management. Both were BSIK-programmes, therefore part of the third generation ICES/KIS subsidies. The objectives of both programmes were to contribute to the Dutch knowledge infrastructure, by developing and disseminating (innovative) knowledge. Both programmes encompassed a number of projects, with Transumo including total of 30, and Living with Water having approximately 100. The programmes are no longer active. Transumo's final congress was in November 2009, and Living with Water's final conference was in January 2010. The chapters that follow will provide further information on these programmes.

As discussed in section 4.1, the researcher was working on a transition monitoring projects for these KAIPs, and this created a unique opportunity for their evaluation. The researcher received ready support in this endeavour, and was granted full access. The sustainable mobility (Transumo) and innovative water management (Living with Water) cases were selected in particular because they combined the researcher's primary field of interest, which was a combination of public administration and environmental sciences. Two of the KAIP categories of the joint financing arrangement related most closely to this combination: sustainable system innovations (for Transumo) and spatial planning (for Living with Water). The other three joint financing arrangement categories were more technology and natural sciences oriented. Further, the two cases were selected because they were comparable in terms of their organisational structures and topics/ fields, while differing enough to allow for interesting comparisons. Further, the two cases provided a good account of KAIPs in the Netherlands relating to spatial matters.

11 The existing survey concerned the school superintendents surveys by Meier and O'Toole, based on which they have published a variety of articles, for example Meier & O'Toole 2003.

4.4 Enabling assessment: operationalisation

Receptivity is the intervening variable in the assessment of impact of knowledge and innovation programmes. As used in the current thesis, receptivity depends on eight independent variables, all related to the **perceptions of senders and receivers**. These variables were selected after a careful review of the literature. Perceptions are the best forms of assessment available when factual measurements are not possible. By combining the perceptions of senders and receivers, an accurate assessment can be provided of the overall receptivity toward the KAIPs.

- Senders' awareness of the needs and desires of the receivers [v1]
- Sender's association with the needs and desires of the receivers [v2]
- Sender's acquisition of the resources needed for impact [v3]
- Senders' opinions of the applicability of the innovations [v4]
- Receivers' awareness of the innovations put forth by the senders [v5]
- Receivers' association with the benefits of the senders' innovations [v6]
- Receivers' acquisition to the adoption of the sender's innovations [v7]
- Receivers' opinion of the applicability of the innovations [v8]

Each variable will be connected to fixed research techniques and indicators. These indicators are a reflection of this thesis' search for literature and empirical data. Other indicators are imaginable, as long as they incorporate the basic ideas discussed in Chapters Two and Three (such as a focus on learning and interaction) and fit within the receptivity framework.

In the empirical chapters both programmes will be scored with a **positive, negative or neutral score** on each indicator (the scale). *A positive score means that the chance of programme success is enhanced, and a negative score means that the chance of programme success is hampered*. Based on the average of the indicator set per variable each variable will also receive a positive, neutral or negative score. Which score each indicator receives is determined by the researcher, based on an elaborate discussion of the findings on that indicator in each case. Evaluation is, after all, valuating something positive or negative (Bressers & Hoogerwerf 1995: 19). Neutral is added, because indicator results might be mixed or unclear. Judging it as negative in these cases would fail to incorporate the duration of implementation or the complexity in the field (Gooren 1985: 189, 192-193).

4.4.1 Receptivity of senders – variables and indicators

Four variables are identified as critical parts of the senders' receptivity: awareness, association, acquisition, and application. Each variable and indicator will be investigated by inquiring the perceptions of senders (programme managers and project leaders). The indicators are derived from the discussion of each variable in the previous chapter (section 3.3). In this discussion, several key elements and characteristics were discovered by discussing

literature on societal change, innovation, and impact. These elements are translated into indicators.

The first variable, awareness perceptions (V1), is operationalised using the following three indicators:

1. Satisfaction about own role in societal context
This indicator receives a positive score when senders are on average mostly positive about the environment they work in, and do not mention severe problems. The indicator receives a negative score when more problems are mentioned than opportunities or other positive remarks.

2. Fit between urgent problems as seen in project/programme versus connected receivers
This indicator receives a positive score when the problems mentioned by the senders correspond (on the whole, small differences will be allowed) with the urgent problems mentioned by receivers. The indicator receives a negative score when there is a large gap between senders' and receivers' perceptions of urgent problems (e.g. when they concern entirely different topics, or are conflicting in nature).

3. Presence of future images/ visions
This indicator receives a positive score when the senders are able to discuss their objectives in terms of more general ideas on the future of the sector they work in, and when these future visions correspond with programme objectives (telling one story). Differences in nuances and subparts of the future visions are allowed. The indicator receives a negative score when senders are unable to formulate their project in terms of future ideas or visions or when their ideas differ significantly from programme ideals.

The second variable, association perceptions (V2), is also operationalised using the following three indicators:

1. Presence of (receiver-oriented) learning in project/ programme
This indicator receives a positive score when the majority of the senders mention examples of lessons learned in interviews, or when learning in projects or programme becomes apparent in another manner. This indicator receives a negative score when a significant group of senders is unable to discuss lessons learned or fails to demonstrate development and/or learning in the course of project or programme.

2. Fit between project ideas and 'official views'
This indicator receives a positive score when the future visions and ideals of the projects correspond with receiver objectives and ideas, which can be visible in for instance policy documents and business strategies. Small differences are allowed. This indicator receives a negative score when a significant discrepancy exists between the ideas of the senders and the ideas of the receivers.

3. Dissemination strategies/ fit with dissemination needs receivers
This indicator receives a positive score when the dissemination strategies and channels correspond with the desired strategies and channels as expressed by receivers (the receiver position will be determined based on survey results) and senders demonstrate openness towards adapting their strategies to needs receivers. This indicator receives a negative score when significant differences exist between the chosen dissemination strategies and channels and the strategies and channels desired by the receivers, for instance if none to only a few strategies and channels correspond.

The third variable, acquisition perceptions (V3), also has three indicators in this research:

1. Diversity and strength of connections
This indicator receives a positive score when the connections of the senders correspond to all helixes of the triple helix structure, and when the contacts with these connections are solid and committed. This indicator receives a negative score when the connections lack (too many) important actors from one or more helixes and when the connections are little committed or involved.

2. Handling of external conditions (time, money)
This indicator receives a positive score when the senders demonstrate their ability to cope with external conditions, such as requirements of the joint financing arrangement and planning issues. This indicator receives a negative score when severe problems have occurred in coping with external conditions.

3. Presence of needed competencies
This indicator receives a positive score when the senders are able to distinguish the competencies they required for making a success of their projects or programme, and can explain or visualise why they possessed these competencies. This indicator receives a negative score when the senders are either unable to mention the competencies they required, or when they admit or demonstrate not having possessed these competencies themselves.

The fourth variable, application perceptions (V4), is also operationalised using three indicators:

1. Position of the programme in the sector; programme perceptions
This indicator receives a positive score when the programme management itself judges its position in the sector to be solid or well-appreciated. This indicator receives a negative score when programme management itself judges their own position in the sector to be lacking in embedment.

2. Impact of the project; project perceptions
This indicator receives a positive score when the project leaders themselves describe their project as having had impact and are able to demonstrate to the researcher why this is true. This indicator receives a negative score when projects leaders either mention they did not have (significant) impact (on average) or when they are unable to demonstrate that they have had impact.

3. Impact of the programme; project perceptions
This indicator receives a positive score when project leaders describe the programme they were part of as having had impact and are able to explain to the researcher why this is true. The indicator receives a negative score when project leaders are either discuss the programme as not having had impact (on average) or when they are unable to demonstrate or explain why the programme did have impact.

The technique or method employed to gather data relevant to each indicator is provided in the table.

Table 4.2: Sender-related variables and indicators: to be given a positive, neutral or negative score

Variables	Indicators	Techniques
Awareness	Satisfaction with own role in context	PL interviews[b], programme interview
	Fit urgent problems	PL interviews, survey
	Future images	PL interviews
Association	Presence of learning	PL interviews, programme interview
	Fit official views	PL interviews, programme interview
	Dissemination fit	PL interviews, programme interview, survey
Acquisition	Diversity and strength connections	PL interviews, programme interview, survey
	Handling external conditions	PL interviews, programme interview
	Competencies	PL interviews, programme interview
Application	Estimated positioning of programme	Programme management interview
	Impact of project	PL interviews
	Impact of programme	PL interviews

[b] PL stands for 'project leaders'

4.4.2 Receptivity of receivers: variables and indicators

Four variables are adopted to provide indication of the receivers' receptivity: awareness, association, acquisition, and application. Each indicator will be assessed based on data collected on the perceptions of receivers (stakeholders and other actors who were connected to, but not directly part of the programmes). These indicators are derived from the discussion in the previous chapter (section 3.3) which covered the literature on societal change, innovation, and impact.

The fifth variable, awareness perceptions (V5), is operationalised into four indicators:

1. Use and necessity of programmes
This indicator receives a positive score when the receivers on average discuss the programmes as being useful and important in the sector they function in. This indicator receives a negative score when the receivers describe the programmes on average as either not useful or not necessary in their sectors.

2. Need for innovations and changes proposed by programmes
This indicator receives a positive score when the receivers on average embrace the need for change and innovations in the sector. This indicator receives a negative score when the receivers on average mention that innovation and change is not required in their sector.

3. Added value of susmob/inwat[12] compared to normal mobility or water
This indicator receives a positive score when the receivers on average describe either sustainable mobility or innovative water management as being important concepts to them, compared to regular mobility or water management. This indicator receives a negative score when receivers on average indicate that they do not see added value in concepts such as sustainable or innovative and that regular management is sufficient.

4. Importance of susmob/inwat in their organisation
This indicator receives a positive score when receivers on average indicate that the concepts of sustainable mobility or innovative water management play a significant role in their organisation. This indicator receives a negative score when receivers on average answer that this is not the case, and that their organisation therefore mostly or entirely concentrates on 'normal' mobility or water management.

The sixth variable, association perceptions (V6), is operationalised using three indicators in this research:

12 Susmob stands for sustainable mobility and inwat stands for innovative water management

1. Importance of innovation and change for the sector
This indicator receives a positive score when receivers on average mention that innovation and change is important in their sector. This indicator receives a negative score when receivers on average answer that innovation and/or change is not important for their sector.

2. Consideration of the costs and benefits of innovation/ change
This indicator receives a positive score when receivers (on average) let the benefits of change and innovation prevail over the costs, i.e. when they see the costs as inevitable or worthwhile given the perceived benefits of change and/ or innovations. This indicator receives a negative score when the receivers (on average) see the costs as too high, or the benefits as being too few or distant to justify investment.

3. Importance of susmob/inwat to policy and other decision-makers
This indicator receives a positive score when the receivers (on average) describe sustainable mobility or innovative water management as guiding principles (or at least important principles) for policymakers and other decision-makers. This indicator receives a negative score when receivers (on average) view sustainable mobility or innovative water management as having little to no importance for policymakers or other decision-makers.

The seventh variable, acquisition perceptions (V7), is operationalised into 3 or 4 indicators[13] in this research:

1. Realism and feasibility of developed innovations
This indicator receives a positive score when the receivers on average value the knowledge and innovations developed by the senders to be realistic and feasible; hence, applicable. This indicator receives a negative score when the receivers on average value the developed knowledge and innovations of the senders to be too unrealistic or unfeasible to allow for application.

2. Usage of knowledge and innovations by receivers
This indicator receives a positive score when the receivers on average indicate to use knowledge and innovations developed by the senders, or at least have a serious intend of using it in the future (considering not all projects and ideas were completely developed by the time of interviewing). This indicator receives a negative score when the receivers on average discuss that they do not and will not use knowledge and innovations developed by the senders.

13 This depends on the programme: Transumo has 3 indicators, Living with Water 4.

3. Influence of programmes on receivers
This indicator receives a positive score when the receivers on average answer that they perceive the programmes (the senders) to have had influence on themselves and other receivers and the group of 'no influence' respondents does not exceed 25%[14]. This indicator receives a negative score when more than 25% of the receivers indicate no influence of the programme on themselves or their organisation. Because this influence will be investigated with a Guttman scale of answer options the degree of influence is also a factor in the scoring process.

4. Living with Water: proposition scores
This indicator receives a positive score when the majority of the propositions receive an answer which indicates impact of Living with Water. This indicator receives a negative score when the majority of the propositions receive a score which indicates little to none impact of Living with Water.

The eighth variable, application perceptions (V8) is operationalised into 7 indicators in this study:

1. Notoriety of the programmes
This indicator receives a positive score when receivers on average discuss and describe the programmes as being notorious in the sector they are active in. This indicator receives a negative score when receivers on average believe the programme to be unknown or known only a little.

2. Appreciation of programmes
This indicator receives a positive score when the receivers on average indicate that they and other receivers appreciate the existence and content of the programmes. This indicator receives a negative score when receivers on average do not appreciate the existence and/or content of the programmes.

3. Acquaintance with KAIPs in general[15]
This indicator receives a positive score when receivers on average answer that they are familiar with one or more KAIPs in the Netherlands, and are able to mention examples of

14 The reason that this percentage is less than 50% (whereas the other indicator concentrate on 'on average') is the fact that the receivers for this indicator came from the address files of the two programmes, and the lowest influence option was 'new knowledge or contacts', something acquired quickly.

15 Receivers were not asked after 'KAIPs', as this abbreviation would have little meaning to them. The survey inquiry called them 'innovation programmes'

this. This indicator receives a negative score when receivers on average mention not to know any KAIPs or are unable to mention examples of KAIPs.

4. Familiarity with Transumo/LwW

This indicator receives a positive score when more than 90% of the receivers indicate they know the programme they are inquired about. This percentage is so high due to the survey respondent group: all respondents came from the programme's own address files. This indicator receives a negative score when more than 10% indicate not to know either Transumo or Living with Water.

5. Contact with Transumo/LwW

This indicator receives a positive score when receivers on average indicate to be in contact with the programmes. This indicator receives a negative score when receivers on average indicate they are not in contact with the programmes.

6. Influence of programmes

This indicator receives a positive score when receivers not only perceive the programmes to have had influence, but also when they are not disappointed in this degree of influence. No more than 20% of the receivers is allowed to be disappointed in the degree of influence of the cases to allow for a positive score. This indicator receives a negative score when either receivers on average perceive the programmes not to have had influence or the degree of disappointed receivers is higher than 20%.

7. Stakeholder estimation of familiarity of programmes in sector

This indicator receives a positive score when more than one-third of the sector is estimated to be familiar with the programme in his sector. This indicator receives a negative score when the estimated amount is significantly below one-third of the sector, and it is a definite negative score when the estimated amount is less than 20% of the professionals.

Table 4.3: Receiver variables and indicators: to be given positive, neutral or negative scores

Variables	Indicators	Techniques
Awareness	Use and necessity of programmes	Receiver interviews
	Need for changes	Receiver interviews
	Added value of susmob/ inwat	Survey
	Importance of susmob/ inwat in organisation	Survey
Association	Importance of innovation/ change for sector	Receiver interviews
	Cost-benefit consideration of innovation/ change	Receiver interviews
	Susmob/ inwat importance for decision makers	Survey
Acquisition	Realism and feasibility of innovations	Receiver interviews
	Usage of knowledge and innovations	Survey
	Influence of programme on receivers	Survey
	Propositions LwW	Survey
Application	Notoriety of programmes	Receiver interviews
	Appreciation of programmes	Receiver interviews
	Acquainted with KAIPs in general	Survey
	Familiarity with Transumo/ LwW	Survey
	Contact with Transumo/ LwW	Survey
	Influence of programmes	Survey
	Estimation familiarity programmes in sector	Survey

It is important to note that all results on the two selected cases cannot be generalised to other cases, due to large differences in time, context, and content of the programmes.

Chapter 5

The need for knowledge and innovation in mobility

This chapter addresses the following research question: *In which environment did the programmes originate and how did this environment affect the way the programmes were organised?* The chapter begins with a background description of the mobility domain, the problems of the sector, and the necessity of initiatives such as mobility knowledge and innovation programme Transumo. It will discuss the role of the knowledge and innovation programme, and the specific characteristics of the Transumo programme.

5.1 Challenges and dynamics in the mobility sector

Mobility plays a large role in virtually every country around the world. The ability to transport goods and persons is the foundation of large, modern industrialised societies. Mobility and economy are highly intertwined. A report published in 2003 indicated that 10% of European gross domestic product depended on transportation (European Commission 2003: 5). Mobility concerns are far reaching, and cover everything from your local commute to work and the deliveries of the local florist along country roads, to the travels of the large container ships hired by multi-national car manufacturers to go from seaport to seaport. Virtually every individual on earth is involved in mobility, and this makes it simultaneously local, regional, national and international by nature. It is often hard to determine where one level ends and another begins. What's more, the ability to move around, both within cities and across the world has direct implications on people's perceptions of personal freedom, liberties and abilities.

With so many interests, values and objectives at stake, decision-making in the area of mobility can be a tricky endeavour. Knowledge development and change are necessary to deal with changes in coupled systems (such as the economy, transportation networks and the environment), but these developments and changes sometimes intrude upon the values, expectations and experiences of various sectors of society. Problems often get locked-in, as has been seen in the last decades. Pollution, congestion, fragmentation and many other issues are frequently debated in politics, in the media, and among citizens (for instance European Commission 2003: 8). Although everyone is affected by problems associated with existing transportation networks, significant changes have been few and far between. Despite the recent economic crisis, the mobility sector appears to be on a constant growth trajectory (Geerlings & Peters 2002: 19; Rotmans 2006: 195), meaning that the problems are likely only to get aggravated in coming years. Both science and policy agree on this predicted growth in mobility movements (for instance Golder et al. 2007: 11; Van Egeraat 2003; V&W 2008: 17-20; V&W-*Nota Mobiliteit* 2006, 2005, 2004).

Geerlings & Peters (2002: 21) classify the problems associated with transportation as follows: A first set of problems they identify, pertain to emissions – not just of CO2, but also of CFK, CxHy, CO and NOx, which have various effects on the environment, including acid

rain which was a large concern in the 1980s. Transport is estimated to account for approximately a third of total polluting emissions (Rotmans 2006: 196). Some of these emission problems have been handled rather successfully over the last decades, while others are still pressing. The second set of problems relate to what Geerlings and Peters call 'quality of life', for example, noise and safety. The third set of problems pertains to congestion and others forms of infrastructure quantity issues.

Awareness is growing that no single solutions is likely to address these problems. A more systemic approach to mobility must be taken to include all aspects and characteristics of the complex system. Such a systemic approach will need to take into account the interests of stakeholders, as well as multiple macro-considerations such as the economy and the environment. In other words: a sustainable approach to mobility is required to deal with the presenting problems. Sustainable mobility, as used in this thesis, relates to an approach that combines economic interests (profit), with environmental (planet) and social (people) Interests. Sustainable mobility thus concerns a combination of problems and issues. In particular, it concerns economic, environmental and social interests (for instance Van Eijndhoven 2007: 14), and sustainable solutions have to consider all three if they are to be successful. Although this approach provides chances for change, it also inspires hesitation and reluctance among stakeholders, as they fear the possible loss of current comforts, as well as perceived rights and privileges.

Traditionally, the mobility sector has been primarily economy-oriented, with little concern for other priorities. But this is changing. Although economic efficiency remains the prime focus, it is increasingly accepted that economic efficiency can coincide with environmental and/ or social improvements. Geerlings and Peters (2002: 165) describe the sustainability challenge for the transport sector as follows:"(…) the challenge lies in a quality leap, both in terms of economic efficiency as in terms of livability (societal efficiency). Livability does not only concern the reduction of nuisance to acceptable degrees, but to such a degree that staying in town, as visitor, inhabitant, or employee, becomes attractive (fun, pleasant, appealing)!".

The many priorities for sustainable mobility lead naturally to tensions arising from sometimes conflicting goals (Rotmans 2006: 206). However, these tensions can also inspire action. Many have searched for hybrid solutions befitting the complexity and interrelatedness of the problems. Geerlings and Peters identified four possible solution directions (2002: 23). The first option is to reduce transport volume by reducing demand and introducing logistical solutions that reduce the total distance travelled each day. The second class of options involves the stimulation of modal shifts towards less polluting forms of transport. The third category of options involves the application of technology, while the fourth and final category is of solutions oriented towards better spatial planning.

More concretely, others have expressed these goals in terms of making mobility more demand-driven instead of supply-driven, individualising public transport, smart mobility

management, introducing cleaner cars, and smarter spatial planning (Kemp & Rotmans 2004; Rotmans 2006: 212-215). Because of the complexity and entangled nature of the problems (Rotmans 2006: 211), no single solution is expected to suffice, and all solutions must be considered and used in intelligent combination

The Netherlands is a small country with mobility problems that are intertwined with the whole urban field. Where one city ends the next city starts. This is especially so in the western part of the country, or the Randstad (OECD 2007: 101-110; see Van der Bol 2010 and Buijs et al. 2009: 102-105 for a good description of this metropolitan area). Congestion is a serious problem here, as is the fragmentation of mobility systems, pollution, and noise. If change is to come to Randstad's transportation woes, all relevant stakeholders have to make an effort.

Like many mobility sectors in Europe, Asia, and the United States, the Dutch mobility sector, just like, is in the public domain. Governmental agencies play a vital role in organising transportation and planning future solutions. However, governmental actors have realised increasingly that they need other actors. They need businesses, NGO's and citizens to support their decisions and cooperate with them. A good example of this is the intended introduction of road pricing in the Netherlands. The lack of support of citizens, who were united by the national drivers association (ANWB), meant the plan was never implemented. Later attempts to introduce similar initiatives also struggled to receive sufficient support. Thus both the receipt and the sustenance of broad-based support is an essential part of today's policymaking. However, the challenge is particularly great in the area of mobility as everyone uses the roads, public transport system, and other transportational infrastructure.

Both the previous and current mobility policies have been limited in their success (Geerlings & Peters 2002: 25) in furthering acceptable solutions, thus strengthening the governmental belief that they cannot realise future (sustainable) mobility by themselves. Several initiatives have been developed to provide for cooperation, such as bilateral arrangements aimed at linking policymaking process with the expertise and resources of non-governmental actors. Multilateral arrangements were also created in the mould of Etzkowitz' triple helix organisations that were described in Chapter 2. Actors share several roles and duties while continuing to fulfil their primary tasks and roles. The latest efforts are in accordance with suggestions made in the consultancy report '*Meerwaarde van Transumo in het Kennislandschap*' (DHV 2009), which lists several noteworthy (multi-actor) initiatives to further the cause of sustainable mobility.

The first of this is the *Sustainable Mobility Platform* which "focuses on the accelerated market introduction of sustainable fuels and vehicle technologies, especially commercially-

feasible possibilities to the Netherlands in the next two to four years[16]". The prime focus of this policy entrepreneurial intervention lies in stimulating market developments (ibid.: 5). Second, DHV mentions *KiM*[17] as another prominent multi-actor player. KiM is a knowledge institute within the Ministry of V&W, which aims to develop knowledge that can serve as "strategic basis for policy development" (website KiM). Third, the organisation *Connekt* has been set up as an independent network of businesses and governments which connect actors working in trust to promote the sustainable development of Dutch mobility[18]. They aim to initiate cooperation between business and government, in order to realise added value for both. Connekt was part of the second generation of ICES/KIS programmes, and among the institutions responsible for the initiation of Transumo.

Other relevant actors in the field of sustainable mobility include knowledge institutes and platforms such as NICIS, CROW, KpVV; cooperation associations such as Innovatieberaad/ Club van Maarssen, NIROV, Strategisch Platform Logistiek; governmental initiatives such as IPE; and facilitating agencies such as CURNET and SenterNovem (DHV 2009: 11). Along with these institutes and organisations, more traditional stakeholders such as businesses, regional and local governments (for instance the provinces and the municipalities), and universities also play an important role. Thus, it is safe to say that the mobility sector knows a large variety of actors, each with their own role and task. Sometimes actors conflict with each other on their goals and priorities, and sometimes there are overlaps. It is perhaps not surprising then that in a domain as complicated and complex as Dutch mobility, some speak of a lock-in situation, in which change is hard to realise. Almost revolutionary transitions are required to break through existing patterns (e.g. Rotmans 2006: 210). Others see more room for (natural and gradual) changes, and aim to influence the system by providing new knowledge and ideas. Most likely a combination of actions will be required: some large changes need to occur in order to avoid future problems, but small and gradual changes will also play an important role in realising progress, as long as they are widely supported and created by stakeholders.

16 Website Sustainable Mobility Platform: http://www.senternovem.nl/energytransition/themes/sustainable_mobility_platform/index.asp

17 Kennisinstituut voor Mobiliteitsbeleid, in English: Netherlands Institute for Transport Policy Analysis: http://www.verkeerenwaterstaat.nl/onderwerpen/kennis_en_innovatie/kennisinstituut_voor_mobiliteitsbeleid

18 Website Connekt: http://www.connekt.nl/nl

5.2 Addressing the challenges: the start of a knowledge and innovation programme on sustainable mobility

The above discussion of the Dutch mobility sector demonstrates the importance of new knowledge and innovations. The sector was running more and more into recurring problems, with fewer and fewer solutions at hand. Congestion problems became more and more noticeable during the last decade, and awareness grew that the current mobility system was close to reaching the boundaries of its potential growth. At the same time, the public's focus on sustainability made it clear to public managers that the topic of sustainable mobility deserved their attention. The urgency of some matters, and the increasing public attention for sustainability issues, meant that something had to change. What resulted was an increase in multi-actor initiatives and a new constellation of actors in the mobility domain. Although the government retained the majority of the power and mobility remained in the public domain, governmental actors became more a coordinating and facilitating partner, instead of an initiating and developing actor. This reflected the realisation that problems can only be tackled by combining efforts and cooperating with each.

The Transumo programme thus started amidst a rising momentum and an increased sense of urgency. A proposal was submitted to BSIK in 2003, but was initially rejected. However, the Cabinet and the Commission came to an agreement that the topic of sustainable mobility was of too high importance and urgency for the Netherlands to ignore and Transumo's initiators were invited to redraft the proposal, along with two other proposals. They rewrote their proposal in a limited time, and incorporated advice received from Commission. This new document was found to be compatible with the two other proposals that had also been resubmitted, and so Transumo received a positive evaluation, as did the other redrafts. Although Transumo received the lowest score[19] of the newly accepted proposals, it did meet the basic criteria and was found worthy of the subsidy.

As the lowest scoring programme of the group, the Cabinet was advised to give Transumo the subsidy in two separate portions. Out of a total subsidy amount of €30 million, only €10 million was to be given at the beginning. The remaining €20 million was to be awarded after two years on condition of positive intermediate evaluation. The Commission further advised Transumo to make improvements in a number of areas. They were advised to improve or make more concrete their research method, clarify their vision for breaking through the impasse in research and policy in the mobility sector, to improve their management structure, collaborate more greatly with several important parties from the freight transport and logistics management sector, and better embed themselves in international knowledge networks on the topic of sustainable mobility (Commissie van Wijzen ICES/KIS

19 3.0 out of 5, in comparison to 3.2 out of 5 for KSI and 3.4 out of 5 for KN-TDL.

2004: 7). The Dutch Cabinet complied with this advice and decided on March 24. 2004 to subsidise Transumo, with all extra requirements proposed by the Commission.

In order to realise these requirements, Transumo created an open application procedure, in which applicants could submit their project proposals after articulating how these would fit within Transumo as a programme. In September 2004, Transumo published their 'project plan', called '*Better Mobility for Tomorrow and 2010*'[20] in which they outlined the activities they would undertake in the upcoming years and how these reflected the Commission's advices. This document further outlined the activities to be funded by the first the €10 million in subsidies, and also indicated activities and plans for the second period which would assumedly be funded to a tune of €20 million.

5.3 From proposal to maturity

As advised by the Commission, Transumo started by creating five domains or themes within the programme in order to organise the projects and to provide greater focus in realising their vision. These themes were as follows: passenger transport, freight transport, traffic management, infrastructure, and transition management[21]. The first four had a strong content-dimension, whereas the latter was more process-related in focus. Another important aspect of the original Transumo project plan was the idea of test grounds, so-called *proeftuinen*.

Projects had to apply for financing using a project proposal format encompassing nine segments[22]. The list of segments and the format of the application demonstrates several core characteristics of aspirant projects: the project proposals had to focus on sustainability, work with a tripartite consortium, focus on strengthening the knowledge infrastructure, articulate objectives that could be used for evaluation, and develop ideas for the dissemination of results[23].

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20 "Betere Mobiliteit voor Morgen en 2010", in Dutch

21 Transition management is a new mode of governance for sustainable development (Loorbach 2007), in which complex and wicked problems are approached in a multi-level, multi-actor and multi-scale way.

22 These segments were: 1) summary of the project idea, 2) embedment of the project in Transumo, 3) formulation of the problem, 4) approach, intended results and output in measurable objectives (all in terms of the three aspects of sustainability, and transition knowledge; the way the project would contribute to the tripartite knowledge infrastructure objective, in terms of quality, productivity, viability; and legitimacy), 5) planning and phasing, 6) justification of the research, 7) knowledge dissemination, 8) financing, and 9) signatures (Transumo Project Plan, Appendix 2: Toetsingscriteria Projecten, September 16th 2004).

23 This is striking, as Transumo projects indicated in the 2009 project leader interviews that there was no real dissemination plan at the start (in the cases that project leaders did refer to an initial project plan

Transumo's first newsletter[24] was sent out a year after the programme's project plan, in September 2005. This newsletter announced that 25 projects had been approved. Most of these were core projects of Transumo that continued until the end of the programme. In the third newsletter, in May 2006, Transumo announced its new vision on sustainable mobility[25]. In May 2006 Transumo also introduced seven new themes[26] to replace the initial five themes. The reorganised programme's seven themes were each connected to a theme leader, who would integrate the projects in the domain and facilitate the dissemination of knowledge through networking[27]. Although their names were modified somewhat in the final 'Transumo footprint folder[28]', these themes remained largely intact during the programme.

In 2006, Transumo learned from their evaluators that they were satisfied with the development of the programme, and that virtually all of the monitoring milestones of 2005 were realised[29] in the previous year. Transumo was thus invited officially to submit their second subsidy request for 2007-2009. With this decision, Transumo was finally granted the same status as the other BSIK-projects.

5.4 Imagining the future: objectives

Transumo's primary objective was to stimulate the transition to sustainable mobility by developing and disseminating knowledge and innovations. On its website Transumo describes its mission as follows:

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they often spoke somewhat belittling about this plan as if it was just a formality) and that sustainability was something that was brought up by Transumo later on in the programme.

24 Newsletter Transumo, Number 01, September 30. 2005

25 This is especially interesting, as during 2007 and early 2008 Transumo often claimed 'not to have a vision'. With this they meant that they did not have a detailed vision on how the future of mobility should look like. Of course, a detailed future vision is not the same as the vision brochure they developed in 2006, but it still is noteworthy to see that Transumo started out with the idea that they had a pretty good idea about how the future ought to look, and that this changed at some point during the later months of 2006 or early 2007. An explanation for this is the involvement of several scientists in Transumo in this period, who advised Transumo on several matters, but were also critical about Transumo's ability to developed more detailed future images and actions plans for today.

26 These themes were: Administrative Processes, Collective Transportation, Chain Integration, Network Integration, Space [spatial planning], Traffic management, and Self Steering.

27 This was one of the things that ultimately did not go as planned, as was indicated in the 2009 programme interview.

28 November 2009, handed out at Transumo's final congress

29 Newsletter Transumo, Number 04, July 18. 2006

"to accelerate/encourage the transition to sustainable mobility. This will be achieved by initiating, and establishing for the long term, a transition process that leads to the replacement of the current, supply driven, mono-disciplinary technology and knowledge infrastructure, with a demand driven, multidisciplinary and trans-disciplinary, participative knowledge infrastructure"[30]

The core objectives of the BSIK structure are visible (knowledge infrastructure improvement, demand-driven research) in this mission statement. Objectives more specific for Transumo include the focus on transitions, sustainability, and long term thinking. In general, two types of objectives can be distinguished: content-related objectives and process-related objectives (see also Armenakis & Bedeian 1999: 295 for a discussion on content and process in change processes).

Content-related objectives concern the development of the content of knowledge and innovations for sustainable mobility. Here, one can think of the project-content; the knowledge, innovations and procedures that were developed. The results of this effort are varied, although they all relate to mobility. *Process-related objectives*, on the other hand, concern the ways of working that were applied in Transumo. Their dedication to participative, multi-actor, multidisciplinary and trans-disciplinary knowledge infrastructure development is indicative of their process-related objectives.

5.5 A playground full of mobility actors

From the very beginning, Transumo had as a core purpose the development of knowledge and innovation necessary to stimulate the transition to sustainable mobility. Consistent with the BSIK-demands, they carried out this work in a multi-actor setting, including actors from several levels of government, business executives of various stature, consultancy firms, universities, other knowledge institutes, and societal organisations. As mentioned above, Transumo ran from 2004 to 2009, and by the end of the programme it consisted of more than 30 projects related to sustainable mobility. The Transumo projects always consisted of consortia of actors: in general this would at least be business actors and knowledge institutions. The principal agent for Transumo was the Ministry of Transport, Public Works, and Water Management (V&W) and Transumo originally intended to involve governmental actors as well, but in many projects, this involvement was difficult to realise or intentionally avoided.

Nonetheless, more than 150 organisations were involved as consortium partners in Transumo[31], and many more were involved in a less intimate fashion[32]. Because Transumo

30 Website Transumo: www.transumo.nl

31 Website Transumo – 'about Transumo' section

32 For example as visitors at meetings, as participants in the vision development trajectory, or as involved outsiders in one of the projects.

worked primarily on long-term, strategic, and scientifically-oriented objectives, the more operationally focused echelons of many organisations related less to the Transumo objectives. The targeted stakeholders generally concerned those within the partner organisations that work on a similar level of strategic thinking and long term planning.

Because Transumo never listed a fixed group of stakeholders as their prime target, the domain in which Transumo worked did not have fixed and sharp boundaries. Boundaries and systems depend on the actors' perception: what are they focussing on and where do they draw boundaries (Gerrits et al. 2009: 137). The figure below represents the boundaries as broadly perceived by Transumo. In this figure the reader will see that Transumo originally intended to involve a wide array of actors, including governmental agencies, business actors and diverse knowledge institutions. Although not excluded from Transumo's reach, the figure does not include smaller categories of actors, such as societal organisations. Business actors have been divided into three categories: large executive businesses, small and middle-sized executive businesses, and consultancy firms. Governmental agencies have been divided into national agencies (mostly V&W), regional agencies, and local agencies. Knowledge institutions have been separated into universities and 'other knowledge institutions' ('other KI's'), e.g. application-oriented organisations, such as the Dutch TNO and colleges.

The figure include three circles, the first of which is the Transumo circle which consists of the programme's management, projects leaders, and individuals and organisations intensely and directly involved in the programme. The second or inner circle consists of project participants, frequent visitors of workshops and the like, and other directly involved actors. The third circle, the outer circle, consists of actors connected in some way to Transumo, but with little direct actual involvement. These were, for instance, recipients of the newsletters or incidental workshop participants. The figure is based on general impressions of the author.

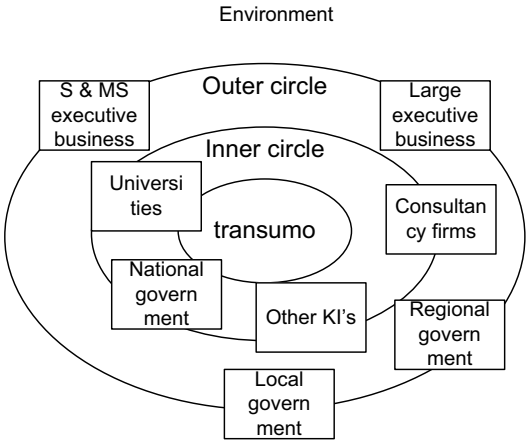

Figure 5.1: Intended involvement of actors in Transumo

As Figure 5.1 demonstrates, Transumo initially aimed to involve the national government (most prominently V&W), knowledge institutions, and consultancy firms that were closely linked to business actors. It initially sought to involve businesses directly, but soon realised that it was harder to involve those than consultancy firms and knowledge institutions. Regional and local governmental actors were involved in several projects, but due to the high number of regional and especially local governmental organisations, Transumo had to accept that their involvement would be limited to a selected few. National government and universities were even given a core place in the 'Transumo circle' because the national government was Transumo's principal, and universities supplied many of Transumo's directors and board members.

A network analysis was carried out to evaluate the involvement of these intended actors with project leaders and programme managers providing the relevant data. Four main indicators were assessed in this survey: 1. Frequency of contact, 2. Match with initial expectations, 3. Commitment of contact, 4. Match with expectations. To assess the actual involvement of actors, the network analysis survey asked respondents to rate the *frequency of contact* with diverse actors as being daily, weekly, monthly, 3-monthly, less than 3-monthly, or never. In the figure below, the thickness of the line represents the frequency of contact[33].

33 A normal line is 0.75 pt in thickness. This was the pt value attached to 'less'. Never contact would result in no line. Contact every 3 months resulted in a 1.5 pt line, contact every month resulted in a 2.25 pt line, contact every week got a 3 pt line, and contact every day got a 3.75 pt line. This last category never occurred, it was mentioned only once by a respondent, for small and middle-sized businesses.

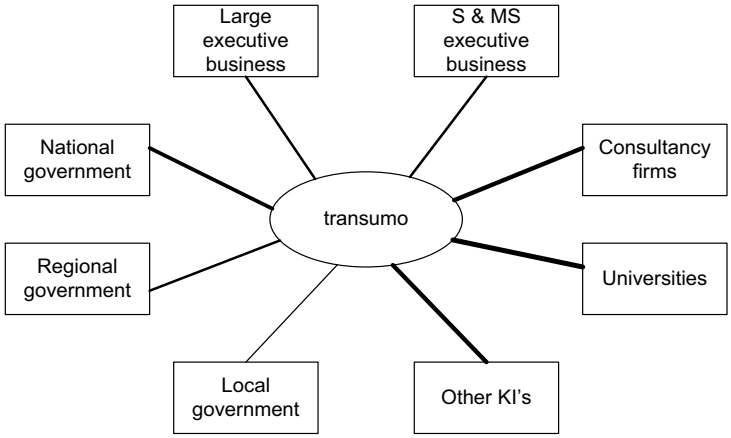

Figure 5.2: Frequency of contact with actors in the mobility domain

As the above figure indicates, respondents to Transumo's network analysis survey were especially close with universities (mostly weekly contacts), consultancy firms and knowledge institutions (weekly to monthly contacts) and national government (monthly contacts). The least frequent contact was with local (less than every three months) and regional government and businesses (every three months). A comparison between figures 5.1 and 5.2 demonstrates that Transumo stayed largely true to its original plans to involve of national government, universities, other knowledge institutions and consultancy firms. However, some differences existed in the amount of actual contact and the respondents' initial expectations. Due to chapter length considerations, the discussion will be limited to a few key actors.

Universities and consultancy firms were contacted at roughly the same or greater rate than initially expected. In the figure, every respondent is represented by a 0.75 pt line. The thicker the line, the more respondents chose this answer option.

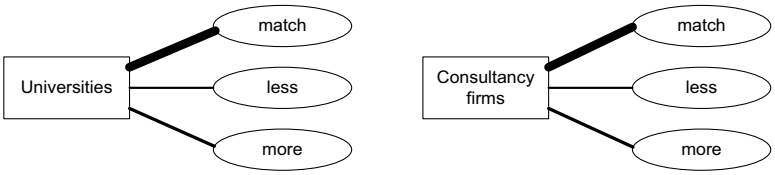

Figure 5.3: Matching expectations for universities and consultancies

The results were very different for some other actors. Large executive business' and national government's contacts were especially at a 'less than expected' rate as demonstrated in the figure below.

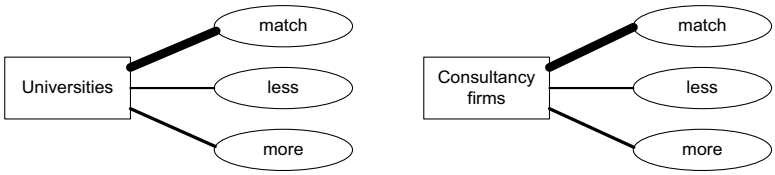

Figure 5.4: Different expectations for large executive firms and national government

Respondents often expressed disappointment in the amount of contacts with these actor types. For national government it is even the case that the majority of the respondents indicated that they had less frequent contact with national government than initially expected. Results for small and middle-sized executive business were rather similar to large executive business. This category scored less often than large executive business a 'less than expected' score, though. Results for regional government were more evenly spread between the answering options. Knowledge institutions other than universities scored similarly to the universities. Although the actual frequencies indicated were rather in line with original expectations as laid out in figure 5.1, the Transumo project leaders and programme managers had high expectations of their level of contact with of the national government that were not met. The monthly contacts were seen as insufficient. Similarly, although initial expectations of executive business might have not been high in the first place, expectations were still higher than the actual frequency of contact.

The relationship between Transumo and the Ministry of Transport, Public Works, and Water Management (V&W) was difficult and fragile for several reasons. The supervising Commission did not want V&W to get overly involved in Transumo because of earlier experiences with Connekt[34]. Aside from that, V&W also took too long to decide what their involvement in projects would be, and by the time they were ready to make such choices, the projects had already been running for two years[35]. Furthermore, personal and intangible matters, such as changes in staff at V&W, caused discontinuity. Project leaders reported in interviews that they sometimes deliberately chose not to involve national governments, because of difficulties arising out of their dual role as subsidiser or principal and as participant. From the perspective of V&W, Transumo's objectives offered little value to the ministry (DHV 2009: 4; thesis receiver interviews). Thus, neither Transumo nor V&W were very positive about each other[36]. The V&W's lack of involvement and the low levels of involvement from business executives meant that the demand side was not as well represented as originally planned.

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34 This statement is based on the Transumo programme management interview.

35 This statement also originates from the Transumo programme management interview.

36 The reader should be aware both parties also mentioned positive matters about their relationship. However, the negative aspects overshadowed the positive aspects.

It is important to bear in mind, however, that the involvement of actors is cannot be defined solely by frequency of contact. Commitment is often experienced as more important than frequency of contact. The network analysis survey therefore also investigated the perceived commitment of actors. Results are somewhat more equal across actor types in this regard than in Figure 5.2[37].

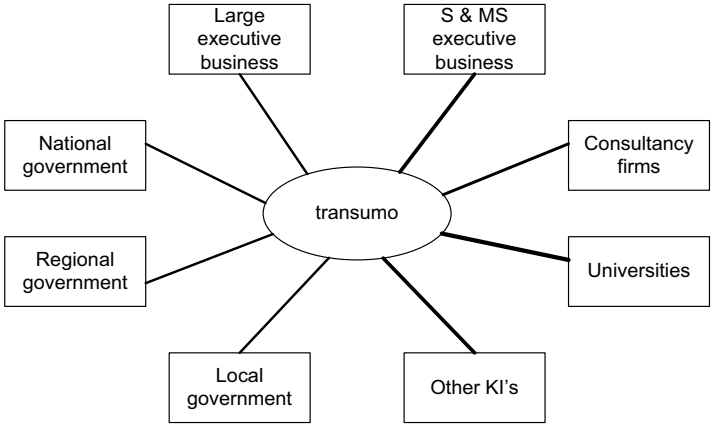

Figure 5.5: Commitment of actors

From Figure 5.5 it can be deduced that small and middle-sized businesses, universities, and knowledge institutions were seen as 'reasonably committed', and universities were seen as most committed. The governmental agencies were on average rated as being 'moderately committed', just like the large businesses. Respondents were also asked whether the actual degree of commitment matched their initial expectations. Both categories of businesses scored quite often in the 'less committed than expected' category, as indicated in Figure 5.6.

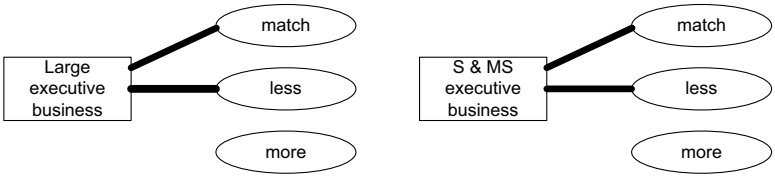

Figure 5.6: Different expectations for commitment executive business

37 For a valuation of 'very committed' a 3 pt line was reserved, for 'reasonably committed' a 2.25 pt line, for 'moderately committed' a 1.5 pt line, and for 'little committed' a 0.75 pt line. For 'not committed at all' no line would be drawn, but this did not occur on average (the answer option was chosen twice though, both times for local government). For clarity purposes, this was not the same as 'no contacts at all', which was an answering option as well, in case a project leader or programme manager just had not been in touch with a certain actor.

No category of business was rated 'more committed than expected'. In the case of large businesses, more respondents saw their commitment as being 'less than expected' than 'matches expectations' (for small and middle-sized executive business, the same number of respondents chose 'matches expectations' as 'less than expected'). However, businesses still scored better than the national government[38].

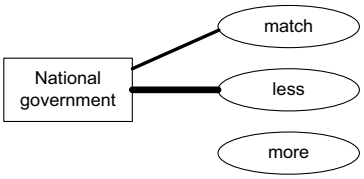

Figure 5.7: Different expectations for commitment of national government

A clear majority of the respondents saw national government as being less committed than initially expected. In comparison, virtually all respondents saw the commitment of universities (92.3%) and other knowledge institutions (91.7%) as matching their expectations. This analysis has provided some insights into the involvement and commitment of actors in Transumo, and whether this matches initial expectations on frequency and commitment of contact. From this analysis it can be concluded that as initially expected, local and regional governments and all levels of business were not greatly involved with the programme (see Figure 5.1). Further, also in accordance with Figure 5.1, local and regional governments and large firms were considered not very committed.

If, however, respondents are asked to match the degree of involvement or commitment to their initial expectations, a different picture starts to emerge. Disappointment is strong with regard to the involvement and commitment of national government and executive firms. Observations of the author confirm this, and this topic was frequently brought up in meetings and conversations. Key actors in Transumo's environment can thus be said to have both displayed a measure of interest in Transumo and kept their distance at the same time. Governmental agencies especially, were less involved than anticipated, despite the initial expectation that they would form an important part of the programme and its projects. The environment in which Transumo operated in thus required a degree of flexibility and adaptivity, which will be examined in the next chapter.

Also due to the separation in two phases of subsidy allocation the programme had to be highly aware of their context and their requirements, maybe more than other programmes that did not experience such a snip. Due to complicated arrangements and regulations, and

38 The lack of connections made with V&W has also been noted in other evaluations of Transumo, for instance DHV 2009

lower than normal working tariffs than common in business, Transumo had to work hard to keep business on board. The setting was not easy, or directly welcoming, but Transumo did benefit from the great degree of interest in their programme and many actors sought to become actively involved. This receptivity of the receivers and of Transumo (the sender) itself will be investigated in the following chapter. The initial hypothesis, based on this Chapter Five, is that senders would be more aware of and willing to meet the requirements of other stakeholders, but that the receivers would be interested but somewhat distant. The accuracy of this prediction will be examined more closely in Chapter Six. Before the receptivity analysis is conducted, the next few pages will first explore some projects of the Transumo programme.

Painting a picture:
intermezzo on Transumo projects

This intermezzo will discuss several Transumo projects in order to provide greater background into the current case and examples for use in the analysis of the case study. The intermezzo begins by describing the Transumo A15-project before turning more briefly to a number of other projects, including a successful and less successful one. In the latter two cases the role of receptivity in assessing impact is studied.

Transumo A15-project

The Rotterdam port is of great importance to the Dutch economy, with approximately 430 million tons of goods transferred each year[39]. The growth of transportation based business and the economic profits they bring are essential for the economy, but they put great amounts of pressure on the environment. Plans were approved several years ago to expand the port area (Tweede Maasvlakte[40]) in order to facilitate the desired growth. However, space pressures are significant in the Netherlands and the port's expansion slated to take place on land reclaimed from the sea. A total of 2000 reclaimed hectares will facilitate the expansion, half of which will be used for infrastructure, while the other half is used for industrial sites.

This amount of new infrastructure appears substantial, but so are the demands. For example, all goods entering the port must also leave the port again, and a substantial share of the goods that enter the country via the port is transported further by road. Although Rotterdam has a good connection with the hinterland, the roads are often unable to fluently support all current demands. With the development of the *Tweede Maasvlakte* this issue is expected to become even more pressing. Congestion, but also pollution, climate change, accessibility and costs pose real challenges to the port authorities, and threaten their goals of sustainability.

One of the Transumo projects was carried out in the port of Rotterdam. This project was called '*From Maasvlakte to Hinterland: sustainable freight transport as challenge*', or '*the A15-project*' in short. A15 refers to the main road running from the port area to the hinterland. More than thirty actors, among them government agencies, business actors, port authorities, environmental groups, and universities, collaborated together in order to tackle the complex sustainability challenge of the port. The objective of the project was to use knowledge, innovative solutions and new insights from public administration research to ensure effective cooperation between multiple actors. Such cooperation was to be fostered in order to obtain integrated ideas and solutions to address problems in the port's future

39 http://www.portofrotterdam.com/nl/over-de-haven/ - last accessed June 2011

40 Much information on the Maasvlakte-2 project can be found on http://www.maasvlakte2.com - much of the data mentioned about the port area also stems from this website.

accessibility and sustainability. Freight transport on the A15 was to serve as a case study project for other aspects of the port's accessibility and sustainability. The effort began with a shared problem analysis of road accessibility in the year 2020. This problem analysis was used as the starting point with which to search for practical and innovative solutions that were deemed appropriate by all participants. Insights were also developed into potential technical and logistical solution directions.

This effort was not without its challenges. While some stakeholders were determined to focus the project explicitly on accessibility (making congestion the most important theme), others were determined to broaden the scope to include sustainability concerns covering environmental and societal factors. The pro-accessibility stakeholders were convinced that the pro-sustainability stakeholders were mainly interested in environment, and that an increased focus on sustainability would jeopardise the economic importance of the port as a profit centre. This illustrates how hard it is to come to meaningful solutions together, even if stakeholders in a multi-actor setting basically agree with each other, and intend to work on solutions together. In the end, stakeholders reached a shared perspective, but the project leader remained concerned it would not result in any real changes for the port.

Other Transumo projects

This section will discuss three more Transumo projects that are relevant in terms of mutual receptivity. Naturally, these are not the only projects with interesting receptivity results or successful outcomes. The first project discussed here is the project *DESSUS (DESigning SUStainable Accesibility)*[41]. This project's key idea was that, in order to realise sustainable mobility, the domain of traffic and transport and the domain of spatial planning needed to be better attuned to each other. Project managers noticed that this idea was widely supported by stakeholders, but that it did not happen much in practice. To stimulate change, they set up a broad consortium with many actors from governmental agencies, businesses, and the scientific world. The project started two subprojects to work on this aim, one to realise better integration between the domains, and another to realise better integration among other parties. This effort to increase the receptivity of stakeholders was described as follows by the two project leaders: *"Transition has to develop on two front lines: at the model makers [e.g. scientists] and at the policy-makers. The coherence between these two parties is very important – two parties which do not understand from each other why they don't understand each other. We try to provide a working procedure for spatial planning people and traffic and transport people because they share the same frustrations with model-makers and policy-makers: the frustration that they do not understand*

41 http://www.transumofootprint.nl/Lists/Projectdatabase/project.aspx?ID=7

each other.". Realising receptivity was therefore a core objective of this project and they chose the strategy of co-producing knowledge with both the demand and supply actors as a means for reaching it.

The second project discussed here is that of *Europese Netwerken*[42]. This project was a cooperation initiative between businesses and the scientific community. The project involved several pilot projects in which they researched and tested several initiatives to reduce or improve transport in order to realise environmental benefits, while maintaining or increasing business profits. Several of these pilot projects resulted in concrete outcomes and changes. The project had a clear sustainability objective, but attempted to realise it while honouring the objectives of participants who had other interests as well. As the project leader commented: *"The partners of the project do have a certain feeling for sustainability, especially when it comes to realising innovative concepts. But you have to be common-sensible here: cooperating with business actors means that it's about making profit for them, that's what they want to realise."*. The guiding paradigm for this project was thus the co-creation of intelligent solutions that accepted and incorporated the interests of its diverse stakeholders and it was through such efforts that the project eventually became successful in realising its objectives.

The third and last project discussed here is the *Verzekeren per Kilometer*[43]. This project researched ways of insuring vehicle owners based on their driving behaviour and routines, such that people who drove safely and sustainable would be rewarded, and those with unsafe or unsustainable practices would have to make a greater financial contribution to the insurance pool. This way, drivers would pay in accordance with their choice of driving style, instead of according to standardised contribution agreements. Although this idea has been tested and adopted in some international markets, it was unique within and beyond Transumo for the fact that not just one, but six insurance companies were involved. The cooperation between universities and insurance companies proved successful, and the idea was commercially adopted. However, the project was less successful in involving and enthusing governmental agencies. The project leader summarised the problem as follows: *"The project does not ally well [with ideas of governmental agencies] because they believe they can do it themselves with their own policies. It's the 'not invented here' syndrome."*. Nonetheless, this problem was partially overcome by the sheer enthusiasm of business actors who chose to adopt the recommendations, thus securing the success of the project.

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42 http://www.transumofootprint.nl/Lists/Projectdatabase/project.aspx?ID=11

43 http://www.transumofootprint.nl/Lists/Projectdatabase/project.aspx?ID=24

An example of a project with problems: Integraal Collectief Personenvervoer

The Integraal Collectief Personenvervoer (ICP) project was aimed at finding integral solutions for non-public, collective transport aimed at specific target groups. Again, the project required cooperation with a diverse set of actors to realise a truly integral system. Early in the project (2006), its management became aware of high political and organisational risks to be associated with this cooperation (Hilferink & Alink 2010: 5). None of the participating actors were prepared to let go of their own domain and power, or to accept new domains and responsibilities. Further, no single actor could be identified as the owner of problem, a fact that led to many conflicts between actors (ibid.). As such, a decision was made to terminate the project prematurely. Although lessons were learned and initiatives were created, the project was unable to fulfil its original objectives, or to realise new ones. The project will thus be reviewed using the evaluation framework put forth in this study in order to assess whether less successful projects actually receive lower scores in the receptivity framework. The data for the assessment stems from an interview with the project leader, in February 2009, not long after the project had been terminated.

Table iT.1: ICP sender receptivity scores

Awareness	Satisfaction with context	Negative
	Fit urgent problems	Neutral
	Future images	Neutral
Association	Presence of learning	Positive
	Fit official views	Neutral
	Dissemination fit	Neutral
Acquisition	Diversity and strength connections	Negative
	Handling external conditions	Negative
	Competencies	Negative

The receptivity assessment demonstrates many neutral and negative indicator scores. The problems of this project appear to be the largely the responsibility of the receivers who were unable to cooperate and work on the shared objective. However, the project's sender side was also rather passive in furthering the cooperation. Although there must have been attempts to align the actors, this quote demonstrates significant problems with this effort: *"And so it went on and on for a while, and then it stopped. (…) When they [the province] came to us and told us they did not want to continue with it if it went this way, we stopped."*. A possible reason for this passivity is that the province was the prime initiator of the project, and project management relied heavily on their influence. When the province became dissatisfied with the trajectory, the project itself did not have the strength to enact

change. Although the receptivity of the receivers was there initially, it soon plummeted when they became aware of the required sharing of responsibilities and power. Whatever the reason for this, the analysis of the ICP using the evaluative framework supports its ability to score troubled projects appropriately lowly. The next section will similarly apply the framework to a successful project in order to determine if it is scored appropriately highly.

Success case Rush Hour Avoidance

Rush Hour Avoidance, known in Dutch as Spitsmijden, was a project that was carried out under Transumo's 'Self-Regulation' domain. The project focussed on stimulating 'good behaviour' with positive financial incentives (rewards), instead of the more common approach of punishing bad behaviour with negative financial incentives (such as fines). One of the most striking aspects of the project was that it managed to combine short-term tangible solutions with long-term ideals. One project leader encapsulated the long-term ideals as follows: "*Sustainability is part of the project. The most important aspect of sustainability in the project is in the transition part of the project. Other elements in which sustainability can be seen in the project are the effects on welfare, and in how we relate sustainability to human relations: the tripartite cooperation in this consortium is unique. Each of the parties alone could never have made this happen. In the end sustainability is all about people*". The project became very well-known in the Netherlands and received a lot of media attention. Experiments carried out had positive results, and the idea was then adopted for further testing by the national government themselves. The steady progress from an idea, to an experiment, to adoption in a short time frame is surely indicative of a successful project. But is this success adequately captured in the application of the receptivity framework? The next subsection will explore this.

Receptivity analysis of Rush Hour Avoidance

This receptivity analysis will focus on receptivity variables relevant to the sender side, to take into account the fact that interviews were conducted with a project leader, but not with receivers. Further, the analysis of the receptivity of the sender will not explicitly discuss 'application perception' indicators, as these could not be deduced from the project leader interview in a systematic way. However, application perceptions will become clear from the discussion of other variables and indicators and receiver perceptions will be briefly analysed based on other sources of information. The findings were as follows.

Table iT.2: Rush Hour Avoidance sender receptivity scores

Awareness	Satisfaction with context	Neutral
	Fit urgent problems	Positive
	Future images	Positive
Association	Presence of learning	Positive
	Fit official views	Positive
	Dissemination fit	Positive
Acquisition	Diversity and strength connections	Positive
	Handling external conditions	Neutral/Positive
	Competencies	Positive

Most indicators showed a positive score, with two exceptions. Satisfaction with the content was scored as neutral, as the project leader indicated that the project was well received by the receivers, but long-term thinking and sustainability should have been of greater concern to the policymakers:"*I hope that long-term thinking will gradually start to move up on the list of priorities with policymakers and politicians. If you take sustainability seriously, your policy will equally need to be sustainable, and thus focussed on the long term*". The handling of external conditions received a score somewhere in between neutral and positive as problems with the joint financing arrangement and other money issues were hardly mentioned but were not absent either. The project leader commented as follows in this regard:"*What they [Transumo programme management] could do to increase involvement is to have as little bureaucracy as possible and as much inspiration as possible. Right now [early 2009] they are doing this very well. They have simplified the accountability and reporting systems, which helps a great deal*". This quote implies that although there may have been problems with the external conditions earlier on, this problem was no longer significant at the time of the interview. The other indicators all received positive scores. Urgent problems mentioned included negative thinking, congestion, and the environment, all of which were consistent with survey findings on problems as perceived by receivers. The project leader had no problem describing the elements of an ideal future mobility system, and was able to discuss the reality of these ideas. Learning could be seen in the project by, for instance, the development of dissemination strategies throughout the project's duration, and the participation in additional (non-obligatory) Transumo activities, such as the 'transition management advice trajectory'. The project management indicated their ideas corresponded with official views, as both the government and businesses had shown great interest in their outcomes and had adopted the idea themselves. Dissemination strategies were flexible, focussed on keeping a simple and tangible message, and diverse in its usage of communication channels. The project also had a broad consortium, in which not only business and knowledge institutions participated, but also governmental agencies. Those involved were often also very committed. The proj-

ect had a very enthusiastic group of people and a highly visible project representative that mobilised many parties and ensured the implementation of the project ideas.

There is no data that will allow for receiver receptivity analysis specifically for Rush Hour Avoidance. However, from the receiver receptivity analysis of Transumo as a whole (see next chapter) it can be concluded that receivers thought positively of the project. Survey respondents often mentioned Rush Hour Avoidance when asked whether they knew of KAIPs or KAIP projects. Furthermore, virtually all Transumo project leaders in interviews mentioned Rush Hour Avoidance as Transumo's key success story. Because its innovations were eventually adopted by the government, it can be concluded that receivers see benefits of the project ideas, and that they are open, willing and able to implement the project ideas that they deem relevant and beneficial to them.

This brief receptivity analysis reveals several important aspects of a successful project. The combination of short-term tangible solutions and experiments with long-term sustainability ideals helps sell the project to the largest number of stakeholders. The tripartite cooperation was also well executed in this project. Unlike many other Transumo projects governmental actors were very much involved and committed to Rush Hour Avoidance. Several project leaders were active in the process, and each had his own task (for instance advertising the project to the outside world, or process management). This helped to optimise efforts, and to reduce the potential constraints of difficult external conditions. Science and practice co-produced the ideas in the project, and each provided input in the process based on his or her own experiences and expertise. Along with a great idea, the project's success can be attributed to a combination of enthusiasm, committed tripartite cooperation (including scientist-practitioner cooperation), a tangible short-term experiment, long-term ideals, and enough manpower to deal with all the work. Further, the application of the receptivity framework to the successful project Rush Hour Avoidance demonstrated that successful projects indeed score high on the indicators and variables. This means the framework appears appropriate for assessing knowledge and innovation programmes' impact. The next chapter will apply the framework to Transumo as a programme.

Chapter 6

The impact of a mobility knowledge and innovation programme

This chapter will assess the impact of Transumo. This assessment will serve as a case study on the evaluation of the impact of KAIPs. The receptivity of senders and receivers will be examined using the evaluation method devised in this thesis for evaluating KAIPs' impact. Eight variables concerning sender and receiver perceptions were developed in order to assess receptivity.

- Awareness of needs and desires of receivers by senders [v1]
- Association of needs and desires of receivers by senders [v2]
- Acquisition of resources needed for impact at the senders [v3]
- Application opinions of the senders [v4]
- Awareness of receivers towards innovations of senders [v5]
- Association of receivers towards innovations of senders [v6]
- Acquisition of receivers to adopt innovations of senders [v7]
- Application opinions of the receivers [v8]

The assessment of these variables will allow drawing conclusions on the receptivity of Transumo's senders and receivers. The research question for this chapter is: *What was the impact of the programmes on the (un)intended recipients of their knowledge and innovations?* As discussed in Chapter Four, data acquired in several ways will be used to assess the KAIPs on the above variable, and the individuals who provided this data in the Transumo case can be divided into two groups. The first group were the senders. Project leaders directly involved with the programme were interviewed, and these individuals worked in a variety of organisations, including executive businesses, universities and consultancy firms. Programme leaders were also interviewed, but these individuals were directly employed by Transumo. The second main group comprised the receivers. The interviewed receivers also came from diverse backgrounds, including businesses, governmental agencies and knowledge institutes. The survey respondents were also a mixed group in that some were directly involved in the programme, and others only vaguely acquainted with it. They were for instance workshop visitors, advisors, project participants, and so on. Appendixes to this thesis list all interviewed respondents. For more information on the surveys, please refer to section 4.2.

6.1 Sender receptivity

To recap, the following indicators were formulated to operationalise the variables. In this first section, the focus is on sender-related indicators.

Table 6.1: Sender variables and indicators

Variables	Indicators
Awareness	Satisfaction with context
	Fit urgent problems
	Future images
Association	Presence of learning
	Fit official views
	Dissemination fit
Acquisition	Diversity and strength connections
	Handling external conditions
	Competencies
Application	Estimated position Transumo in sector
	Estimated impact projects Transumo
	Estimated impact programme Transumo

6.1.1 Awareness

Satisfaction with one's own role in the societal context

Project leaders viewed the mobility sector as segmented and connected at the same time. Some said that high segmentation existed between mobility issues, as it does between mobility in general and other sectors such as spatial planning and energy. Multiple other project leaders, however, argued that mobility was a very connected sector because it existed only in relation to other domains. Other trends project leaders commented on were the decentralisation of government, and the increasing role of market parties in decision making. Sustainability also received a great deal of attention in the sector, but this was also a contested subject. To summarise from the many diverging perspectives of our project leaders: the mobility sector knows multiple challenges, and sustainability is a key concern. However, sustainability does not always get the type or degree of attention that project leaders would like to see. Overall, project leaders were not greatly satisfied or dissatisfied with the context they worked in. Therefore, the end score for this indicator is neutral.

Fit of Transumo problem perceptions with sector problem perceptions

The project leaders had a diverse range of problem perceptions. Interestingly, several project leaders felt that the framing of the issues in terms of 'problems' is in itself problematic, and that the focus should instead be more on chances and possibilities for progress. Nonetheless, they referred frequently to sustainability being a key issue in their work, focusing on three aspects: accessibility (which is related to profitability), safety, and environmental responsibility. Often project leaders felt that the sense of urgency was lacking in relation to the problems they perceived to be most prominent. The more concrete the problems they mentioned, the greater their attached sense of urgency.

However, the receivers from the survey found *congestion* (30.9%) and *accessibility* (30%) to be pronounced problems, both of which were related to profit and enterprise. More environmental concerns, such as climate change and air pollution, received much less support (11.4% and 6.0%). It must be noted, however, that 'sustainability' was not an answer option for the survey respondents, and that many respondents used the open answer field to say they could not choose between these problems, that all were important for sustainability, and that in general, the mobility sector ought to be made more sustainable[44]. This means the problem perceptions of senders (project leaders) and receivers (survey respondents) does not diverge too significantly. Overall, it can be concluded that there was indeed a fit between problem perceptions of the senders and receivers, albeit with the receivers demonstrating a slightly higher profit-orientation and the senders being more focused on the environment. The end score is therefore positive.

Future images and the realism of these images

The interviewed project leaders provided a diverse set of ideas on improving the future of the mobility sector. Several general elements can be distilled from this varied set. First, financial stimulation was seen frequently as a means of improving the mobility sector. This view was likely inspired by the success of the Rush Hour Avoidance project. Second, many called for increasing means of travel as a way optimising the choices of citizens and other travellers. A third element was the realisation of awareness about the limits of mobility and the chances of sustainable mobility among citizens and professionals. The fourth and last recurring element concerned matters such as cleaner traffic and improved safety measures, i.e. more tangible solutions and chances.

Most project leaders considered their ideas of making improvements to be realistic on a long term basis. Some of the ideas such as that of financial stimulation and increasing choices was seen as very realistic and were already familiar for many because much has been said about them as potential solutions. Other ideas were considered long term and more difficult to realise, but none were deemed entirely unrealistic or impossible by themselves. The project leaders appeared thus well acquainted with the possibilities of the mobility sector, and the chances for change. Because this is a good starting position for a KAIP (attempting to realise change with an awareness of possible ways of doing so) the end score of this indicator is positive.

44 16.4% chose the open answer field over one of the listed answer options. They did not all say something about sustainability. About a quarter of this 16.4% did, however, give an answer that can be seen as oriented at a broad sustainability idea. The question was primarily developed for the transition monitoring project, not for this thesis research, but in retrospect the answering options should have been more systemised to provide a better comparison.

6.1.2 Association

Presence of (receiver-oriented) learning in projects/ programme

The culture within Transumo was rather open to learning, including learning from failures. A general observation was also that the Transumo project leaders were capable of critical thinking, an ability which was fostered to a large degree by their acceptance that failure was a real possibility given the nature of innovation projects. After all, attempts to stimulate change and manifest new directions are bound to invoke resistance in some actors. As one programme manager reported, "*We learnt a lot from the analyses of these [failed] projects (…) Well-documented failures do not trouble me or my colleagues (…) it provides crucial information.*"

Although programme management accepted well-documented failures as legitimate project outcomes, project leaders themselves greatly feared such failure. They were keen to prove their ideas, and make them work in practice. When they encountered problems leading to the failure of a project, their disappointment sometimes got in the way of their learning. "*They are not always prepared to put their experiences on paper*", a programme manager commented.

In contrast, the programme management itself was rather open about its failures and the lessons learnt. They especially regretted accepting a separation of the subsidy track into two separate tracks, and the consequences of this. In their opinion, this had a negative influence on the programme because it meant that they needed to produce results quickly – more quickly than is feasible for a KAIP. They also regretted their indolence in the first project acceptance track. In their opinion, they ought to have focused more on transition and sustainability and the presence of proper dissemination strategies from the start, and that they should have judged their projects based on that. The ease with which programme management spoke about their lessons learnt and regrets leads to a positive score on this indicator.

Fit between project ideas and 'official views'

There was some lack of fit between what Transumo did, and what receivers thought Transumo should focus on and do. This is definitely the case at the programme level: "*Many expect us to work on innovations, and then observe that it is very much knowledge-driven, and then they are disappointed. Whereas it's actually the case that we are a knowledge programme, with innovations as an extra. I do not know how that difference in expectations ever originated*". As demonstrated in this quote Transumo has not been able to entirely reconcile the differing expectations of the senders and receivers.

The same is true at project level, albeit to a slightly lesser degree. Project leaders were asked to review the fit of their project with the governmental actors' views on (sustainable) mobility. The answers were varied, ranging from, "*Yes [we connect with views of government agencies], the ambitions are also quite high there*" to "*they could not care*

less, they care about the delusion of the day (…) we do this project despite the government". Most project leaders' views were somewhere between these extremes, and the perceived fit between senders and receivers can be judged both positively and negatively in this regard. Also, many problems with fit stem from more general societal trends, such as decentralisation, profit-orientation, and the need for simplification and control instead of the acceptance of complexity. Therefore, all in all, this indicator is scored as neutral.

Fit of dissemination strategies with that of the receivers

Many projects leaders did not have a clear dissemination plan at the start of their project. Although they had to include a dissemination plan in their original application to Transumo, this initial plan was not considered very helpful in realising the dissemination and diffusion of ideas. Dissemination strategies often changed during the course of the project to adapt and create a better fit with receivers. Most commonly used methods of dissemination were congresses and seminars, personal contacts, and scientific publications. In general, these products and channels corresponded with the needs and desires of the receivers. Receivers equally valued congresses, seminars and other meetings, but did request an increased use of practice-oriented rather than purely scientific publications.

Programme management initially hoped to disseminate ideas and knowledge through project participants and other involved parties. It took some time before they realised that this strategy was not working as planned. Especially in the early phase of the project, participants chose to await results before promoting the project. Further, the participants were unaware of this expectation of the Transumo programme management. The management thus tried to fix this by creating a central dissemination strategy under which they contacted general managers and other key organisational players and organised several educational courses.

Another programme management strategy was dissemination through theme leaders. This strategy also encountered problems. "*The theme leaders did not take up this role, and because of that we missed a chance in many trajectories to embed the Transumo-ideas. We assumed that theme leaders would take part in all kinds of networks, and then would carry out the Transumo ideas to these networks, but that only happened in dribs and drabs*". Dissemination strategies of Transumo were therefore somewhat ad hoc and chaotic. Initial ideas often failed to be implemented in practice. However, the programme management also often proved dynamic enough to tackle problems as they arose. They initiated new strategies, communicated their expectations better, and planned new meetings and workshops to discuss their ideas. The projects eventually managed to realise a proper fit between the dissemination channels desired by the receivers, and the channels they used. Because of these changes and adaptations, this indicator received a positive score.

6.1.3 Acquisition

Diversity and strength of connections

While much of the mobility sector was focused on immediate problems and plans, Transumo focused more explicitly on long-term objectives and strategies. This sometimes led to the receivers rejecting the programme as being 'too vague, too long term and too abstract', and sometimes led to resentment in the Transumo management and a rejection of the receivers' expressed needs and desires. These mutual disappointments had a negative effect on the diversity and strength of the connections at Transumo. Programme management sometimes felt that despite the importance of their work, they did not get appreciation for their knowledge of mobility change. As one programme respondent put it, "*In a certain way they also have blinkers on about us*". Receivers, on the other hand, were disappointed with the content of Transumo and the degree of knowledge and science focus in this content.

Programme management thus concluded: "*We find it hard to make a connection with the activities that take place in the outside world, and they do not come automatically to Transumo either*". There appeared to be a lack of fit between the needs and desires of the receivers, and what Transumo had to offer. Although virtually all relevant stakeholders were involved in the programme, this involvement was not always as committed as desired. Although Transumo had a broad array of connections, the strength of these connections was not always quite as high as anticipated and hoped for. This was already clear from the results of the network analysis survey in Chapter Five. Especially (national) government remained at a distance from the programme. Business, on the other hand, was relatively well involved. The end score is therefore neutral.

Handling of external conditions (time, money)

The author was aware of the frustration of some participants with the joint financing arrangement before the interviews were begun. To avoid invoking repeated complaints about the arrangement and its focus on accountability and control, no interview questions related directly to the arrangement and the financing structure. Despite this, virtually all respondents mentioned it - sometimes briefly, but usually extensively. A more elaborate account of all frustrations and issues mentioned can be found in Bressers et al. (2009: 25-27). Project leaders complained in particular about the forms and sheets they had to fill out. "*It was endless quantities of papers, forms, and so on…*", one project leader said with a sigh.

They also talked about the complex financial arrangements, which in some cases, led to the departure of consortium partners. They also discussed general trends of increasing control and accountability in society. One project leader said: "*You have to find a way that does not bulge from rules and accountants and all that. It's also caused by the society, which is also bulging in it's strive for more accountability.*" Another project leader agreed with this, saying that "*what bothered me most in this project was the process; changes all*

the time. You can also blame that on the government. There is no trust beforehand; it's a controlling government".

The separation of the two funding phases was seen as one of the prime causes of these administrative problems. "*We had to show results very quickly to keep our Transumo project continuing because of the snip. This affected our project in a negative sense*." As was discussed in one of the previous indicators, this separation was also seen by programme management as one of the most important learning experiences. "*We should never have accepted that snip. We had to repair too much to get good results anyway, that should have been different,*" one programme manager commented. Another said, "*We were dealing with a highly uncertain situation due to the snip*".

Transumo had the resources necessary to carry itself forward as the joint financing arrangement provided money for the projects. Their internal financial organisation was also well organised and orderly. However, the money was not usually seen as enough. Business actors especially could pay hardly any labour hours from this money, because their own rates were much higher than stipulated through the arrangement. Thus, despite the enthusiasm, many projects suffered from a lack of manpower. Nonetheless, the general enthusiasm did compensate somewhat for the formal lack of time. But the money also came with many requirements and rules, which proved difficult with regard to the open nature of innovation projects. Results had to be planned beforehand, even though results innovation projects do not often start with a clear idea of what they will produce. Although a certain number control structures appeared natural and desirable for such a joint financing arrangement, the specific approach chosen in the Transumo case was less than ideal. Furthermore, Transumo at first failed to deal with this situation in an appropriate manner. The management was new at the game, and demanded high levels of adherence to these demands. After the second joint financing track was approved, they improved this substantively. However, because of the time it took, this indicator receives a negative score.

Presence of needed competencies

Programme and project managers were asked to name important competencies for the execution of KAIPs. Both mentioned *enthusiasm and activity* as a core competency. They also mentioned the *mobilisation of parties* as an important competency. They noted further that practice proved much more complex and unruly than anticipated, and that they needed additional competencies in order to tackle these problems. One of these extra competencies was the *ability to switch back and forth between parties, and connect them in the process*. Another competency concerned the commitment of partners as an issue as programme management recounted the issues they faced in implementing project ideas. Being able to *realise implementation and execute plans* was thus seen as another important competency. Programme management mentioned also the *ability to let people*

create project proposals, and in that competency also the ability to include sustainability, transitions, international connection, and process knowledge in these proposals.

Both project leaders and programme managers were thus capable of distilling important competencies from their activities. Some of these competencies were abundantly present in the projects and programme and a good example of this is the enthusiasm/ activity competency. Other competencies were not as frequently mentioned, particularly the realisation/ implementation competency. Realising the commitment of other actors in actually executing project ideas was sometimes problematic. In general, all competencies were present to a certain degree, but the long-term and strategic focus of the programme proved a problematic factor in realising implementation. Nonetheless, programme management learnt how to switch back and forth between actors and interests along the way. Because of these mixed results, the indicator is scored as neutral.

6.1.4 Application

Estimated positioning of Transumo in the sector

The presence of learning has been discussed in relation to an earlier indicator. Although learning was always stressed, it was in second half of the programme that Transumo strongly developed its ability to accept criticism and use this in a constructive way. This honest and open attitude of the programme management is reflected in responses to questions relevant to the current indicator. Programme managers shared a number of things that should have been done better. An important concern they had was the depth of people's familiarity with the programme: "*within the mobility world, we are rather well-known. People known Transumo, but do not know what happens there*". They noticed that although Transumo's role was less visible and disputed within the mobility sector, it was often mentioned as a focal point in other sectors: "*Maybe they do not know how things are within the mobility field, but they know someone from Transumo, and therefore come to us. Within mobility, everything is much more traditional and much more segmented*".

High-profile support among receivers was perceived to be rather limited. "*No, I did not experience that [high-profile support for Transumo]. I did hope for it; expect it even, from the Ministry of V&W. You see in policy documents and such that Transumo is mentioned as a party that was consulted for the development of policy, and on that level, it's going well as Transumo is seen as an important source there. But in newspapers and the like, they never mention Transumo. The same is true for other stakeholders than V&W. (…) I do not therefore notice very much official or formal support.*". But this was not the only factor limiting impact. As one programme manager honestly admitted: "*It was a minus point that we did not organise more at the start for the embedment. If I would have to do it again, I would force projects to connect much more with the societal dynamics. With many projects, that did not go well*".

Nonetheless, the position of Transumo was strengthened by its ability to realise most of its initial plans, as well as the programme plans that it added later on. Transumo's programme management was particularly proud of their almost 100% realisation of initial plans, the actions they undertook to improve several content-related matters (such as transition and sustainability) and the fact that they set up a transition programme within Transumo. They were also very satisfied with their communication strategies and the fact that they managed to get so much done with such a small team. These successes helped Transumo establish its place in the mobility domain. The combination of these successes and the problems discussed earlier led the Transumo programme management to judge their position in the mobility sector both positively and negatively. Therefore, this indicator receives a neutral score.

Estimated impact projects Transumo

Project leaders were asked how they perceived the impact and spin-off of their project(s). Perceptions varied across projects as some projects became real success stories, whereas others failed in execution. In general, project leaders were able to mention some degree of impact and spin-off, but this was in many instances less than they desired it to be. The presence of such reflections can partially be explained by the timing of the interviews (see Chapter Four), as most projects were still running, and had not seen the optimal effect of their actions just yet. By early 2009, only about one-third of the projects were able to report real spin-offs, while the rest mentioned some general effects. The only projects unable to mention spin-off were a project that had been terminated due to problems between participants and a project that had yet to start. Managers saw barriers for spin-off as being the receivers' 'delusions of the day', the lack of basic knowledge among stakeholders, and the differences between science and practice. However, they saw opportunities to create connections and to communicate with receivers who displayed an open mind. Nonetheless, because the project leaders mentioned only limited noticeable impact, this indicator receives a neutral score[45].

Estimated impact of the Transumo programme

In general, the project leaders believed that Transumo was well-known among national government and knowledge institutions, but not among local government and executive business. "*Yes, Transumo is known, but not very. The familiarity is also not just positive. (…) In the first two years, many people were nagging about Transumo, it was poorly organised, there were just procedures, rules and protocols*." More positive respondents also had some reservations: "*In name, Transumo is well-known and has developed more*

45 As could be seen in the Transumo intermezzo this result varies between projects. Some projects were very successful, and could therefore indicate impact and spin-off without a doubt.

and more resonance. I just don't know whether it will stick, whether it will mean that Transumo's objectives will be reached".

Many respondents also indicated that the true effect of Transumo had yet to become visible. Most respondents did have faith in Transumo's eventual effects, especially because Transumo worked hard on collaboration. "*Transumo has had effect in that sense that parties who would usually not have worked together have done so now. In that sense, there is effect. Knowledge institutions and businesses have come closer to each other*." Project leaders remained a little hesitant, yet hopeful. "*The direct measurable effect is very limited, with the exception of a few concrete cases (…) But it is very important to realise that distributive effect. The seed has been sowed, but it takes some time before we can harvest.*" Because of these hesitations, this indicator receives a neutral score.

6.1.5 Scoring sender receptivity

The following table provides an overview of sender receptivity[46].

Table 6.2: Scores on sender receptivity

Variables	Indicators	End score
Awareness	Satisfaction with own role in context	Neutral
	Fit urgent problems	Positive
	Future images	Positive
Association	Presence of learning	Positive
	Fit official views	Neutral
	Dissemination fit	Positive
Acquisition	Diversity and strength connections	Neutral
	Handling external conditions	Negative
	Competencies	Neutral
Application	Estimated position Transumo in sector	Neutral
	Estimated impact projects Transumo	Neutral
	Estimated impact programme Transumo	Neutral

Grey-scaled colours were assigned to variables based on the indicator scores. From Table 6.2 it becomes evident that the first variable (awareness) was judged mostly positively. The second variable (association) was judged mostly positively as well. The third variable (acquisition) was evaluated as neutral, with one negative indicator. Application received all neutral scores.

46 Light-grey is reserved for positive scores, whereas dark-grey is reserved for negative scores. Neutral scores receive a grey-shade in-between light and dark.

6.2 Receiver receptivity

To recap from Chapter Four, the following indicators were connected to the four variables.

Table 6.3: Receiver variables and indicators

Variables	Indicators
Awareness	Use and necessity of Transumo
	Need for changes
	Added value of susmob
	Importance of susmob in organisation
Association	Importance of innovation/ change for sector
	Cost-benefit ratio of innovation/ change
	Susmob importance for decision makers
Acquisition	Realism and feasibility of innovations
	Usage of knowledge and innovations
	Influence of Transumo on receivers
Application	Notoriety of Transumo
	Appreciation of Transumo
	Acquainted with KAIPs in general
	Familiarity with Transumo
	Contact with Transumo
	Influence of Transumo
	Estimation familiarity Transumo in sector

6.2.1 Awareness

Use and necessity of Transumo

Six receiver interview respondents were invited to provide their opinion on the use and necessity of programmes such as Transumo. They were somewhat positive about this, albeit in a very prudent way. One positive respondent said that "*programmes such as Transumo bring the future to the forefront*". Another respondent indicated that "*[they] work with businesses, governments, and knowledge institutions. That already indicates that there is a need*". These respondents therefore completely supported the use and necessity Transumo.

Other reactions were less positive. Several respondents mentioned their appreciation for 'something like Transumo', but added that they were not sure whether Transumo was the right vehicle for the progress they desired: "*Yes [there is use and need], but with several reservations. That island behaviour has to stop. Right now it's mostly the playground of the knowledge world, watch out for that! (…) There definitely is use and necessity, but it has to become much more tripartite. When that's the case, a programme like this*

will be highly sensible. That will benefit change. The tripartite constellation does not work successfully now". Another with similar views concluded that "*it should have been much better steered, much tighter, much more concrete, much more aimed*" and "*more practical and broader*". The sixth respondent was not positive about Transumo and similar projects at all, concluding that "*we should really check into that [use and need]. It should not become institutionalised*". All in all, results on this indicator are mixed. Only two out of six respondents were truly positive, one was rather negative, and the others had hesitations. The end score is neutral.

Need for change

The receivers interviewed were asked to reflect on the need for change in the mobility domain. Respondents were very positive about the need for societal change: "*Yes, absolutely. On macro grounds, it is clear: the transport sector is an important cause of emissions. The climate change problem becomes more and more cutting. That sustainability is necessary in the transport sector is clear, many see that already*". Receivers interviewed also emphasized the growing sense of urgency for sustainability and sustainable mobility: "*Yes [there is a need]. What you see is that public attention for sustainability and mobility is very high, in many ways. (…) You can also see that need growing. I see it in my own environment as well*".

Some receivers indicated that concrete sustainability efforts are more challenging. However, they do not see sustainable mobility as an impossible goal. Approximately 67% of receivers surveyed through the Transumo address list believed that sustainable mobility was definitively possible. Another 18% somewhat agreed with them. The majority of the respondents (mostly actors working in areas related to sustainable mobility) saw plenty of potential for its realisation. To summarise, results indicate that stakeholders do see a need for change and they feel that this change is possible. However, judging from the less positive reaction to Transumo in the previous indicator discussion, one can conclude that while the need for change is widely shared, the need for Transumo is not necessarily. In the eyes of (some) receivers Transumo may not be the best way of accomplishing the desired changes. However, this specific indicator leads to a clear positive end score, since the need for change is widely supported among actors working on sustainable and/ or innovative solutions or future mobility.

Added value of sustainable mobility

Survey respondents were asked to value the concept of sustainable mobility in comparison to 'normal' mobility. Virtually no respondents answered that they thought the addition of 'sustainable' had no added value (1.6%), while almost half (47.5%) indicated that they believed 'sustainable' to have much added value. Thus, the end score on this indicator is positive.

Importance of sustainable mobility in organisation

Respondents were asked about the importance of sustainable mobility in their own organisation. Here, 29.1% answered that this concept is very important in their organisation. An additional 28.4% answered that it was rather important in their organisation. Only 3.5% answered that it had no importance at all. The positive results may be related to the fact that survey respondents were people working on sustainable mobility issues themselves. However, they were part of much broader organisations, which did not always work on sustainable mobility per se. Sustainable mobility thus played a significant role in the organisations of Transumo's receivers, and this indicator is scored positively.

6.2.2 Association

Importance of innovation and change in the sector

Receivers were asked during the interviews whether they believed innovation and large-scale societal change were important in the mobility sector. Almost everyone answered positively. Many connected the importance of change to their own goals and actions; a good sign from the perspective of association. "*Yes [I find it important]. (…) Sustainability, accessibility and safety are important objectives for us. They all require large-scale innovations. Without these innovations, our own objectives won't be realised*".

The respondents mentioned in some cases that there was no option other than innovation and societal change: "*We have several major challenges in the area of climate change and energy scarcity. We really have to do something with that in the Netherlands. If we continue to do as we have done, we will get stuck. The programmes contribute to taking on these challenges. We have no other option (…)*". One respondent noted that this was not a matter of ideology, but rather a matter of rational choice and economic consideration: "*You have to realise economic growth by a clever application of mobility. Mobility is becoming a scarce product more and more. (…) It is not an idealistic stimulus, but rather an economic stimulus*". The score for this indicator is thus positive.

Cost-benefit consideration of innovation and change

Most interview respondents had no problems identifying potential benefits of change, claiming that: "*We live of innovation and change. (…) We thrive when something is jammed, when something has to change: that's our job*". Respondents from governmental agencies were somewhat more moderate in their reactions, but did say that "*everyone wants quicker and safer traffic flows*" and that innovations and societal change "*generally contribute to the objectives of [organisation]*". Despite these potential benefits, respondents did express prudence when asked to weigh them against the costs of innovations and societal change.

They generally saw the costs to be most pronounced on the short term, and the benefits to be not easily visible initially. Four out of six respondents mention this short-term versus

long-term problem. Their view was that innovation leaders would have to invest over a long term before they saw returns. As one respondent put it, "*For those who start the developments first, the short-term cost-benefit ratio will not be positive. But in the long term, this will become positive*". This is confirmed by another respondent, who answered: "*Probably over the long term, it will [pay off], but in the short term, this is difficult*".

Business respondents largely shared these concerns, but were in some cases more positive. One summed it up as follows: "*By definition the benefits will weigh up to the costs, otherwise these developments would not take place*". Another said, "*as a business you constantly keep track of this. Personally I am motivated by the societal changes you see, which are also necessary, and not by money. But we have to do it in such a way that money is made, otherwise we cannot exist*"[47]. Thus, according to the receivers, the costs and benefits are in balance and the problems to be expected in the short run do not influence them negatively. The combination of problems and positive responses thus leads to a neutral score.

Importance of sustainable mobility to policymakers

The survey asked receivers if they thought sustainable mobility was an issue for policymakers and other decision makers. Whereas half of the respondents believed this to be very much the case, or mostly the case (together 50.9%), another large share (33.1%) indicated that they did not really think that sustainable mobility was an issue for these decision-makers. Given the mixed nature of the findings, the end score on this indicator is thus neutral.

6.2.3 Acquisition

Realism and feasibility of innovations

Receivers perceived the changes proposed by Transumo to be somewhat realistic, but did consider them highly ambitious and long term. This ambition level and long term orientation was not considered a bad thing, "*you can easily walk somewhat ahead of your troops*", but it did limit the realism and feasibility of the changes. As another respondent said, "*Transumo finds realism and feasibility very hard. You also need steps for today*". Thus, although the direction of the change was not unwelcomed by the respondents, they wished for more concrete and short-term results instead of just long-term abstract aims and directions. This mixture of answers results in a neutral score.

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47 This is a common problem in innovation adoption, as new products or technologies have not yet proven what they are worth, so expectations cannot be fuelled by application in practice yet (Kemp et al., in Rotmans 2006). In a situation like this, Rogers notes, an innovation requires early adopters: actors who are widely respected by their peers and serve as a role model for other potential adopters. When these early adopters decide to support an innovation they reduce uncertainty about the application in practice of an innovation (Rogers 2003: 283).

Usage of knowledge and innovations

Survey respondents commented on average that they used Transumo's knowledge and innovations to some extent. A fifth of the respondents (20.1%) reported that they did not use Transumo-derived knowledge and innovations. This is a surprisingly large proportion given that these respondents were on Transumo's address file and regularly received communications from them. Another third of the respondents (34.5%) answered that they used Transumo knowledge and innovations only every once in a while. Together, this meant that more than half of the respondents, who were direct recipients of Transumo's knowledge and information, either did not or barely ever used these innovations. Less than ten percent (8.2%) answered that they used Transumo-derived knowledge and innovations on a regular basis. The usage of Transumo knowledge and innovations by direct individual recipients was therefore very limited.

This question was checked against the proportion of respondent organisations that used the knowledge and innovations. Results of this analysis were somewhat more positive. The number of organisations that did not use Transumo innovations was smaller (15.8%), and the number who used the organisation frequently was higher (11.3%). However, the reader should be aware that these differences are small. Despite these seemingly dismal numbers, it is worth remembering that the programme never expected all or even most recipients and their organisations to use the knowledge and innovations derived. Thus, the indicator receives a neutral score.

Influence of Transumo on receivers

Receivers were asked about the influence of Transumo, both on themselves and on their employers. Almost a third of the respondents (31.5%) answered that Transumo had no influence whatsoever on their organisation. The remaining responses were presented such that agreement with later responses indicated agreement with previous responses. In this regard, 27% agreed that 'Transumo has resulted in new knowledge and contacts for my organisation'. A further 13% agreed that 'Transumo brought my organisation new projects and activities', while 5.5% answered that 'Transumo brought my organisation new thinking directions and ways of working'. Only 0.7% (2 respondents) claimed that 'Transumo has created a complete change in my organisation's thinking and working'.

When asked about the influence of Transumo on themselves the balance shifted somewhat to 'Transumo has brought me new knowledge and contacts' (43.2%). A large share (37.3%), however, chose 'no influence at all'. It is worrisome that a third of the respondents believe that Transumo did not have had any influence on them, not even in introducing new knowledge or contacts. This is especially striking if one takes into account that many of the survey respondents were rather involved in Transumo, as workshop participants, project acquaintances, and in similar capacities. Furthermore, the amount of influence attributed to Transumo in this indicator is much less than one would conclude based on the

indicator 'usage of knowledge and innovations' discussed above. The score for this indicator is therefore negative.

6.2.4 Application

Notoriety of Transumo

Consistent with the conclusions project leaders drew in the section on sender receptivity, receivers indicated that Transumo was well-known among knowledge institutions and national governments, less so among societal organisations and consultancy firms, and barely known by (non-consultancy) businesses. The respondents did not mention local and regional governments. Overall, the interview respondents believed Transumo to be fairly well-known in name, but much less so in terms of the content of the programme. Results are therefore neutral.

Appreciation of Transumo

On average, it appears that (interviewed) receivers in the mobility sector had a limited level of appreciation for Transumo. Their appreciation was stimulated by the success of the Rush Hour Avoidance project, Transumo's open way of working, the knowledge held by the programme, its environmental objectives, its positive intentions, and the broad perspective that it took. However, some of these same factors were also mentioned as shortcomings. Respondents brought up a lack of attention to embedment and implementation, difficulties in the interactions with V&W, the troubles surrounding innovation and sustainability, and the fact that Transumo was seen as very broad, impractical and offering little by way of application. All in all, the tone of the respondents and the content of their answers depicted scepticism and hesitations. The score for this indicator is negative.

Acquainted with KAIPs in general

Survey respondents were asked if they were familiar with one or more KAIPs in the Netherlands, and 80.8% indicated to know at least one. Of these respondents, approximately half mentioned Transumo as the one they knew best, and a somewhat smaller group mentioned one of the Transumo projects as the knowledge and innovation programme they knew best (Rush Hour Avoidance was mentioned most often). Results here are thus positive. Direct recipients of Transumo knowledge and innovations are properly aware of the existence of Transumo and its projects.

Familiarity with Transumo

Respondents were then asked directly whether they knew Transumo. A vast majority knew Transumo, with only 3.9% of respondents – all hailing from the business community – answering that they did not know Transumo. The respondents who knew Transumo were roughly divided into three groups of rather similar size: those that said they knew Transumo

a little, those that said they knew Transumo rather well, and those that said they knew Transumo very well. Results are, thus, positive on average.

Contact with Transumo

About half of the survey respondents (48.3%) answered that they had little or no contacts with Transumo. The group that did have contact with Transumo (the other half) interacted mostly with project leaders, theme leaders and with the programme bureau. Respondents from knowledge institutions in particular generally said they were in touch with Transumo, and this corresponded with results from the network analysis. What is surprising, however, is that employees of large executive business also indicated that they were frequently in touch with Transumo. This is in contrast to the small and middle-sized executive business, consultancy firms and some segments of government. Consultants on the whole appeared to be rather weakly involved. When they were in contact with Transumo, their interactions did not broaden to include others in their organisation as had been originally expected. The difference between this result and the network analysis can be explained by the difference in level of analysis: the network analysis asked about consultants who were already involved in projects and programme, whereas the survey also included consultants who were not involved at all. Because of the mixed nature of the responses, the indicator has a neutral score.

Influence of Transumo

An earlier indicator required respondents to choose an urgent problem which they felt was most important in the mobility sector (such as congestion). For the current indicator, respondents had to rate Transumo's influence in relation to it. Most receivers estimated the influence of Transumo in urgent problems to be small to reasonable. More than half of the respondents (56%) said that Transumo had not had much influence on this problem. A quarter of the respondents (25.8%) said Transumo had had a reasonable degree of influence on their chosen urgent problem. Many respondents reported further that they had higher expectations from Transumo before the programme started. More than a quarter of the survey respondents (26.3%) answered that the influence of Transumo on these problems was smaller than they had initially expected, whereas only 2.1% indicated the influence was larger than expected. This disappointment in the influence of Transumo over urgent problems leads to a negative score on this indicator.

Estimation of the sector's familiarity with Transumo

As estimated by survey respondents, a moderate number of Dutch mobility professionals (25%) knew of Transumo at the time. This number may be somewhat higher among the directly targeted individuals and organisations (such as the V&W), although there are indications that even among directly targeted organisations, only half the people know

Transumo, of which a smaller fragment claimed to know Transumo 'very well'. Due to the mixed results, this indicator receives a neutral score.

6.2.5 Scoring receiver receptivity

The following table provides an overview of receiver receptivity[48].

Table 6.4: Scores on receiver receptivity

Variables	Indicators	End score
Awareness	Use and necessity for Transumo	Neutral
	Need for changes	Positive
	Added value of susmob	Positive
	Importance of susmob in organisation	Positive
Association	Importance of innovation/ change for sector	Positive
	Cost-benefit consideration innovation/ change	Neutral
	Susmob importance for decision makers	Neutral
Acquisition	Realism and feasibility of innovations	Neutral
	Usage of knowledge and innovations	Neutral
	Influence of Transumo on receivers	Negative
Application	Notoriety of Transumo	Neutral
	Appreciation of Transumo	Negative
	Acquainted with KAIPs in general	Positive
	Familiarity with Transumo	Positive
	Contact with Transumo	Neutral
	Influence of Transumo	Negative
	Estimation familiarity Transumo in sector	Neutral

From Table 6.4, it becomes evident that the first variable (awareness) was rated mostly positively, the second variable (association) was rated mostly neutrally, the third variable (acquisition) is rated as being either neutral or negative, and the fourth variable (acquisition) had two positive indicators, two negative indicators, plus three neutral indicators. No variable received just positive, just neutral, or just negative scores, and the grey-shade given to the variables themselves is based on the majority of indicator scores.

48 Light-grey is reserved for positive scores, whereas dark-grey is reserved for negative scores. Neutral scores receive a grey-shade in-between light and dark.

6.3 Impact through the lens of receptivity

This chapter aimed to investigate sender and receiver receptivity in the Transumo case, in order to determine the impact of the programme. The following research question was constructed for this purpose: *What was the impact of the programmes on the (un)intended recipients of their knowledge and innovations?* The review of sender and receiver receptivity demonstrated both the successes and failures of Transumo in realising impact. In the early receptivity phases, awareness of both the senders and receivers appeared high and receptivity was good. In the association phase, however, some problems emerged, such as the tension between short and long-term goals and the cost of change. Problems were seen also in the areas of acquisition (the ability to realise change). The joint financing arrangement was supposed to convince actors to invest in long-term and high-risk initiatives, but this arrangement itself appears to have become something of a burden, and has not taken away the long-term investment problem.

Both senders and receivers struggled with this. Receivers perceived the programme to be somewhat problematic, due to its abstract long-term focus, whereas senders failed to deal with problems surrounding the joint financing arrangement early on. It appears that only towards the end of the programme did senders and receivers managed to realise some degree of interface, before which they were busy dancing around each other in an attempt to realise their own objectives. Their struggles were mainly between short-term results and a long-term orientation, between a scientific bent, and a focus on practice, between alternative administrative agreements, and between desires for control and transparency. These tensions are reflected in the poor results on the application variable. Interestingly, the same tensions played a role in reducing the involvement of the national government in the programme. The long-term and scientific orientation gave governmental actors the feeling that the programme results would not be very realistic and feasible, and as a consequence, the tensions intensified from the lack of involvement of key players such as the Ministry of V&W.

Transumo cannot, however, be considered a failed programme. They succeeded in developing an idea for the future of the mobility sector, connected hundreds of actors in this process, and disseminate these ideas via a diverse set of channels. The closing conference was well visited, and several projects of the programme have been very visible and effective in promoting new ideas. An important virtue of the programme was its openness to learning, especially in the second phase of the programme (this development is also described in Wittmayer et al. 2009). However, the programme itself suffered as a result in the divided subsidy allocation. Although it was understandable that the Commission was reluctant to grant Transumo all the money at once because of its initial poor showing at the proposal stage, this decision may have had a damaging effect on the programme's outcomes.

Sender and receiver perceptions of the impact of Transumo thus lead to the conclusion that Transumo has had an impact, especially through several successful projects, ideas and networks, but that this impact was not as high as it could have been. Both senders and receivers played a role in this. The receptivity analysis demonstrates that the role of receivers as a limiting factor is somewhat bigger than the role of the senders. This is not to place blame on anyone, as an important cause of this lack of receiver receptivity is the current state of affairs in the Dutch mobility sector. The diversity of the issues and problems faced in the sector, the fact that multi-actor working is rather new and unexplored, and the fact that changes in mobility affect everyone from professional actors to ordinary citizens together make things difficult. Nonetheless, as a result of Transumo's efforts, the field has been opened up and some evidence has been offered that change is possible, but a lot of work remains to be done.

Chapter 7

The need for knowledge and innovation in water management

The research question this chapter will focus on is: *In which environment did the programmes originate and how did this environment affect the way the programmes were organised?* This chapter will provide the reader with a description of the water management domain, specifically the challenges it faces. It will also describe characteristics of the KAIP and its role in furthering innovative water management in this domain. Water management is a complicated issue, facing urgent problems for which solutions are often lacking, or difficult to implement. The difficulty drives the necessity for greater knowledge and innovations in this field. Specifically, it calls for the provision of greater technological solutions, but only in combination with the development of more relevant managerial and organisational methods to increase the effectiveness of the implementation of the solutions. A tripartite programme, with a strong network function was thus called for to provide the necessary knowledge and innovation.

7.1 Challenges and dynamics in the water sector

Water matters. Whether your country is at sea or inland, whether your country experiences problems with flooding or drought, whether your country has large rivers or not: water matters. It is essential for the existence of life. Water needs to be clean, for purposes of drinking, hygiene and recreation, and so it is important to maintain the water system as well as possible. Water also needs to be available in the right quantities – both droughts and floods can cause havoc. Water management is thus about balancing water quality and quantity as well as possible, in a given ecosystem. It also encompasses concerns of health, sanitation and pollution (Kuks 2004: 2).

Water management is not a nationally confined problem and it features firmly on the international agenda (Kuks 2004: 1). In the European Union, problems such as floods, biodiversity and pollution are frequently of concern (see for instance the EU-directive WFD 2000/60/EC). Among the more prominent international issues surrounding water are the privatisation of water services, and a related push for full cost recovery (ibid.). Another is climate change, which is likely to affect ecosystems all over the world (WWF 2010: 15). A balance has thus to be sought in water management among economic, social, and environmental objectives (OECD 2006: 5). It is the difficulty of this balance that leads to 'wicked problems' (for instance Termeer 2009b) in the water sector. Such problems are those for which the implemented solutions add to other problems. This creates many difficult demands for knowledge development (Van Buuren 2006: 11). Countries across the globe thus require approaches to water management with high levels of innovation, adaptivity and cooperation (Bressers & Lulofs 2010: xii-xiii). Even then, water will never be entirely controllable.

The water domain is usually managed by governmental agencies who attempts to steer, control and purify the water as well as they can. Problems persist, despite their best efforts. These problems impact not only the citizens, but also the flora and fauna of the region. Given the challenges, governments have found that acting unilaterally is not enough, and that the best method is deliberate decision-making, with the support of a many actors as possible. Within each country, the balancing act between economic, social and environmental objectives calls for much effort from all involved actors. But the combination of the high stakes, the diversity of the water issue, and the involvement of many actors creates many more complications in an already complex domain. Public-private partnerships are one way of structuring the requirement for cooperation and involvement of multiple actors (OECD 2006: 5-6). The specific level of involvement required of various actors in such a partnership differs across countries, and depends to some extent to what degree water is considered a public good that has to be collectively looked after.

A good example of attempts to control the water can be found in the Netherlands, which has a centuries-old history of water management. Evidence of the efforts of local water agencies goes back as far the eleventh century (Van Buuren et al. 2010: 31-32; Wesselink 2007: 239). Water agencies attempted to control the water, tried to avoid flooding, and hoped to regain land from the sea. Over the years, the magnitude and importance of the work of water agencies increased, becoming more and more systematic and institutionalised (Van Buuren et al. 2010: 32). From the seventeenth century onwards, land reclamation became more and more common, spurred by technological developments such as the (further) development of the wind mill (ibid.). Land reclamation was a constant concern, with ever increasing consequences and challenges as they came with negative effects (Wesselink 2007: 239). Technology became more and more important in the fight against the sea, and with greater professionalisation, came greater institutional knowledge of how to deal with water. The belief that water could be controlled and organised as desired became widespread (Van Buuren et al. 2010: 36).

Increasing problems, both in the physical water system and in the governance system, resulted in a call for increased centralisation (Van Buuren et al. 2010: 34; Kuks 2004: 4-5). This call was not immediately translated into substantive change. Most decisive power remained with the water boards and the provinces, and not the central government. However, by the middle of the 19th century, the central government was ready for increased centralisation and it implemented a system of cooperation and task division between state level Rijkswaterstaat and regional level water boards (Van Buuren et al. 2010: 37; Kuks 2004: 5; Lintsen 2002: 553).

The vast knowledge of water management technology and management that was accumulated over the years put the Netherlands on the map as an expert on water management (Van Buuren et al. 2010: 37). Although the Dutch efforts had their share of critics, these

voices were largely ignored and the country's leaders continued working from the perspective that water could be entirely controlled (ibid.). However, a serious surge flood occurred after a storm in 1953, which killed over 1800 people, and left many more homeless. The dikes and other structures existing at the time had been unable to handle the exceptionally high tides. The destruction fuelled a rapid increase in awareness of the country's vulnerability in the area of water safety. Although it took several decades to become completely visible, this flood served as a turning point for Dutch water management.

At first, yet another technological solution was sought to protect residents from the sea, but this solution raised a number of environmental concerns. Ending the working of the tides and the influx of salt water would have resulted in loss of biodiversity and other ecologically damaging effects (for instance Van Eijndhoven 2007: 21). Taking into account these criticisms, part of the Oosterscheldekering was closed using a sliding door system which would remain open when the water was calm, and closed in times of calamity. This innovative barrier ensured the preservation of the ecology of the Oosterschelde, while also protecting the population of Zeeland from another major flood like that experienced in 1953. This advancement was achieved after efforts were made to include the views of several stakeholders in the decision-making process. Although technology was still the leading driver of the new approach, understanding of the domain was significantly broadened by this consideration of environmental concerns.

Van der Brugge et al. describe how Dutch water management has been largely technocratic in nature (2005: 164) with a strong faith in engineering solutions for water resource problems (Van Schie 2010: 12; Kuks 2004: 7). However, negative side effects of engineering started to come to light in the 1960s, and it was not until the 1980s that ecosystem protection became a focal point in water management (Kuks 2004: 7; Lintsen 2002: 566). Nonetheless, the faith of people in the strength and safety of the technological solutions remained until the 1990s, when it became apparent that good technology did not protect from all forms of flooding. After the last major flood occurred in 1953, the Netherlands experienced two additional large river floods in 1993 and 1995, and further regional flooding in 1998 (Van der Brugge et al. 2005: 164). The question of whether Dutch water management was still up-to-date was raised across all sectors of society. A commission (Commission Tielrooy) was set up to address this question, and they concluded in their report that Dutch water management was not ready for the challenges of climate change (Van der Brugge et al. 2005: 164; CW21 2000). This view was later reinforced by the breach in the dikes around the village Wilnis in 2003. Although the Dutch approach to water management was innovative and succeeded in significantly managing the risk of flooding, safety was not ensured (Wesselink 2007: 241).

The dense population, increasing demand on spatial planning and global trends such as climate change (and the resulting sea level rise) meant new ways of managing water were needed (Van der Brugge et al. 2005). This called for sustainability and innovation, and the pro-

gression from a technocratic regime to a combined beta-gamma approach. This desired shift is often described as the transition from one regime to another (Van der Brugge et al. 2005; Rotmans 2006; Waterkoers 2 Ministry of V&W 2006). Dutch governmental actors accepted that change was required and the transition received growing degrees of support in recent years from many different stakeholders. The current Dutch water policy calls for an even greater shift toward a more integral way of working, both in terms of cooperation between domains and between disciplines (see for instance Lintsen 2002: 568). It also has led to an increasing integration between water management and spatial planning (Van Schie 2010: 12-13).

Over the years that this was happening, new actors got involved in water management, without a related retreat of older actors. The increased involvement of stakeholders resulting from the progression provided the water sector with new knowledge and incentives, but also with new problems. The four policy levels of Dutch water governance (national, regional, water boards, and local) had to improve their interaction and attunement to the stakeholders. Both the executive business sector (e.g. contracting companies) and the advisory business sector (e.g. consultancy firms and communication agencies) became increasingly involved in water decision-making. Knowledge institutes sometimes acted as intermediaries in the decision-making processes, and sometimes as initiators of the developments and decisions. At the same time, the domain itself underwent significant changes in its political management. In the mid-nineties, citizens were given voting rights over the boards of the regional water authorities and the managers were confronted with ever-increasing demands for transparency and accountability.

In 2006, Rijkswaterstaat listed six challenges for the water sector incorporating the new integral way of working. These were: dealing with uncertainties; involving citizens in efforts to increase water safety; cooperation between businesses and government; attention to other domains; cooperation between governmental levels; and developing a direction for change while remaining flexible to changing demands (WINN Rijkswaterstaat 2006: 45-47). Similar challenges were listed by the Directorate-General of Water in the Ministry of V&W's water vision document of 2006 (Waterkoers 2). This document described how the changes in the water sector were in no way recent, but that it was becoming more and more visible how broad, diverse and fundamental these changes were (V&W 2006: 37).

The call for more flexibility and adaptation was supported by many, including the government (WINN Rijkswaterstaat 2006; Waterkoers V&W 2006), and the scientific community (see Edelenbos 2010). In the sprit of corporate social responsibility, it was supported also by business actors. The new way of operating has been dubbed as adaptive water management, and it forms the basis of research and development efforts of scientists and practitioners across the country (see for instance Huitema et al. 2009). This adaptive water management method is thus multi-level, multi-actor and multi-scale in nature, which means a degree of fragmentation that makes system-wide action difficult (Edelenbos 2010: 11). The water sector therefore faces several challenges.

First, developments in the physical system have demonstrated that change is needed, and even urgent (floods and dike breaches). Second, such change cannot come from technological measures alone. Third, the involvement of multiple domains, disciplines and actors results in increased complexity, with many more interests to take into account. Fourth, the current situation shows that fragmentation still exists in the water sector, despite the call for integral working. Fifth, change is required on physical, political, social and economic aspects if the transition is to be made towards a more sustainable water management system. The current situation does show some progress towards these goals in that the government accepts the need for change, but the goals themselves are far from achieved. It is the acknowledgement of these challenges that led to the call for the development of multi-actor organisations working on innovative solutions and ideas.

7.2 Addressing the challenges: the start of a knowledge and innovation programme on innovative water management

Although water management was a very public domain in the Netherlands, it was clear that other actors were required to participate in the development of ideas for the future of Dutch water management if these ideas were to combine societal relevance with scientific progress. The challenges of Dutch water management could no longer be met by sticking solely to traditional approaches. A programme that could unify these objectives was therefore desired and addressed by the initiation of the Living with Water KAIP.

Living with Water was one of the 67 consortia that applied for the BSIK financing in February 2003, after the decision to grant these subsidies was published in the Staatscourant in December 2002 (CvW ICES/KIS Part I 2003). The Commission felt positively about granting Living with Water subsidies in the Spatial Planning theme[49]. The projects in the theme were seen as being widely supported by the governmental actors, and were judged to be of high quality in general. Of the five projects in the theme that were granted subsidies, Living with Water placed third, with a score of 3.7[50]. They had requested 26.8 million Euros, and were granted 22 million (ibid.).

Multiple judges weighed in on this score, and their views were taken in equal measure to calculate the final score of 3.7. One such judge was KNAW (an umbrella organisation of research institutes which advises the Dutch government), who evaluated the scientific qualities of the Living with Water proposal positively, describing it as an "*internationally favourable programme (…) with good scientists in the team, and participants with*

49 Dutch name: Hoogwaardig Ruimtegebruik

50 Out of a highest possible score of 5. All proposals judged with less than a 3.0 were not granted subsidies.

a practice background. Knowledge transfer and dissemination are very good". They gave LwW a score of 4.4 out of 5. The planning offices were somewhat more prudent in their judgement, saying that "*of most studies the necessity of knowledge development is obvious*", but also that "*the foundations of the budget are weak"* and *"of five Living with Water projects the societal relevance appears low*". Senter (a programme management institute for Dutch governmental agencies) then judged the project plan and organisations to be solid, but asked for more details on the budget (CvW ICES/KIS part II 2003). Each of these judgements was placed next to each other, with similar weights attached to each component. The 3.7 score was the result of this process.

The main advice the Commission gave Living with Water was to make a further selection of the projects to ensure relevance. They also suggested cooperation with other spatial planning projects. In the months that followed, Living with Water and the other joint financing consortia developed their project plan further, selected the first round of projects, and developed a monitoring system. These monitoring systems were evaluated in November 2004. Living with Water's system was judged to need somewhat more accentuating, especially in relation to the proposed cooperation with Habiforum and Klimaat voor Ruimte (two other spatial planning projects). In August 2005, the Commission wrote that the revised monitoring plan was "*significantly improved compared to the earlier version. The description of the subprojects and the cohesion between these and the indicators is now adequate. With regards to the objectives it is still the case that accentuation is required; the Commission sees this as very important especially because of the open character of the programme*"[51].

7.3 From proposal to maturity

In September 2006, the Commission evaluated Living with Water's progress, based on the report provided to them by the programme. The Commission was again largely positive about the programme, and did not see any major problems. They advised only that the programme obtain independent supervision as this had not been realised so far. In general, they described the progress as good, and said that the integration between beta and gamma and between science and practice appeared to be developing well[52]. By then Living with Water had approximately eighty projects, and had really kicked off.

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51 Advies over herziene nulmeting en eerste voortgangsrapportage Bsik-projecten, August 25th 2005

52 Advies van de Commissie over de voortgangsrapportages van de Bsik-projecten over 2005, September 6th 2006: 21

The midterm review process was initiated in 2007. Project leaders were interviewed and twelve conclusions[53] were drawn on the programme and on the water sector. The report concluded that the programme management was well appreciated by its project leaders. It also stressed that the integration and connecting of projects, knowledge and ideas was essential for further success and that several worlds existed in the water sector that needed to be bridged in order to realise this integration and connection (Van Helsdingen et al. 2007). This report was part of the internal evaluation Living with Water carried out as a preparation of the external evaluation for the midterm review of the subsidiser (also in 2007). In 2008 this resulted in that Living with Water again received a positive evaluation in 2008, and was placed in the first category of BSIK programmes, an judgement reserved for programmes thought to be likely to realise its objectives.

Even though the Commission evaluated their own monitoring systematic as highly effective and suitable for wider application[54], they acknowledged that it did not work as effectively in the case of Living with Water. As written in their evaluation: "*The observation that the current indicators say little about the actual impact of the programme due to their quantitative nature needs attention. For the consistency in monitoring the indicators need to be broadly maintained. The Commission agrees with the vision of the external evaluation commission that additional (qualitative) indicators need to be developed. The Commission especially points towards the necessity of spending more attention on increasing visibility of societal and economic revenues of the programme*"[55].

The Commission concluded that Living with Water was well on its way towards realising most of the indicators, but it also advised the programme to pay greater attention to the impact and visibility of its results. In their words: "*The revenues are potentially sizeable, but to today too little visible. The project needs to improve the visibility of the development of societal and economic revenues and where they can settle*"[56].

After the midterm review, Living with Water responded in the ways recommended, and increased its focus on impact and embedment. It also set to work on a new monitoring approach that would overcome the problems listed. In the mean time, to maintain

53 Among these conclusions were several perspectives on innovation, change, and bridge-building between worlds (conclusions 1-4, 7, 11), conclusions on project skills (conclusions 5-6, 10) and conclusions on programme skills (conclusions 8-9, 12).

54 Intriguing is that in the letter to the Second Chamber the minister concluded, based on the recommendations of the commission, that "*the monitoring systematic (…), which is successful in the opinion of the Commission, should be applied on all government-initiated, comparable, impulses (…)*". In the case of Transumo it was concluded that Transumo struggled with this monitoring systematic. Furthermore, earlier ICES/KIS evaluations proposed a combination of quantitative and qualitative methods to realise more sufficient monitoring, which was not adopted enough in the BSIK monitoring. The conclusion that the monitoring systematic was successful is therefore noteworthy.

55 Advice of the Commission on the midterm evaluation of the BSIK projects, April 29th 2008, p. 92-94

56 Ibid.

consistency, they continued to meet the demands of the old monitoring indices. Between 2008 and 2009, the programme grew in confidence, and presented itself to the world as a success story.The high level of participation amongst its stakeholders in knowledge conferences over that time demonstrated the significant degree of interest the sector had in the results of the Living with Water programme. In particular, the closing conference of the programme in 2010 attracted approximately one thousand water professionals, far more than had been anticipated.

7.4 Imagining the future: objectives

The Living with Water programme had three main objectives as formulated in the 'core messages' presented in 2005.While the exact content of the formulations changed over the course of time, the essence of the objectives remained unchanged.These were as follows:

1. **Giving water its new place**, with societal support for the needed measures and remaining flooding risks
2. **Stimulating innovative water management**, by intensive cooperation between researchers of different backgrounds, gamma and beta, in practice-oriented and fundamental research
3. **Development of a knowledge infrastructure**, existing of sustainable (international) cooperation partnerships between knowledge asking and knowledge offering people, between science and practice, between water managers, universities, knowledge institutions and consultancy firms[57]

Some later versions stressed the integration between beta and gamma further, while assumed the development of a knowledge infrastructure was a given, as this was the objective of all BSIK-programmes. Despite these differences, all versions included several central elements, specifically the provision of new and greater spaces for water, realising cooperation between diverse actors, and developing new knowledge of water management. The final three 'core revenues' were formulated as follows.

1.A new place for water

2.A bridge between practice and science

3.Vital alliances[58]

Both content and process objectives were developed and eventually later fulfilled. Networks were established, the 'ivory tower' of science was knocked down, and innovative solutions and ideas were developed to provide a new place for water in the Netherlands and abroad.

57 Note 'Core Messages', date September 28th 2005

58 Website Living with Water: www.levenmetwater.nl (2010 version)

7.5 A playground full of water management actors

Living with Water was formulated as a network organisation, and this network became an important part of the programme's development and functioning. To better understand the effectiveness of this network, this section will discuss four indicators: 1. frequency of contact, 2. match with initial expectations on frequency of contact, 3. commitment of contact, and 4. match with initial expectations on commitment of contact. Each indicator is investigated via a network analysis survey administered to Living with Water's project leaders and programme managers.

This analysis will shed light on the involvement of receivers in the network. Living with Water targeted a broad array of actors, in which the tripartite constellation of triple helix organisations (Etzkowitz 2003) was well-represented. It focused its efforts especially at knowledge institutions and governmental actors. The Ministry of Transport, Public Works and Water Management (V&W) was, just like at Transumo, the core principal of the programme. Business actors were also originally intended to be involved, specifically consulting and advisory firms, but also some executive businesses.

In total, Living with Water comprised approximately 100 projects, involving about 200 organisations and 1000 researchers[59]. Even more people were involved in meetings, workshops and other activities outside the project consortia, although it was usually the individuals involved in strategic planning for their organisations that got involved. Whereas Transumo projects focussed largely on researching, testing and experimenting, Living with Water projects sometimes also incorporated implementation trajectories. Thus, operational level actors had a greater role, and even led the initiative in the more practice-oriented projects.

As was the case with Transumo, no fixed list of targeted stakeholders was developed and distinct boundaries were not drawn around the programme. A very broad estimate of intended involvement is provided through a diagram on the programme's website[60]. Although this diagram mostly focuses on the groups within Living with Water (e.g. the Board, the 'Knowledge Engine' and the Scientific Advisory Council), it also mentions the involvement of scientists, water managers, and businesses. From this, it can be deduced that Living with Water envisaged scientists to be closely involved, and governmental actors (water managers) and businesses to be both somewhat less involved, but still part of the network.

The same division of actor types has been made for the purposes of the diagram that follows as in the Transumo chapter. Business actors have been divided into large executive firms, small and middle-sized executive firms, and consultancy firms. Governmental

59 Website Living with Water: http://www.levenmetwater.nl/pages/partners/

60 Website Living with Water: http://www.levenmetwater.nl/pages/partners/

actors have been divided in national, regional and local government, with the regional level consisting of the provinces and the water boards, and the local level consisting of the municipalities. Knowledge institutions have been separated into universities and 'other knowledge institutions' ('other KI's'), of which the latter includes applied-knowledge organisations and colleges.

Three circles of involvement are distinguished. First, the Living with Water circle, which consists of LwW programme management, projects leaders, and individuals and organisations that were directly and intensely involved. The second inner circle consists of project participants, frequent visitors of workshops and the like, and other directly involved actors. The third and outermost circle represents actors connected in some way to Living with Water, but with little direct actual involvement. These can be, for example, recipients of the newsletters and incidental workshop participants. The figure is based on the observations of the author, as well as on information provided on the Living with Water website.

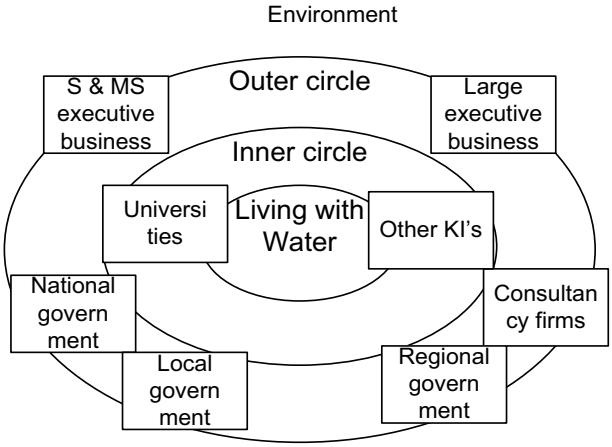

Figure 7.1: Intended actor involvement

As this figure demonstrates, Living with Water expected to be close with universities and other knowledge institutions. Governmental actors and businesses were expected to be involved, but less closely than knowledge actors. National government was the principal of Living with Water, but because of the high degree of decentralisation in the water sector, they are not depicted as being more involved than regional and local governments. Executive businesses are represented as being slightly less involved than consultancy business.

The first indicator of the network analysis survey inquired after respondents' perspective on frequency of contact. The results from this correspond rather well with figure 7.1. Knowledge actors were indeed very involved, and that executive business actors were

indeed much less involved. However, contrary to figure 7.1, governmental actors were much more involved than executive business actors[61].

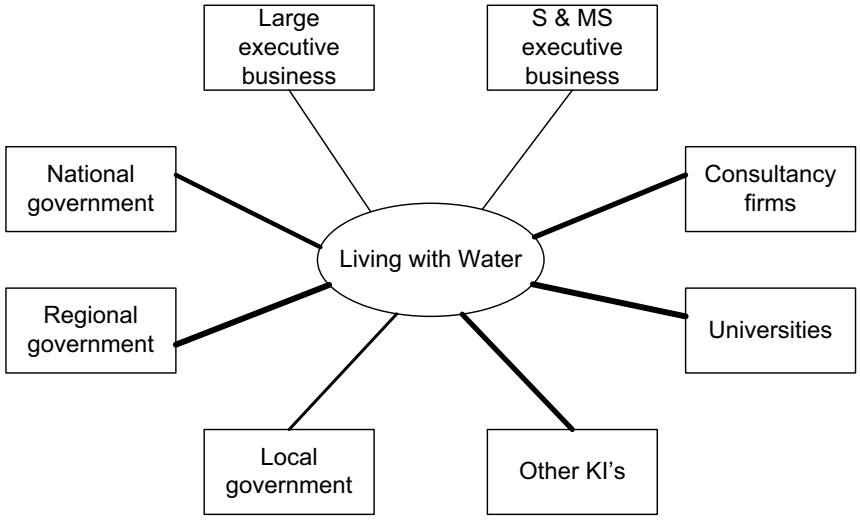

Figure 7.2: Frequency of contact between actor types and Living with Water

Contacts with universities and regional governments were especially frequent. The interactions with the regional government occurred weekly on average, while the contact with universities was almost daily. Contacts with executive business were much less frequent: on average less than once every three months.

What cannot be seen in this figure, is that responses were much more varied in the Living with Water case than in Transumo, where actor would receive largely similar evaluations of the frequency of their contact (e.g. mostly monthly for national government and mostly weekly for universities). Further, while the answer options 'daily' and 'never' were barely ever chosen by Transumo's respondents, business executives involved in Living with Water chose the option 'never' most often, while university-based respondents most frequently chose the option 'daily[62].

61 A normal line is 0.75 pt in thickness. This was the pt value attached to 'less'. Never contact would result in no line. Contact every 3 months resulted in a 1.5 pt line, contact every month resulted in a 2.25 pt line, contact every week got a 3 pt line, and contact every day got a 3.75 pt line.

62 The fact that large executive business still has a 0.75pt line and universities still have a 3pt line is due to the variation in answers between respondents: there were also respondents which indicated that they had weekly contacts with large executive business, or less often than every three months contact with universities.

The second indicator concerned how well frequency of contact matched initial expectations. In general, the frequency of contact usually matched expectations across actor types, with minimal differences between them. The highest level of satisfaction[63] was reported by universities and other knowledge institutions. As the figures below demonstrate, virtually all respondents here indicated that the frequency of their contact 'matched expectations' or was 'more than expected'[64].

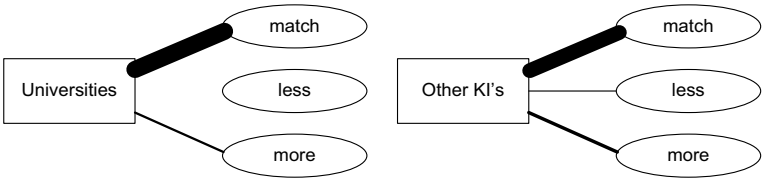

Figure 7.3: Matching the expectations on knowledge actors

Although still high, business actors (regardless of business size) indicated the lowest satisfaction levels.

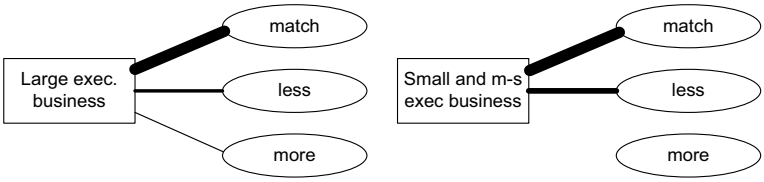

Figure 7.4: The matched and non-matched expectations of executive businesses

As the reader can see, the differences are small. However, the small and middle-sized business had the largest number of respondents who felt the involvement was less than anticipated (10 indicated 'matches expectations', while and 5 chose 'less than expected').

Governmental actors score in between knowledge actors and business actors: with most respondents saying their interactions 'matched expectations', several indicating 'less than expected' and some 'more than expected'.

The survey confirms the somewhat distant relationship between Living with Water and executive business, but this was anticipated by most respondents. Disappointment on the

63 High satisfaction is achieved when contact matches expectations or contact is *more* frequent than anticipated.

64 Just like in the Transumo chapter, every respondent is here represented by a 0.75pt line which means that the thicker the line, the more respondents chose this answer option. A reader should keep in mind that for some actor types more respondents gave an answer than for other actor types. Thickness of lines should therefore not be compared between actor types, but the division of respondents per actor type can be compared to the division of answers of another actor type.

frequency of contact was therefore much less pronounced in Living with Water[65] than in Transumo. In any case, frequency of contact is not the only way to determine the input of receivers in the Living with Water network. Even when frequency of contact is limited, the commitment of actors strongly influences network processes and content. The third indicator was thus developed to investigate this commitment.

Although commitment of contact performs very similarly to the frequency of contact indicator, several key differences can be noted[66].

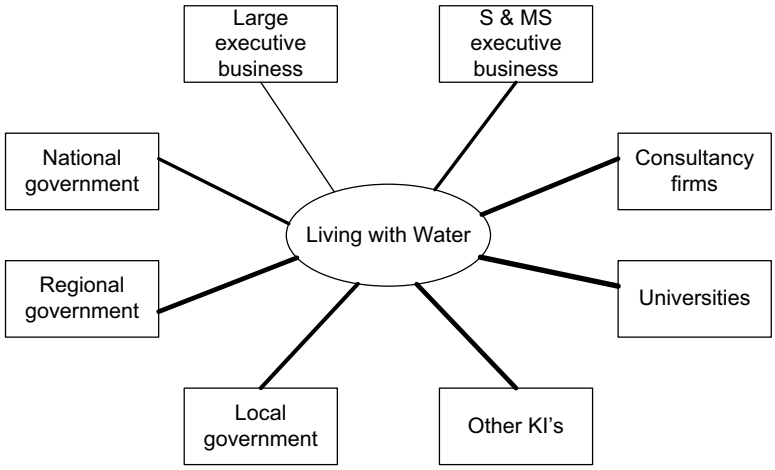

Figure 7.5: Commitment of actors involved in Living with Water

As was the case in 7.2, large executive business scored lowly on this measure, and small and middle-sized business did much better on this regard. Executive business were reported to be 'little committed', while small and middle-sized businesses were somewhere between 'moderately' and 'reasonably' committed. The highest score went to the universities, which were 'very committed' on average (virtually all respondents chose this answer option, possibly because most projects were run by scientists). Of the governmental actors, regional government scored best, with answers averaging between 'reasonably committed' and 'very

65 Do note that these are generalisations; for specific projects the situation may have been entirely different.

66 For a valuation of 'very committed' a 3 pt line was reserved, for 'reasonably committed' a 2.25 pt line, for 'moderately committed' a 1.5 pt line, and for 'little committed' a 0.75 pt line. For 'not committed at all' no line would be drawn, but this did not occur on average (the answer option was chosen twice though, both times for local government). For clarity purposes, this was not the same as 'no contacts at all', which was an answering option as well, in case a project leader or programme manager just had not been in touch with a certain actor.

committed'. Consultancy firms and other knowledge institutions receive the same average score. The national government scored similarly to small and middle-sized business, and local governments were 'reasonable committed' on average.

Indicator four measured if the levels of commitment displayed matched respondents' initial expectations. As was the case in indicator two, the highest satisfaction existed about the commitment of universities and other knowledge institutions.

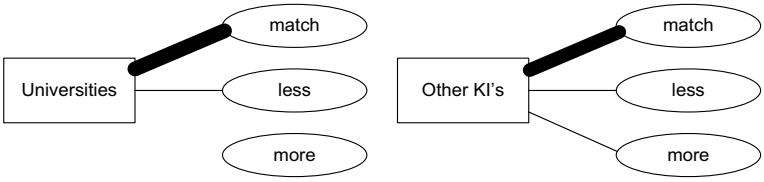

Figure 7.6: Matching expectations on knowledge actors' commitment

The lowest level of satisfaction was for large executive business and small and middle-sized executive business.

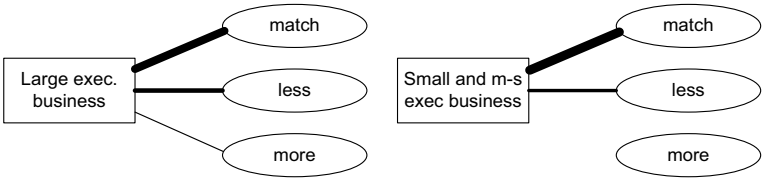

Figure 7.7: The matching and non-matching expectations of executive business

National and regional government scored similarly to small and middle-sized business, with just a few more respondents choosing 'matches expectations'. Consultants and local governments mostly 'matched expectations'; with a small number of respondents indicating 'less' and 'more' than expected.

Overall, compared to Figure 7.1 several things are noteworthy. First of all, results are very scattered across the answer options grid, which means there are large differences between projects[67]. Second, the involvement of knowledge actors appears to have been very frequent and committed. This corresponds with the position Living with Water originally assigned to the scientific community in the involvement diagram presented on the website. Third,

67 This is not good or bad. Diversity between projects is good, but it can also mean projects find it harder to connect with each other on meta issues, because they diverge so much. Whether it is good or bad depends on the projects and on the consequences of the differences.

despite the equal positioning on the website diagram, governmental actors were more closely involved than business actors. Regional and local governments were especially frequently involved and highly committed. Consultants displayed largely the same level of involvement as regional government, but executive businesses did not. The large executive firms appear to have been least involved and committed, and to have caused the most 'disappointment' about their involvement. Further, although the small and medium-sized executive businesses were not frequently involved, their commitment was valued more greatly than that of actors from the large executive firms. From this analysis, it appears that the Living with Water network consisted mainly of knowledge actors, governmental actors (especially regional and local) and consultancy firms. Demand actors were well-represented in as far as water is a public sector. However, they are poorly represented when one considers the private sector to be a vital part of water management.

The reasons for the poor involvement of executive business are at least twofold[68]. First, the joint financing structure required complex co-financing and allowance agreements. The amount of money per working hour was considered too low by business actors, who are accustomed to far higher rates within their companies. This meant that the business actors could not put too many hours into the projects, as this would affect profit levels. Second, the focus on beta and gamma integration was not welcomed by executive business, who felt that gamma science had no contribution to their work. The dislike of gamma sciences also led to the loss of some executive business participants.

The subquestion for this chapter, "*In which environment did the programmes originate and how did this environment affect the way the programmes were organised?*", can thus be answered as follows: The environment in which Living with Water originated was more welcoming and open than that of Transumo. This was mainly because of the actors far greater experience with innovations in water management than in mobility, because the programme proposal was immediately accepted, and because the actors were more involved and committed. Business, however, remained more distant. Thus, in the absence of frequent interactions, the programme had to anticipate business receiver's desires, instead of receiving their inputs directly. The final effect of this on the programme's functioning was the lowering of dissemination levels to business actors, and lower applicability of the results.

68 Based on programme management interview

Painting a picture: intermezzo on Living with Water projects

This intermezzo will discuss several Living with Water projects in order to provide greater background into the current case and examples for use in the analysis of the case study. The intermezzo begins by describing a small number of selected Living with Water projects. After that, a less successful and a successful project are analysed on their receptivity. In these two project descriptions the role of receptivity in assessing impact is studied.

Living with Water projects

Four projects will be discussed in this section. The first project to be discussed here is *Eerst Zuiveren Dan Bergen*[69] which investigated the capacity of reed fields to serve the purpose of water purification and water storage, and eventually be used as a raw material for green energy production. The project was carried out at an estate in the east of the Netherlands. Participating actors were the estate owner, governmental agencies, an advisory organisation, scientists and several actors on the edge of public and private enterprises. The triple helix was thus well represented in the project. However, the actors spoke a range of different languages and came from different working cultures. In order to overcome potential tensions and problems arising from the cultural and language differences, project leaders went to great lengths to create greater mutual understanding by focusing on the importance of learning from ánd about each other. This proved successful, and the estate area became a place of interest for many actors working on sustainable water storage and energy production.

The second project discussed here is the project *Bestuurlijk Schakelen*[70]. Whereas Eerst Zuiveren Dan Bergen was rather practical in orientation, Bestuurlijk Schakelen was more scientific. The four layers (national, regional, water boards, and local) of Dutch public decision-making on water demanded that project leaders be able to switch intelligently and adaptively between them. The project analysed this switching process in practice by applying scientific strategies from the field of public administration. One of the areas this project was concerned with was short term versus long term tensions. The recommendations they made were often concrete and tangible, directly applicable in day-to-day business. The project was successful in its combination of science and practice, and actors in each field were able to learn from each other. Science welcomed the real life experience of the practitioners and the lessons they could learn from the application of their ideas, whereas practitioners welcomed the practical tools they were equipped with by the scientists.

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69 http://www.levenmetwater.nl/projecten/eerst-zuiveren-dan-bergen/

70 http://www.levenmetwater.nl/projecten/bestuurlijk-schakelen-in-waterbeheer/

The third project is *Zilte Landbouw Texel*[71]. This project was led primarily by a scientist and a farmer who worked together with several other participants to develop a shared objective: farming on salty ground. For a long time it was assumed that salty ground was unsuitable for agriculture. This limited the available land space for agriculture, as more and more coastal areas became brackish and salty. The project leaders aimed to demonstrate that this land could be suitable. As a result, not only did they succeed in growing several types of vegetables, the farmer and scientist became working partners and even friends: "*I [the scientist] became friends with [the farmer], and because of that we didn't argue about the products the project delivers, even if these are potentially limited in terms of scientific revenue. Our objectives are so different, but it goes well. We need each other.*" The scientists got enough data to spawn several published articles. All in all, there was a clear awareness among participants that they were invaluable to each other and their shared objectives were powerful enough to overcome the differences between their other objectives.

The fourth and last project discussed here is *Waarheen met het Veen?*[72]. This project combined the efforts of a broad consortium, with representatives from science, government and business. It aimed to limit the soil subsidence of peat soil areas, so as to ensure that this unique land type was preserved in the Netherlands. The project aimed to support policy-making on this matter, and involved all stakeholders to create well supported solutions for the peat areas. Conflicts between national and regional governmental agencies on the future of these areas were addressed by providing all required knowledge about the effects of every potential future strategy (Van Buuren 2009: 8). This increased stakeholders' knowledge on the effects of their decisions, which helped to improve the decision-making process. Communication and interaction was of vital importance in realising the outcome, as the project leader commented: "*In the project, we realised a close cooperation between knowledge carriers and knowledge users, we wanted to cater to the demands parties have as much as possible. (…) What is different in this project from other projects I work on is the fact that we make the interaction of parties our key concern.*". Being open to each other's requirements and desires helped this project to take decision-making about peat areas to the next level.

An example of a project with problems: Spaarkaart

The project Spaarkaart aimed to facilitate the building of artificial hills from dredged materials. It had a good start in that it received positive publicity, won a prize in a govern-

71 http://www.levenmetwater.nl/projecten/zilte-landbouw-texel/

72 http://www.levenmetwater.nl/projecten/waarheen-met-het-veen/

mental competition for innovative projects, and realised enthusiasm among many potential participants. However, problems started to occur soon after these victories. The original ideas had to be amended, there were financial shortcomings, participants had trouble understanding each other, team spirit and adroitness were lacking, and many unforeseen obstacles occurred (Arcadis 2009: 3). The project management invested much time and effort to setting the project back on course, but their efforts did not have the intended effects. Nonetheless, it is not the author's view that the project was a failure. Considerable reflection took place at the end, and internal evaluation of the project made contributions to other projects (ibid.).

Nonetheless, this case will be used as a means to evaluate the validity of the conceptual framework, by determining if this less successful project indeed scores lower by the method. The assessment is based on an interview with the project leader, and other sources of available data.

Table iLwW.1: Spaarkaart sender receptivity scores

Variables	Indicators	End score
Awareness	Satisfaction with context	Negative
	Fit urgent problems	Negative
	Future images	Neutral
Association	Presence of learning	Positive
	Fit official views	Negative
	Dissemination fit	Positive
Acquisition	Diversity and strength connections	Negative
	Handling external conditions	Negative
	Competencies	Neutral/ Negative

The project scores low on the receptivity assessment. It should be noted that the results relate to the period of interviewing and afterwards; not to the early phases of the project. At first it appeared that the fit between project's urgent problems and receiver's urgent problems was high, and that the fit between official views and project views was high. In the first phases of the project the context appeared satisfying; after all, they had won the competition, they had realised enthusiasm among receivers. The receptivity assessment is a reflection of the state of affairs in March 2008, when project frustrations ran high and the objectives appeared to become failures. During that year project management managed to turn some problems into learning experiences, and they worked hard on formulating lessons learned in (evaluation) documents. Because of this effort, the project was able to make the best of the situation they faced. This results in the positive indicator score on 'presence of learning'. The other positive indicator score is 'dissemination fit', since the project chose a very visual and well-aimed dissemination approach.

Spaarkaart is an example of a project where things did not go as planned. Receiver receptivity was apparently not high, as lack of commitment and participation of receiver actors were an important reason of the project's problems. This lack of receiver receptivity translated directly into lack of sender receptivity. The project was not able to tackle the problems they faced, and they became important obstacles in the realisation of their objectives. From this it can be concluded that less successful projects indeed score low on the receptivity assessment. The next sections of this intermezzo will assess a successful project, in order to determine whether this project scores high on the receptivity assessment.

Success case Waalweelde

Waalweelde is one of Living with Water's success stories. This regional development project worked on the realisation of an integral regional development of the river area. In this development trajectory many aspects played a role, including the economy, living by the water, nature, biodiversity, everyday surroundings, and safety. This was carried out in interaction with relevant stakeholders, labelled with 'the four B's'[73]: business, citizens, governors and civil servants. Waalweelde was a consortium project with tens of individual development projects under its umbrella. Many actors were therefore involved, even if they did not participate in the central consortium of the project. Although executive business was not part of the project's central consortium, it did take the lead in several design and implementation trajectories, as did the local government. The combination of the central consortium and the several consortia of the subprojects created a large network of actors, from the entire triple helix.

At first the project encountered problems, because the national government agency Rijkswaterstaat perceived the project as a competitor to their own regional development trajectory. This resulted in tensions, which started to change when Rijkswaterstaat learned that their own trajectory did not produce the desired outcomes. From then onwards, they became very interested in the project, although some concerns remained. National government hesitated to share the development process with other stakeholders, as it would result in less control over the process and the outcomes, and create more uncertainties.

Regional government, however, became very enthusiastic. A consultancy firm advised regional government to become more involved in the project, as much energy existed in the project that would cause their participation to pay off. The province of Gelderland, a consortium partner in the project, thus adopted the project. The deputy of the province became a sponsor of Waalweelde. This gave the project a great impulse, as it meant that

73 The four B's refer to the Dutch words: bedrijven (business), bestuurders (governors), beambten (civil servants), burgers (citizens).

the project process now lay in the hands of those who would actually implement it. Today it is used by many as an example of a successful integral and interactive water project, including the State Secretary Atsma (see parliamentary report on water of December 13. 2010: p. 50).

Receptivity analysis of Waalweelde

This intermezzo will discuss the results of the receptivity analysis conducted for Waalweelde. Such an analysis of the Transumo project, Rush Hour Avoidance, demonstrated that successful projects tend to score highly. This intermezzo will test this idea by applying the conceptual framework to a second successful case, while focusing mainly on sender receptivity variables. This focus is driven by the available data, which is limited to an interview with a project leader. Interviews were not conducted with receivers, but the receiver perceptions will be briefly analysed based on other sources. Further, sender receptivity analysis will not explicitly discuss indicators related to 'application perceptions', as these could not be deduced from the project leader interview in a systematic way. However, application perceptions will become clear from the discussion of the other variables and indicators. Overall, sender receptivity variables awareness, association and acquisition were scored as follows.

Table iLwW.2: Waalweelde sender receptivity scores

Variables	Indicators	End score
Awareness	Satisfaction with context	Neutral/ Negative
	Fit urgent problems	Positive
	Future images	Positive
Association	Presence of learning	Positive
	Fit official views	Positive
	Dissemination fit	Positive
Acquisition	Diversity and strength connections	Positive
	Handling external conditions	Positive
	Competencies	Positive

All indicators but one receive a positive score in the Waalweelde case. As the project leader of Waalweelde commented, a lack of satisfaction with the context was the reason for executing the project: "*the immediate cause for our project is the dissatisfaction we noticed about the system. (…) the municipalities along the rivers are rather small, they only have small administrative machinery, hence stakeholder involvement in regional development trajectories does not have priority number 1 for them. Often there's only one civil servant, who does this part-time. That's a very weak basis*". The project had more faith in executive business than in governmental actors, and the same interviewee

added the following to his answer: "*the only actors that really realise change in the area are the entrepreneurs. Aldermen are, in general, risk avoidant, citizens are often conservative, civil servants don't get enough space from their governors to move around … Entrepreneurs have the money, the ideas, and the decisiveness*".

Interestingly, dissatisfaction with the context tends to be a predictor of success in a project and this fact will be taken into account in Chapter Ten when indicators are reviewed. The need for change is also a driver of project action, and it pre-empts failures in connecting to the needs and desires of receivers. As was the case in Rush Hour Avoidance, all other indicators were evaluated positively. Specifically, the handling of external conditions was scored positively because of the fact that the project leader did not raise it as a concern at all. Further, all he mentioned about the joint financing arrangement was that it was instrumental in realising innovation: "*You need financial support from outside (…) crucial for innovation*". Reasons for the other positive scores include the fact that the project lists very specific and well thought-through lessons learned, that Waalweelde has been adopted ánd that the project has been scaled up. Other important reasons include the fact that there were a broad array of actors who were very committed (both governmental and business actors), and that the project participants displayed all competencies listed by the programme management including active cooperation and effort to make connections. As a result of these, the Living with Water programme management frequently mentioned Waalweelde as an example of a project that succeeded in connecting short term goals and actions with long term solutions[74].

As previously mentioned, no data was collected from the receivers', but their perspective can be constructed from several general observations. First, a province deputy adopted the project as it was well connection with the national government's development plans. This indicates the awareness, association and acquisition of the receivers. A second observation is the fact that entrepreneurs took the initiative and the lead in several subprojects. These observations lead to the conclusion that the receivers considered the project worthwhile and interesting, and took steps that could lead to the implementation of the project. The receiver receptivity variables, including application perceptions, therefore appear to be fulfilled in the Waalweelde case.

The case of Waalweelde further demonstrates how a project can have difficult start, and yet become very successful. The project managed to combine projects with short-term tangible goals with a broader project perspective that tackled more long term, tacit and abstract ideas (such as interactive decision-making processes, integral working, and sustainability). Furthermore, it emanated enough energy to convince governmental actors to support the trajectory. The energy and enthusiasm that was responsible for so much of its success came from the standard bearers of the project represented this energy, which

74 Interview programme management Living with Water

enhanced project success. The project calls this "*finding your local heroes*", and "*collecting a group of positive people around you*". This support proved helpful in attracting attention and in promoting the dissemination of project ideas.

Thus, it can be concluded that several factors were instrumental in realising the project's success, specifically: managing to combine short-term action and results with long-term objectives; combining science with practice; allowing different perspectives, perceptions and interests to co-exist; and accepting reductions in control to accommodate the complexity brought about by catering to the desires of participants. This successful project received a high receptivity score under our framework, and must be credited especially for turning problems and tensions into strengths rather then succumbing to them.

Chapter 8

The impact of a water management knowledge and innovation programme

This chapter will assess the impact of Living with Water as a case study in the research on the impact of KAIPs. Eight variables about sender and receiver perceptions were developed in order to assess receptivity.

- Awareness of needs and desires of receivers by senders [v1]
- Association of needs and desires of receivers by senders [v2]
- Acquisition of resources needed for impact at the senders [v3]
- Application opinions of the senders [v4]
- Awareness of receivers towards innovations of senders [v5]
- Association of receivers towards innovations of senders [v6]
- Acquisition of receivers to adopt innovations of senders [v7]
- Application opinions of the receivers [v8]

The results on these variables will lead to a conclusion on the receptivity of senders and receivers of Living with Water. The research question for this chapter was: *What was the impact of the programmes on the (un)intended recipients of their knowledge and innovations?* The receptivity results will thus be examined in the light of a possible new evaluation method for measuring KAIPs' impact.

Several types of data were acquired for the purposes of assessing the above variables in the context of Living with Water. First, the project leaders interviewed were senders, directly involved in the programme. Most were governmental actors and scientists from universities and other knowledge institutions, while a small number were consultants. Only the programme manager interviewed was directly employed by Living with Water. The receivers interviewed were from the national government (ministry), universities, and both executive and advisory business. The survey respondents were a mixed group. In general they were receivers, sometimes involved in the programme, sometimes only vaguely acquainted with it. The latter group included workshop visitors, advisors, project participants, and so on. All interviewed respondents are named in the appendixes to this thesis. Please review section 4.2 for more information on the surveys.

8.1 Sender receptivity

The four variables were operationalised using the following indicators:

Table 8.1: Sender variables and indicators

Variables	Indicators
Awareness	Satisfaction with context
	Fit urgent problems
	Future images
Association	Presence of learning
	Fit official views
	Dissemination fit
Acquisition	Diversity and strength connections
	Handling external conditions
	Competencies
Application	Estimated position Living with Water in sector
	Estimated impact projects Living with Water
	Estimated impact programme Living with Water

8.1.1 Awareness

Satisfaction with one's own role in societal context

Project leaders often discuss the fact that not everyone in the water sector is ready for change. From the governors and civil servants to the farmers and ordinary citizens[75], there appears to be an 'inherent conservatism' among the actors that some view as a barrier towards their innovations. This posed a problem to the projects, and although they did not cause them to fail out right, it did limit the possibilities for change. Projects had to cater to the inherent conservatism, and modify themselves in part to be receptive to the audience. These measures ranged from changing the name of the innovation, to changing the location. On the other hand, project leaders often described the growing demand for innovative water management, most notably due to the public's concerns over climate change. This increasing momentum created opportunities for the projects, and they were able to jump on the trend and position themselves as potential solutions to problems induced by climate change.

At the same time, several tensions that plagued sectors of society were especially visible to the programme and project managers. The first of these were the differences between science and practice, and the second was the difference between governmental actors and professionals. Other social context matters relevant to programme included the complex-

75 These four were mentioned most often

ity of the political and administrative structure and the changing roles of key players in the water sector, both of which had an effect on how projects were executed. For example, several laws could stand in the way of the project's plans or ideas (especially EU directives) and the projects had to be modified accordingly. Further, governmental actors were no longer the sole decision-makers, and had to cooperate with businesses and universities. Given that the social context included positive effects (e.g. the trend toward environmental responsibility) and both positive and negative things were recorded in the interviews, the score for this indicator is neutral.

Fit Living with Water with sector problem perceptions

The project leaders interviewed discussed a number of core problems they saw as persistent that either affected the general water sector, or that affected their specific projects. Ten of the 16 project leaders spoke elaborately enough on the problems they witnessed in their environment to provide significant insight[76]. Although the problems mentioned may appear to be very distinct from each other at first glance, three common themes can be discerned. The first of this (mentioned by six of the ten project leaders) had to do with the development and implementation of innovations. They specifically mentioned great resistance towards innovations, the existence of taboos, and the lack of (institutional) implementation of innovations: "*Certainly a relation exists between the difficult process and the fact that it concerns innovation projects, because in innovation projects things are different from the usual. That requires commitment; requires risking one's neck*". A second core theme (mentioned by the leaders of four projects) was a lack of integrated efforts in the water sector, and a third core theme (mentioned by three project leaders) was related to governmental and administrative problems, such as bureaucratic complexity, ownership and laws that conflict with the project.

Since these problems are rather process related, instead of relating to problems in the physical system, the results of the sender interviews will be examined together with process problems raised in the survey of receivers. One can see that rather similar things came to fore in the interviews and surveys. However, the survey data did not emphasise resistance as much as this was emphasised in the interviews. The answer options that most reflected resistance were 'appreciation for innovation projects' (6.3%) and 'problems around the implementation of measures' (8.2%), both of which received relatively little support from the survey respondents. The answer option chosen most often by survey respondents is 'fragmentation in responsibilities' (24.6%). This is followed by 'badly functioning cooperation between organisations' (18.4%). These relate to two additional problems mentioned

76 Because the interviews were used for multiple purposes, as discussed in Chapter Four, not all interviews provided answers on every question or every indicator.

most often by project leaders: lack of integral working (fragmentation) and organisational and governmental complexity.

In summary, there is no massive lack of fit between the views of the senders and the receivers, but project leaders (senders) and survey respondents (receivers) emphasised slightly different issues. As can be expected, project leaders attach greater importance to the success of innovation projects, whereas receivers appear to be much less concerned about this. Because this is the only discrepancy, this indicator receives a positive score.

Future images and the realism of these images

Three general categories of responses were provided by participants reflecting different combinations of priorities for the future First, six out of thirteen project leaders said that their main concerns were in the areas of increasing sustainability, creating more space for nature, and the fact that water is desirable to have as an aesthetic element[77]. Second, four out of thirteen mentioned the need for more integrated cooperating between organisations, groups and people. An additional three respondents described their concerns being mainly about the economic value of water: the importance of water for the economy, the importance of water economy as a theme, and the marketing of innovations. Another theme that was mentioned a few times was the desire for direction and guidance in the water world. These foci are not unique to Living with Water project leaders, and their ideas of the solutions they entail are shared by receivers. In the survey, receivers mentioned 'more space for water' and 'cooperating in a more coherent manner' as their top solutions for physical problems and process problems respectively. The fit is therefore in order, and the indicator receives a positive score.

8.1.2 Association

Presence of (receiver-oriented) learning in project/ programme

Living with Water proved to be very open to learning from its own experiences and that of others. A prime example of this is the adjustment they made in their monitoring process. They started with the monitoring requirements, but soon realised it did not tell them much about the actual impact of their programme. They set up several trajectories aimed at exploring alternative types of monitoring[78]. In 2008, they changed their monitoring system. Project leaders were no longer required to fill out excel sheets filled with indicators, and were instead invited to participate in an in-depth interview[79]. Responsibility for filling out

77 Project leaders who say this often mean with it that water is not 'a problem to be solved', but something that is desirable to have in your neighbourhood.

78 For a more elaborate account see Bressers & Teisman 2009

79 Carried out by the author of this thesis, together with Eveline Maris, a consultant working on project basis at Living with Water.

excel sheets then fell on the programme management, who based their answer on their knowledge of the project and interview information.

Apart from their initiative in improving the monitoring system, project leaders demonstrated their commitment to learning during the interview through frequent reflections on lessons learnt. The management took the lead in this openness with the following attitude: "*if it fails, at least they learn something from it*". Programme management was also were open in discussing things they should have done differently. "*We had too little supervision capacity for the projects (…) we should have been less nervous about the BSIK structure, the monitoring should have been set up differently,(…) we set very high objectives, thankfully we actually achieved those objectives, but we should have been a bit more aware of that; we would have changed certain people quicker*". Learning was widespread both in projects and programme, and often oriented toward improving relations with receivers. This indicator receives a positive score.

Fit between project ideas and 'official views'

Out of 12 project leaders interviewed, four were positive about the fit between the project's goals and the more official views. As one respondent put it,: "*even before we had properly researched and calculated it, it was already applied in policy, it really ran in front of us, actually*". Another project leader mentioned that "*the alderman is very enthusiastic about it. (…) They have the ambition to be innovative, that receives a lot of attention right now*". Others were less positive. Although only one project leader was truly negative about the fit, seven gave rather mixed answers. They often described observing positive attention and focus on development among stakeholders, but commented also that the actual application or adoption ran behind. One these seven said: "*I am not alone in this vision for change, I think it is seen increasingly. But whether people actually act on it… They often point to other people, saying they should act different, but then they don't do it themselves*". The fit therefore appears to be more in word than in deed.

The programme's management made similar comments in their interviews. One manager said: "*Living with Water deals with water in a different way, and you see that whole movement everywhere now. We are also close to climate change adaptation, of which three-quarters is water-related: all the societal attention for climate change concentrates on water. (…) Yes, water has momentum right now*". But the same programme manager also acknowledged difficulties, specifically that they had to be on their toes and ride the wave on time.: "*If you jump on that wave in time, you end up well, but if you jump too late it won't work: you yourself are the one who has to be on time*". All in all, programme managers were somewhat more positive than project managers. As the receivers suggest, this might be related to the fact that Living with Water as a programme works on a more strategic level, and the projects on a more operational level. Innovations and change re-

ceive more resistance when they become tangible. All in all, this indicator receives a neutral score, due to the mixed results and the hesitations about fit on project level.

Dissemination strategies/ fit with dissemination needs receivers

In general, Living with Water's project leaders had little trouble describing the many methods they used to disseminate their ideas. A large proportion of projects aimed to disseminate their findings via scientific channels, but other common channels included workshops, practice-oriented publications, and websites. However, the survey indicated that academic journals were not the preferred channel of the receivers who instead preferred 'practice-oriented publications' (27.7%), 'personal contacts' (25.2%) and 'meetings, workshops and conferences' (22.6%) as means of receiving the new knowledge and innovations. Scientific journals was the fourth most popular option (out of five options), with 15.1% of respondents expressing a preference for it. Some comments in the open fields of the survey confirmed this observation ands respondents commented that Living with Water should have focused more on practice, and less on science.

The programme management admitted that they did not begin with firm plans for the dissemination of all project results. This did not mean, however, that their implementation was done in an arbitrary fashion: "*Despite this there is straight line in it all, it is not like we were just doing something. That line is that you look whether it is pragmatic and sensible, and based on that you reach agreements*". The programme's management was intensively involved in selection of products developed by projects, and they actively steered for diversity in dissemination means.

All in all, the results on this indicator are rather mixed. There were many instances of a good fit, and sometimes of a lack of it. However, because of the diversity in products and dissemination strategies, and the explicit effort to cater to the receiving public (e.g. by using very visual means of communication to maximise accessibility), this indicator receives a prudent positive score.

8.1.3 Acquisition

Diversity and strength of connections

Living with Water has often been praised for its very large and rather actively involved network. This can be attributed to some extent to the programme management who worked hard to establish and maintain this network: "*You have to invest to get those [strategic partners] in your network; that is very important. Your network is your capital. (…) It is good to involve the people in organisations, and through that also the full organisations that are behind these people, not just the one person*". A strong network consists of both formal and informal ties: "*Informal ties were at least as important [as formal ties]. That's about how everyone works. (…) With just the formal side you won't get there, you*

always need to search for a combination of a formal relation that is noted on paper, and the informal ties, because with those you can arrange anything (…)".

Living with Water's strategic partners were most notably governmental actors. Given the fact that water is a public domain, it is not surprising that five of the ten core partners mentioned in the interview were from the government. In general, Living with Water was rather satisfied with the connections they had. They had initially wanted more consultants and executive businesses to join, but the joint financing arrangement was a key impediment in this regard. When this came to the attention of the programme management, they managed to fix some of the problems and thus increase the participation of consultants. However, executive businesses remained rather absent, largely because of the high implicit knowledge and the participation of gamma sciences. This was not repaired and executive business remained minimally involved. Nonetheless, despite their poor participation, the diversity and strength of the Living with Water network was high. Further, a number of consultants were heavily involved, and the other connections that existed were strong. Although executive business should have been more involved, this indicator receives a positive score.

Handling of external conditions (time, money)

Project leaders barely mentioned the joint financing arrangement in this segment of the interviews, although they did sometimes discuss the fact that they had limited time to devote to the project because of the limited financial provisions under the arrangement's agreements. However, the absence of complaints in this segment does not mean all of Living with Water's requirements and regulations were welcomed. The monitoring sheets that project leaders had to fill out under obligation from the joint financing arrangement were greatly disliked. The project leaders often had to be pushed by programme management to fill out the sheets, and even then, some did not return them or only filled them out partially. The monitoring problem was severe enough that the programme management felt compelled to change the system midway through the programme.

Despite this, the interview data reveals few frustrations over the financial arrangement in comparison to the Transumo case. A possible reason for this was the actions of the programme management. They were supportive of the projects, empathised with their dislike of the system, and even helped some complete the sheets as required. They managed to mediate between their need to fulfil all obligations under the arrangement, and their need to be supportive of their project managers.

While the project leaders were happy with this and did not report significant concerns, the programme management themselves described extensive problems they perceived as being caused by the low level of financing available. Especially for business actors this proved a very difficult point, as was already described on the previous indicator. Thus, the programme management always made sure to keep their financers satisfied by providing

what they desired of them, but they limited the demands these put on project leaders to minimise frustration. As one project leader put it: "*They have managed to keep the administrative load from BSIK relatively low, in comparison to some other programmes*". Another project leader described how Living with Water was both strict and flexible: "*If you don't match the criteria you can forget it. But they are flexible: if they believe in a good idea, you don't need to dot the i's. Great, otherwise many projects would not have been there!*" Thus although monetary difficulties and related time pressures were not completely absent in the programme that demanded significant commitments, the functioning of projects and programme was not damaged.

The views expressed here however, stand in stark contrast to those expressed during a 2007 midterm review. The authors of that report wrote that "*almost every respondent spoke about the high administrative burden*", and "*several respondents (from different organisations types) indicate that, due to the high administrative burden, they would not take part in a similar programme again, which they did regret because, despite the burden, innovations were made possible*" (Van Helsdingen et al. 2007: 33-34). It is striking to see that within a year, sentiments shifted somewhat from frustration to acceptance. This is in contrast to Transumo where such problems were widely reported at the end. It appears that over time, both the Living with Water programme and projects found some sort of balance[80]. The indicator score is therefore neutral.

Presence of needed competencies

Programme managers spoke openly of the necessity of people with a variety of competencies to guide the programme. "*As a programme manager you need to have feeling with that [with the content], you need to know what's going on in the field, you need to understand money, human resources… You have to be very broad as programme manager: you have to be versatile, you need knowledge of governing, finances, content…*". Expertise was thus consolidated across the programme, with different people with differing roles and knowledge areas working to provide the broad set of competencies required. Both programme managers and project leaders needed to be good at making connections between people in different areas, because "*innovation exists mostly at the dividing line between domains*".

Although specific competencies were not explicitly discussed with project leaders, standard practice was for the projects to be selected based on the competencies that were present in the consortium. Also, it appears Living with Water received most praise for its ability

80 Important to note here is that several conversations of the author with project leaders in 2011 reveal that the joint financing arrangement was experienced as the most negative aspect of Living with Water. Some project leaders mentioned it took them years to get everything sorted out administratively. Although the problem appears to have lessened during the programme, it certainly kept playing an important role.

to make connections, and this might be its core competency area. As one project leader from outside the selected group of respondents told the author: "*Living with Water created inspiration (because of the contact with other projects), and a network (of knowledge carriers and creative people) (…) Living with Water facilitates that exchange*". This was true both at the programme and project level. One project leader described how Living with Water brought the "*obligation or choice to bring knowledge institutions and business partners together. From this the pleasant awareness developed that we could not have done it without one another*". Left to their own devices, project leaders would have had difficulty holding on to the cooperation between beta and gamma, largely because this was new in the water world, and participants did not yet see the relevance of it. As one project leader noted: "*Also the fact that Living with Water kept pressing on about beta and gamma integration; I really needed that as a project leader, to keep it in the project*". It appears from the assessment of the programme management that the ability to realise cooperation and make connections is the most important competency necessary, and by their account, these abilities were abundantly present among Living with Water actors, both at project and programme level. This indicator therefore receives a positive score.

8.1.4 Application

Estimated positioning of Living with Water in the sector

Living with Water's management described the water sector in which they play a role as follows: "*We feel at home, it's a pleasant domain, with many likeminded people, who all have their own positions, but who are always prepared to attune with each other. It's not a hard world, the culture is to do things together. It's a nice world*". They also reflected on their own position in this pleasant world: "*We are a knowledge hub, a spider in the web. We can oversee many strings, and have also pulled many strings, especially now in the second half of the match. In the first half you still need to be recognised, you still struggle with the BSIK arrangement; you still have too little results to be seen. In the last quarter of an hour you're seen as an interesting player with results that matter*". This quote nicely describes their development from that of a new player on the field to a player that is increasingly recognised for its ability to connect and bring about results. Although this did not happen overnight or without setbacks, the quotes demonstrate the way with which Living with Water placed itself in the sector. This indicator receives a positive score.

Estimated impact projects Living with Water

It is important to keep in mind that the project leaders were interviewed just before the projects ended, between early 2008 and 2009. Impact was therefore not always clear at the time of data collection. Despite this, most project leaders were able to discuss their impact in the interview, although a large number gave 'neutral or mixed' responses that indicated that they were still rather uncertain about their effects. Approximately equal numbers

believed that Living with Water projects had significant impact or had reservations and were neutral on its role. The latter group described a number of positive contributions (e.g. spin-offs) but combined this description with concerns about the receptivity of the sector, and questions on whether their innovations would be adopted.

The group that was more positive shared these concerns, but were more positive simply because their projects (or parts of it) had already been adopted. While the majority of respondents fell in the positive or neutral category, one was clearly negative about his project's impact, and a further two projects did not discuss their impact in the interview. This indictor thus receives a positive score.

Estimated impact programme Living with Water

Seven out of sixteen respondents did not give an opinion on the impact of Living with Water. Some felt it was not their place to give an opinion on this, and others were not asked because of the open interviewing structure. Those that gave an opinion were usually positive, but cautiously so. The inclusion of gamma/ broad alliances was mentioned several times and this had a positive impact as it received a lot of appreciation in the sector. Several others pointed to the role of Living with Water in the development of the National Water Plan. This was a policy plan in which Living with Water was asked to contribute its advice and opinions. Two respondents were neutral about Living with Water's impact, one was negative. The negative respondent felt that Living with Water was too broad in orientation, and would have more success if it were smaller and more focussed. A trend could be observed across the time span of the 38 interviews, namely that respondents to the early interviews (early 2008) were generally more negative, while those interviewed later were more positive (early 2009). As previously mentioned, a possible explanation for this is the fact that the effects of Living with Water were still rather obscure in 2008, but became clearer toward the end. Thus, this indicator receives a positive score.

8.1.5 Scoring sender receptivity

The following table is an overview of sender receptivity[81].

Table 8.2: Sender scores

Variables	Indicators	End score
Awareness	Satisfaction with own role in context	Neutral
	Fit urgent problems	Positive
	Future images	Positive
Association	Presence of learning	Positive
	Fit official views	Neutral
	Dissemination fit	Positive
Acquisition	Diversity and strength connections	Positive
	Handling external conditions	Neutral
	Competencies	Positive
Application	Estimated position Living with Water in sector	Positive
	Estimated impact projects Living with Water	Positive
	Estimated impact programme Living with Water	Positive

This field of light-grey shading demonstrates the high degree of sender receptivity. Nonetheless, this general receptivity is challenged by three aspects: satisfaction of project leaders with the context they operate in, fit with official views, and the handling of external conditions (especially BSIK). Although none of these led outright to a negative score, they are worthy of attention because they all pertain to the ability to connect with receivers.

81 Light-grey is reserved for positive scores, whereas dark-grey is reserved for negative scores. Neutral scores receive a grey-shade in-between light and dark.

8.2 Receiver receptivity

The variables were assessed according to the following indicators:

Table 8.3: Receiver variables and indicators

Variables	Indicators
Awareness	Use and necessity for Living with Water
	Need for changes
	Added value of inwat
	Importance of inwat in organisation
Association	Importance of innovation/ change for sector
	Cost-benefit ratio of innovation/ change
	Inwat importance for decision makers
Acquisition	Realism and feasibility of innovations
	Usage of knowledge and innovations
	Influence of Living with Water on receivers
	Propositions Living with Water
Application	Notoriety of Living with Water
	Appreciation of Living with Water
	Acquainted with KAIPs in general
	Familiarity with Living with Water
	Contact with Living with Water
	Influence of Living with Water
	Estimation familiarity LwW in sector

8.2.1 Awareness

Use and necessity of Living with Water

Four respondents were positive on this matter and five were negative. One respondent who was clearly negative about the use and necessity of programmes like Living with Water offered the following justification for his view: "*if it were really necessary more would be done with it*". The rest mentioned concerns about the embedment and anchoring of the programme. "*They do all kinds of fun stuff, but then you hear nothing about it anymore, about what will be done with it*", one respondent commented. Another respondent added that the programmes might need a different format; a different set-up. In contrast, one of the more positive respondents commented: "*I see them as very important, a very good addition. In the knowledge- and innovation world you need good institutes, where you can offer a place to people who have expertise. But that's not enough, you also need directly connected organisations where people come together and work on knowledge ánd on practice. (…) This way you can force breakthroughs, which is very important*"..

Survey respondents were also asked about this. Faced with the proposition 'Programmes such as Living with Water are necessary to make water management in the Netherlands more innovative' the majority of the respondents answered positively: 46.6% agreed completely, and 38.9% agreed somewhat. Only 2.1% completely disagreed. This means that the majority of the survey respondents believed in the use and necessity of programmes like Living with Water. Considering both the interview responses and survey results, the score for this indicator is positive.

Need for changes

All respondents felt that innovative water management should be high on the political agenda and four out of five respondents were positive about the need for change. The fifth respondent felt that although change is important, the rather satisfactory performance of the Dutch water management causes people to be unaware of the problems and necessary actions. Because water management is not in the news on a daily basis, citizens remain unaware of the actions that should be undertaken. He described the need for innovating in water management as "*unknown, and unloved*"[82].

However, the general positivity was coupled by some concerns. As one respondent put it: "*Increasing awareness is very difficult, it has to be done better, especially towards citizens*". Another respondent said: "*we definitely support the need for change (…), on a more abstract level we certainly agree with Living with Water. However, on a more practical project level this is not always the case*". From these quotes and others, two things can be learned. First, as many respondents point out, water is low on the political agenda, as is awareness of the necessary changes in the area of water management. Second, while respondents generally agree with Living with Water's strategic or core messages, they disagree somewhat with the projects under enacted. However, because the majority of reactions were positive, the indicator is scored positively.

Added value of innovative water management

In the survey, respondents were asked whether the concept of innovative water management had any added value for them in comparison to 'normal' water management. The respondents, stemming from the Living with Water address file (hence most likely working on themes related to innovative water management), were very certain of the added value. Almost half of the respondents (46.1%) felt that it had much added value while another group of almost half of the respondents (47.5%) answered that it had a reasonable amount of added value. Businesses were particularly positive about the added value of 'innovative' water management. Governmental actors (both executive and governors) were the least

82 Translation of the Dutch expression 'onbekend maakt onbemind'.

positive about the added value of innovative water management. Nonetheless, this indicator receives a positive score.

Importance of innovative water management in respondents' organisation

The survey respondents were asked about the role of 'innovative water management' in their organisation. Given that the survey respondents all stemmed from the Living with Water address file, the expectation was that a large proportion of respondents would answer that innovative water management played a significant role in their organisation. The results confirm this. Only 2.4% of the survey respondents indicated that innovative water management was of no importance in their organisation. The largest group, 35.1%, answered that it was of reasonable importance, with a similarly large group of 28.8% saying that it was very important. Large business actors, consultants, and knowledge institution actors most frequently indicated that it was very important in their organisation. Small and medium-sized businesses and governmental actors tended to say that it was of 'reasonable importance' to their organisation. Thus, this indicator receives a positive score.

8.2.2 Association

Importance of innovation and change for the sector

All five receiver interview respondents were positive about the importance of innovation and change to the water sector. "*We are at the point where we cannot get there with our traditional ways of thinking*", one respondent commented. Another respondent supported this view, concluding that "*a lot is changing in society. We have to anticipate on that in our world*". The changing society, and the fact that innovation and change is no longer a choice but a necessity was mentioned by all respondents. Another reason why innovation and change was important for the sector is reflected in the following quote: "*it is important because the Netherlands has a frontrunner position in the field of water management, and we should keep it that way. Water is the Netherlands' business card*". Innovation and change are thus necessary if the Netherlands is adapt to changing circumstances and remain internationally competitive in this area. This indicator receives a positive score.

Cost-benefit consideration of innovation and change

The receiver interview respondents were asked whether they thought the benefits of innovation and change would be high enough to balance the costs associated with it. Four out of five respondents were positive about this, and the fifth respondent was neutral

rather than negative. Nonetheless, all respondents were cognisant of problems. They said in particular that the costs and benefits were hard to estimate beforehand, and that it would take many years before it paid off. It is also hard to capitalise on the positive effects of innovation and change, therefore much of the work is carried out with public money which calls for high degrees of prudence and control. One respondent summarised it adequately as follows: "*the costs come before the benefits*[83]".

The short term versus long term tension, described in the Transumo chapter, is also visible here, "*it will probably balance out on the long term. On the short term it is difficult, though. It will take dozens of years before it starts to really pay off*". Although the difference in the opinions of the current respondents does not differ largely with the Transumo respondents, the scales tip towards a positive score as the respondents appear to have accepted the costs and desire the benefits.

Importance of innovative water management for policymakers

Survey respondents were asked whether they thought innovative water management was currently an issue for policymakers and other decision makers. With this question they were asked to reflect on other actors' opinions, instead of their own opinions. This proved challenging for some survey respondents, and a quarter of the respondents either answered that they did not know, or that it was 'maybe' important to policymakers and other decision makers. Of the respondents that were able to choose, the majority was positive about the importance of innovative water management for policymakers and other decision makers. This group answered that innovative water management was of reasonable importance (44.4%) or much importance (5.4%), while approximately a quarter answered that it was either not really important for policymakers (23.9%) or had absolutely no importance (1.5%). On the whole, governmental actors and knowledge institution actors were more positive about the importance of innovative water management for policymakers than business actors. Overall, this indicator receives a positive score. The score is not highly positive, though, due to the large group of respondents who either did not know, or who felt that was not really of importance to policymakers.

8.2.3 Acquisition

Realism and feasibility of innovations

Receiver interview respondents were asked whether they thought the innovations and changes proposed under the Living with Water programme were realistic and feasible. This indicator received mixed responses. Two of the respondents were positive about the

83 This is an old Dutch saying: 'de kost gaat voor de baat uit'. It does not have a similar translation to English, but the English expression 'you must lose a fly to catch a trout' is often mentioned as a translation, just like 'nothing venture, nothing gain'.

realism and feasibility of the innovations, one was neutral, and two were negative. The two respondents who were positive about it were cautiously so. As one respondent said: "*the ways of working are innovative, and you see that these ways of working have found their place just fine, for example in Dordrecht or in Gouda*[84]*. From this you can see that these projects are feasible: they have found their way*". The respondent that answered mostly neutral pointed to the vast differences between projects: some were very successful and saw implementation, and could therefore be considered feasible. However, others faced issues of scalability and faced serious challenges in their application outside the project realm.

The two respondents who were less enthusiastic about the realism and feasibility differed in their specific concerns. One pointed to the high ambitions of the Living with Water programme, and asked how realistic these were. Nonetheless, this respondent was not entirely negative about the impact of the programme. The second respondent pointed to the issue of embedment, stressing that feasibility depends on good contacts with the ministries which they felt the programme lacked. "*Something goes wrong in the Living with Water communication with the ministries, and the ministries are very important in the Netherlands. It just does not go very smoothly, it does not land. Nobody really cares; people always have something else to do*". This comment is noteworthy, in particular because the two ministry representatives in our respondent sample did not seem to share this concern. In fact, their interview responses indicated that that found their contact with Living with Water to be satisfactory. The diverse range of answers leads to the provision of a neutral score on this indicator.

Usage of knowledge and innovations

Survey respondents were asked whether their organisation or they themselves used the products developed by Living with Water. Most respondents reported that their organisations used Living with Water's products. However, only a quarter said that they did so on a regular basis (23.5%). Most used it every now and then (42.5%), a further 22.3% said their organisations used the products only barely ever to every once in a while and 7.3% indicated that their organisation did not use the products at all.

The numbers of respondents who used the products themselves was largely similar. The number of individual non-users was slightly higher (10.6%) than organisational non-users. The majority (51.7%) answered they use Living with Water products every now and then, and 13.3% were regular users. It is clear that product usage was better than in the Transumo programme as a majority of respondents use the products on a regular or 'every now and then' basis. The usage is still not as high as can be hoped for, but given the largely positive scores on both organisational and individual usage, this indicator receives a positive score.

84 These are locations of Living with Water projects

Influence of Living with Water on receivers

As was described in the Transumo chapter, this indicator was investigated with a Guttman scale of answer options. 15% of respondents indicated that Living with Water had no influence whatsoever on their organisation, while 19.6% indicated that the programme had not had any influence on themselves. The two lowest Guttman scale answering options were that 'Living with Water brought new knowledge and contacts to my organisation' and that 'Living with Water brought new projects and activities to my organisations' and received similar scores: 26.1% for the former, and 26.7% for the latter.

The balance shifted somewhat when respondents were asked to respond to the Guttman scale options for themselves. Almost half the respondents (47.5%) answered that Living with Water brought them new knowledge and contacts. 17.9% chose the option: Living with Water brought me new thinking directions and ways of working'. 14% chooses the category in between these two (Living with Water brought me new projects and activities). The highest Guttman scale answer (Living with Water caused a complete shift in my organisation's thinking and working) was barely ever chosen. It was never selected in relation to participant's organisations, and chosen only twice in relation to the respondents themselves[85]. All in all, the influence of Living with Water on the respondents was good, but not great. The influence of this programme appeared better than that of Transumo, especially given the much smaller group that indicated 'no influence'. Thus, the indicator receives a cautiously positive score.

Propositions Living with Water

Seven of the 12 propositions will be discussed here. The table below summarises the participants' responses. The most frequently endorsed answers are shaded in grey.

85 Of these two respondents at least one was directly involved in Living with Water

Table 8.4: Propositions of Living with Water

Propositions	Disagree	Somewhat disagree	Neutral/ no opinion	Somewhat agree	Agree
LwW has brought together parties that before went their own way	0.5%	2.6%	29.5%	43.5%	23.8%
LwW has visibly brought water into the spatial development discussion	1.6%	4.1%	21.2%	53.4%	19.7%
LwW is an organisation of importance in the Dutch water world	2.1%	8.3%	20.8%	40.1%	28.6%
LwW has placed topics on the policy agenda that were not discussed before	1.6%	9.3%	40.9%	35.2%	13%
LwW has created new ideas and ways of thinking in the water world	1.6%	5.2%	26.7%	44%	22.5%
I have adapted my behaviour and/ or activities due to what I have learned from LwW	15.6%	20.8%	31.3%	19.8%	12.5%
The results of LwW are not visible in my environment	10.4%	28.6%	34.4%	14.6%	12%

From this table, it becomes clearly visible that Living with Water is appreciated and welcomed by respondents. Living with Water is said to have brought parties together, introduced water management to spatial development discussions, and to be an organisation of importance in the Dutch water world. The first five propositions received almost no disagreement. The sixth proposition, however, stands somewhat apart from the rest. It appears that innovation and change are generally more welcomed when they are spoken of in an abstract, strategic level, than when they concern the implementation of actual projects. This proposition supports the idea that the acceptance of strategic ideas differs markedly from their implementation. Despite this, a reasonable number of respondents actually changed their behaviour and activities.

The seventh proposition is formulated such that it has to be reverse scored (hence the underlining of the word 'not'). Although answers were rather evenly spread, a slight majority indicated that the effects of Living with Water were visible in their environment, and a similar amount was neutral in this regard. Most indicated that Living with Water has had an effect, is appreciated, and has led to changes in the water world. This means that as far as the receivers are concerned, Living with Water has adequately met both their needs and desires. Therefore, this list of propositions receives a positive score.

8.2.4 Application

Notoriety of Living with Water

Receiver interview respondents were asked whether Living with Water was well-known among water professionals and decision-makers. Responses tended to be circumspect, and few respondents were out-rightly positive in this regard. Some respondents were either unhappy with or uncertain about the notoriety of the programme: "*(…) the programmes are hard to keep apart. The name is well-known. But whether it's exactly clear what's happening in there… I don't think so*" one respondent said. Another respondent had looked up the website of Living with Water prior to the interview, and was surprised how many projects he knew, without realising they were Living with Water projects: "*The marketing should have been somewhat better. I know many projects, but it never stuck with me that they were all under the same umbrella*". Other respondents were more positive: "*In the water world, it's [Living with Water is] known to virtually everyone. I saw that at the closing manifestation where a thousand people came (…)*". Governmental officials were especially positive about the notoriety of Living with Water. This indicates that Living with Water is especially well-known among governmental actors. However, because of the mixed nature of responses, this indicator receivers a neutral score.

Appreciation of Living with Water

The responses to this indicator were much more positive. Four out of five respondents were appreciative of the programme[86]. As one respondent put it: "*I think so [it is appreciated]. The involvement of gamma within the water world is high on Living with Water's agenda, and that's much appreciated*". Another respondent said: "*Within V&W, there's a much more positive feeling about Living with Water than about Transumo. (…) The programming of Living with Water may also have been more closely attuned with the ministry than Transumo's. The Living with Water projects stayed somewhat closer to V&W*". Others mentioned the room for experimentation, innovation and interesting discoveries as aspects that promoted the general appreciation of Living with Water. Thus, this indicator receives a positive score.

Acquaintance with KAIPs in general

Most survey respondents were aware of one or more KAIPs (89.5%). Approximately half of these respondents mentioned Living with Water as the programme they knew (best). Others mentioned specific LwW-projects, or other programmes such as KRW[87], WINN[88],

86 The fifth respondent is not negative, but has no opinion on this matter.

87 KRW is the Dutch abbreviation of the Water Framework Directive (2000/60/EC)

88 Programme of Rijkswaterstaat: Waterinnovatie Rijkswaterstaat

Knowledge for Climate[89], Climate *changes* Spatial Planning programme[90] and Building with Nature. The high degree of familiarity respondents had with KAIPs and the sheer number of times Living with Water was mentioned as an example of this warrants that this indicator be scored positively.

Familiarity with Living with Water

Virtually all respondents knew Living with Water (99%)[91], with 39.2% answering that they knew Living with Water very well, and another 39.7% answered that they knew LwW reasonably well. 20.1% answered they knew the programme somewhat well or just a little. Thus, almost eighty percent of the respondent appeared to know the programme at least reasonably, which is a high score, even amongst the sample pool of newsletter recipients. It appeared that knowledge actors were mostly "very well aware" of Living with Water (62.8%), while governors were least likely to be "very well aware" (25%) of the programme. Governors were also the only ones to indicate they did not know Living with Water (8.3% of the governors: 2 respondents). Given the general familiarity, this indicator receives a positive score.

Contact with Living with Water

Survey respondents were asked about their contacts with Living with Water. 38.4% of the respondents answered they were not really, not at all, or not anymore involved with Living with Water. This is ten percent less than at Transumo, but still almost forty percent. Those that did have contact with Living with Water were most often in contact with programme management or project leaders. Small and middle-sized business and governors answered most often that they were not really, not at all, or not anymore in contact with Living with Water (50%). In general, knowledge actors were most in touch with Living with Water, followed by consultants and civil servants.

Knowledge actors also indicated most often that there were many contacts, not just between themselves and the programme, but between their organisations and Living with Water. In general, contacts between the respondents' organisations and Living with Water occurred more frequently than contacts with the individual respondents themselves. This shows that contact went beyond the individuals on the programme's address file, to others. Results on this indicator are therefore positive.

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89 Kennis voor Klimaat

90 Klimaat voor Ruimte

91 Of course the respondents were from the LwW address file; which means most were likely to know the programme.

Influence of Living with Water

Respondents to the survey were asked about the influence of Living with Water on urgent problems in the water sector. Only a small group of respondents believed Living with Water did not have any influence on any physical problem (4.5%). A further small 10% of respondents believed that Living with Water might not have influence the physical problem they selected to be most urgent, but that it did have an influence on other physical problems (9.5%). The largest groups of respondents believed Living with Water to have either little influence on their selected urgent problem (38.5%) and reasonable influence (37.4%). People who chose extremes in precipitation as the most urgent physical problem felt most often that the programme had reasonable to much influence on this problem (total 54.3%). Just like in the Transumo case a fifth of the respondents (20.2%) were disappointed in the influence of the Living with Water programme on physical problems. However, in contrast to Transumo, a tenth of the respondents (10.7%) were also positively surprised by the degree of influence the programme had. This compensates somewhat for the 20% of respondents who expressed disappointment.

The level of expressed disappointment increased somewhat when participants were asked about the influence of Living with Water on process problems. Here 25.4% indicated that Living with Water's influence was smaller than anticipated. Small and middle-sized businesses were most disappointed in the programme's influence on process problems (50%). Also, the respondents who saw 'fragmentation of responsibilities' as the most urgent process problem plaguing the water sector were most disappointed (39.5%). Respondents were most positive about the influence of Living with Water on the process problem of 'administrative complexity'[92]. In general, respondents are most disappointed in the influence of LwW on process problems, probably because their expectations were higher for process problems than for physical problems. Since Living with Water also explicitly aimed at changing process characteristics of the water system (see discussion in section 7.4), this indicator is scored as negative.

Estimation of the familiarity of Living with Water in the sector

Respondents were asked to indicate how well-known they thought the products of Living with Water were among water professionals. 37.1% of the respondents estimated the products and results to be well-known among 15-34% of the water professionals. A further 30.3% estimated that between 35% to 64% of water professionals knew of the products and results. Another 21.1% estimated the products and results to be less well-known, indicating a range of between 5% and 14% of the water professionals. On average, it can be said that respondents estimated that approximately 30% of water professionals in the Netherlands knew the products of Living with Water. Although this number is slightly higher than seen

92 'Bestuurlijke drukte'

from the Transumo interviews, the difference is not major. Therefore, this indicator receives a neutral score.

8.2.5 Scoring receiver receptivity

The following table is an overview of receiver receptivity[93].

Table 8.5: Receiver variables and indicators

Variables	Indicators	End score
Awareness	Use and necessity for Living with Water	Positive
	Need for changes	Positive
	Added value of inwat	Positive
	Importance of inwat in organisation	Positive
Association	Importance of innovation/ change for sector	Positive
	Cost-benefit consideration innovation/ change	Positive
	Inwat importance for decision makers	Positive
Acquisition	Realism and feasibility of innovations	Neutral
	Usage of knowledge and innovations	Positive
	Influence of Living with Water on receivers	Positive
	Propositions Living with Water	Positive
Application	Notoriety of Living with Water	Neutral
	Appreciation of Living with Water	Positive
	Acquainted with KAIPs in general	Positive
	Familiarity with Living with Water	Positive
	Contact with Living with Water	Positive
	Influence of Living with Water	Negative
	Estimation familiarity LwW in sector	Neutral

Most fields in the table are shaded light-grey, indicating a high degree of receptivity amongst receivers towards Living with Water. Although they were scored positively, respondents did allude to several problems and challenges. Nonetheless, the respondents were generally positive about Living with Water and about the importance of innovation for the sector. Most hesitation could be observed around the 'acquisition' variables, and concerns centred largely on the realism and feasibility of the developed innovations. It appears to be the case that receivers value the programme, value the network around it, and value the strategic ideas, but sometimes still have problems with their concrete operational application. Although the average application score for was deemed positive, it was far from overwhelmingly so and a number of negative views were noted. This supports the proposition that

93 Light-grey is reserved for positive scores, whereas dark-grey is reserved for negative scores. Neutral scores receive a grey-shade in-between light and dark.

although the programme is appreciated for its knowledge and innovation development work, the application of the results in (operational) practice will continue to encounter problems.

8.3 Impact through the lens of receptivity

This chapter presented data relevant to the following research question: *What was the impact of the programmes on the (un)intended recipients of their knowledge and innovations?* Sender and receiver receptivity was assessed to draw conclusions on the impact (potential) of Living with Water. The receptivity analysis demonstrated that both sender and receiver receptivity was rather high in the case of Living with Water. Most indicators were successfully realised by both the senders and receivers in the first three receptivity phases. However, small problems existed, for instance in the fit between official views and programme views, in the handling of external conditions, and in the realism and feasibility of the developed knowledge and innovations. These problems had a limited effect on Living with Water's impact. In general, the receptivity was high, which means Living with Water has had, and is likely to continue to have a positive impact.

Nonetheless, the more troublesome issues experienced in the first three receptivity phases, combined with the somewhat larger problems of receiver receptivity in the last phase of application, means that this impact will not be at the maximum of the programme's potential. Living with Water was successful in connecting actors, creating a dynamic network, and balancing several interests and perceptions. A problem, however, lay in their connection with executive business (e.g. contractors). The consequences of the limited involvement of executive business are multiple.

For instance, the knowledge and expertise of business remained untapped in the programmes, which limited their innovative potential. Furthermore, support for innovations developed now remains limited to governmental actors and knowledge organisations. Another consequence is that one of the core joint financing arrangement requirements (developing consortia of business and knowledge worlds) was not completely fulfilled. Nonetheless, the exclusion of executive businesses was not without reason. They were hard to involve due to several causes. Most notable of which were: the requirements of the joint financing arrangement, the long term focus of the programme, and the abstract (beta-gamma) way of working. These issues will be discussed briefly here.

First, the long-term focus of the programme meant that results would be difficult to procure on a short-term basis. This posed less of a problem to the scientists and governmental actors, and more of one for executive business who tend to be focused on making profit. The fact that their financial investment and commitment to projects would not pay off directly was an important barrier. Second, the programme's focus on beta and gamma

integration, the inclusion of social sciences, and the sometimes abstract societal discussion evolving from these were instrumental in the executive businesses' decision to avoid involvement. The businesses were used to working with governments, with engineers, with ecologists, but were not yet interested in discussing organisational, managerial and social changes. Third, the joint financing arrangement meant working for different tariffs than were commonly earned in business. Although programme management attempted to repair this gap to get business actors more involved, hesitations and concerns were already created. Together, these factors and others minimized the role of executive businesses in Living with Water.

Overall, one can conclude that Living with Water has had significant impact, although much of this impact is yet to come and remains uncertain. Its impact is owed greatly to its success in creating a network, the high degree of involvement of governmental actors, the inclusion of multiple successful and applied projects, and the growing role the programme got to play as change agent in adaptive water management. By smoothing over some bumps on the road, the programme could have had, and still might have, more impact. There is an expectation amongst stakeholders that executive business's role in innovative water management will only grow in the coming years, and it is likely that the greater involvement of these actors will be an important step in optimising impact of programme ideas and ongoing project consortia.

Chapter 9

Drawing lessons: how did the programmes function and what were the consequences of that?

This chapter will review the empirical cases in order to answer the research question: *Which lessons on the impact potential of knowledge and innovation programmes can be discovered from an examination of the two cases?* This will be carried out based on the discussion of the characteristics of KAIPs and complex dynamic systems in Chapters Two and Three. The framework developed in chapters Two to Four is not the guiding principle for this chapter. Rather, a reflection on the development and functioning of the cases is discussed in this empirics-based chapter. Based on this discussion, lessons can be formulated about the functioning of KAIPs from the joint financing arrangement and KAIPs in general, although it should be noted that the cases in themselves do not allows for extensive generalisation. These lessons are based on the discussion of KAIP characteristics in Chapters Two and Three, the data retrieved from the application of the evaluation framework, and the assessment of these data in the light of the conditions against which lessons will be drawn as they were discussed in section 3.4.

9.1 The triple helix active in complex dynamic systems

9.1.1 Traces of complexity

This thesis has proposed that the evaluation and assessment of knowledge and innovation programmes in complex dynamic systems cannot be executed based on traditional evaluation types as they preclude the inclusion of continually developing objectives, changing issues, and emerging opportunities. Furthermore, the complexity and dynamics of the setting in which the KAIPs operate does not allow for the observation of simple lines of causality.

The cases clearly demonstrated the saliency of this last point. Complexity was visible in the development of programme objectives, and these objectives thus evolved over time. As discussed in Chapter Seven, the core messages of the water KAIP changed as aspects such as cooperation and beta-gamma interaction became more prominent over time. Similarly, the mobility KAIP worked almost throughout its entire duration on developing and refining its vision of the future. Had the assessment of these two cases simply focused on the objectives they formulated in their early days, much would have been missed. Also, a classical evaluation method would not have adequately taken into account the interest that was developed in sustainability and transitions within the mobility KAIP. Similarly, the ongoing learning process that led to the ability of the water KAIP to stimulate cooperation between beta and gamma would not have received the attention it deserved.

Complexity could also be seen in the extensive multi-actor involvement within the KAIPs. As Chapters Five and Seven discussed, each programme involved thousands of people, from hundreds of organisations. The interactions and feedback loops between participating actors promoted progress, as did their attempts to align their perceptions, interests and ideas to enable their shared objectives. The complex dynamic systems in

which the programmes tried to exert their influence (whether they aimed for the physical system, the social system, or both) simply demanded such multi-actor cooperation. Had the programmes operated within a limited group of actors (for instance, from a small number of organisations, or only from organisations from one helix of the triple helix model) their chance of impact would have been much smaller.

In the spirit of Byrne's idea of 'big and non-linear outcomes resulting from small changes' (1998) and Rotmans' view of transitions, as 'fundamental societal changes aiming at improving sustainability' (2006), the cases support the idea that societal change can only be realised through the cooperation of a broad, yet relevant set of stakeholders. Both included large numbers of important stakeholders and provided space for their diverging perceptions and interests. The development of shared objectives was enhanced by the formation of consortia in the earliest phases of project development, and the co-production of a project plan in these consortia. Furthermore, the explicit attention both programmes gave to the interaction and exchange of ideas was helpful in dealing with potential tensions and problems. By becoming a living and adaptive organism that embraced many nested structures, the programmes were able to adapt quickly to changes and thrive within the complexity of their environments (see Ashmos et al. 2000).

9.1.2 Actor development and changes: the triple helix at work

As would be expected in a triple helix organisation, roles started to shift in the programmes. Actors took over some of the responsibilities of other actors, while maintaining their primary tasks and task division. Role changes were incorporated in the very structure of the KAIPs, and several institutional arrangements were shuffled and rearranged (see also Bouma & Bressers 2008). Many of these changes in institutional arrangements were informal and ad hoc, rather than formal and structural in that they did not involve the passing of laws, the establishment of non-temporary financial arrangements or formal methods of power-sharing. The triple helix literature states that interaction between business, governmental agencies and universities is of crucial importance in improving the conditions for the development of innovations in a knowledge-based society (Etzkowitz 2003: 295). If one expands 'innovations' to 'knowledge and innovations', the KAIPs can be seen as excellent breeding ground for this interaction.

Chapter Five and Seven discussed the participation of actors in each case, and it was apparent how involved and committed these actors were. Overall, the triple helix was well represented in each case, and actors from all helices saw added value in participating in a KAIP, compared to working individually in their organisations or societies. The advantages they cited included increased support for innovations, the usage of other's expertise, financing risk sharing, and many more. However, both cases had difficulties with particular actor groups. The interaction and cooperation of the programmes and projects with some classes of actors was ad hoc and temporary. Nonetheless, it remains that many

actors were involved in the programmes, and it showed clear characteristics of a triple helix organisation.

The *changing role of knowledge actors* was visible in the tasks the knowledge institutions fulfilled. The hypothesis of the triple helix literature is that universities will play a greater entrepreneurial role in society (ibid.: 300). The two KAIPs behaved consistently with the ideas of triple helix literature in that the universities were active proponents of ideas, routines or products, and they tried to convince other participants and receivers of the value of adopting them. Furthermore, because universities were able to handle the time and money requirements and the restraints of the joint financing arrangement, they often fulfilled the role of project leader or project advocate. The universities' role was particular clear in the Living with Water projects Waalweelde and Bestuurlijk Schakelen, as discussed in the second intermezzo. The university participants spent much time promoting their innovative ideas to potential receivers and demonstrating and discussing the value they added in comparison to more traditional ideas prevalent in the sector. In doing so, they took on roles that were additional to their traditional ones as educators and researchers and became project management and innovation advocates and sponsors. This role as sponsor role was for instance visible in the Transumo A15-project. The project leader was from a university, and he used every opportunity available to him to present the project to colleagues in his own and other universities, to businesses, and other institutions.

The *changing role of business actors* was slightly less prominent, but certainly not invisible in the two case studies. The triple helix literature states that the inclusion of research and training activities in the company signals the changing role of business (ibid.: 309). That business organisations have changed is definitely true for the Netherlands as a whole (see for instance Boons et al. 2000), but such a change is not visible as a direct effect of the cases under research here. Nonetheless, the business actors demonstrated other changes not anticipated in the triple helix literature. First of all, in some projects they acted as advocates of sustainability, even when this did not directly relate to their organisation's objectives or core business. A good example of this is the Transumo project Spitsmijden, in which a large Dutch bank became one of the most prominent actors. Second, in some projects businesses fulfilled the role of intermediary between knowledge actors and governmental actors who deemed the ideas of the former group unrealistic) Third, some businesses became active in providing input for decision-making processes.

The *changing role of governmental actors* was also apparent in the cases. The literature states that the role of governmental agencies will change from that of establishing rules and boundaries, to others such as making venture capital available (Etzkowitz 2003: 309). The joint financing arrangement is a clear example of this new task: the government invested money to allow otherwise too risky innovations to take place. Governmental actors also evolved from their primary role as decision-makers. They took on more multi-faceted duties that included decision making, as well as the role of evaluator, participant, investors, and

much more. The multiple-roles did sometimes create tensions in projects and programmes, but generally not to the point where these tensions became problematic. In the Living with Water project Waalweelde, government actors from the province played an important part in stimulating the involvement of many other governmental agencies which was highly valuable because Waalweelde was closely related to the core aims of Dutch water policy as articulated in the policy plan Room for the River. Another Living with Water project, Waarheen met het Veen, also benefited greatly from the synchronisation with policy, even though the degree of desired innovativeness sometimes differed between actors.

To summarise, the three helixes of university-business-government interactions were woven in each other; with the three sometimes almost functioning as one. Science had to come out of its 'ivory tower' and allow for the co-creation of knowledge with stakeholders. Business actors found themselves advocating two different interests: their interest in making profit, and the more long-term interest of promoting sustainability or innovation. Governmental actors sometimes found themselves in awkward situations as the variety of sometimes conflicting roles assigned to them made their participation in the project difficult. Needless to say, these changes were not always easy. Despite these (potential) problems, a triple helix was clearly developed over the course of the programmes. The next section will assess the extent to which this triple helix was realised.

9.1.3 Phases of change

This subsection will discuss the two cases in light of the four phases of the triple helix model, as they were discussed in Chapter Two. The *first phase* (internal transformation in each of the helices, in which the separate helices start playing a new role in society) has been extensively discussed above. The *second phase* (influence of one helix upon another) was also definitely present in the cases. Building on the above discussion, it becomes apparent that the changes in roles were sometimes stimulated or even caused by expectations and desires of the other helices. Universities were required to become more accessible, tangible and applicable in their output and statements. Businesses desired a more down-to-earth attitude from universities, in which theory building and testing became a function of societal improvement, rather than the other way around. Businesses learned that they could not ask for the beneficiary effects of innovation without committing to the more long-term and sustainability ideals of the other participants. At the same time, governmental agencies were required to release some of their control and desire for accountability, in order to meet requirements and objectives of other participants. Thus, it was clear that the helices influenced each other in significant ways.

The *third phase* of the triple helix model (creation of a new overlay of trilateral networks and organisations from the interaction in the three helices) was most visible in the development and construction of the KAIPs. The strength and continuation of some networks, for instance that of project consortia beyond the period of the KAIPs' duration

is another good example of this third phase of the triple helix. An evaluation of previous joint financing arrangements concluded that many networks were continued after the termination of the arrangement (Technopolis 2008: iii), despite the continuing challenges of such public-private partnerships. This appears true also in the third generation of the joint financing arrangement that was assessed through the two selected cases, as many project consortia were active in searching for means and ways for continuation. A new overlay of actors was created in the course of the two programmes, and in the other 35 KAIPs established by the joint financing arrangement. However, the programmes were not retained in exactly the same form after their finalisation (see section 9.4 for a discussion of their evolution as project leaders pursued continuation)[94].

The *fourth phase* concerns the recursive effect of triple helix networks both on the spirals from which they emerged and on the larger society (i.e.: impact). Chapters Six and Eight discussed the perceived influence of the two programmes on receivers and their organisations. In this analysis, it was determined that a significant group of receivers perceived the KAIPs not to have had an influence on themselves and/ or their organisation. Other respondents did experience influence, although this was often limited to acquiring new knowledge and contacts because of the KAIPs. The impact on the larger society was the object of this thesis, and conclusions from this effort will be discussed later on. However, suffice it to say that the KAIPs had a recursive effect on their own spirals that was present but limited. Their recursive effect on larger society (not just the direct recipients) is much more intangible, and can only be estimated and not measured.

9.2 Three functions in impact realisation

Based on the programme objectives discussed in Chapters Five and Seven, and on the discussion of the programmes in Chapters Six and Eight, it becomes clear that the KAIPs had several impact functions. These impact functions are the core processes and activities through which KAIPs realise impact. The figure below visually demonstrates these impact functions and the overlaps that exist between them.

94 Conversations in February 2011 of the author with several Living with Water projects indicate that many project consortia in some way continued the ideas of their projects in their current activities. In some cases new projects were formed, strongly based on the old projects, in some cases the same type of ideas was continued into new projects.

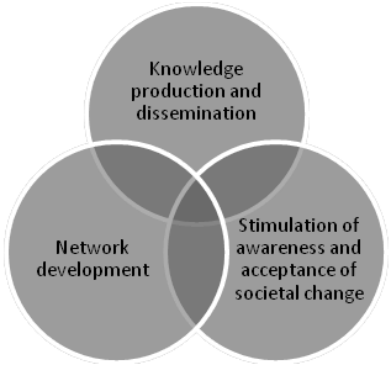

Figure 9.1: The KAIPs and their functions

The literature on networks extensively discusses the role of such networks in *activating*, *framing*, *mobilizing*, and *synthesizing* change (Agranoff & McGuire 2001: 301). These activities shape the three main impact functions of the KAIPs. Because the networks studied here have an explicit knowledge and innovation development function, a fifth activity can be added to this list, namely *developing*.

As previously mentioned, the KAIPS had three main impact functions. The first of these was their **knowledge and innovation production and dissemination function**. Although not all projects were equally successful, the flourishing projects described in the intermezzos demonstrate the success of both programmes in this regard. Each programme managed to produce new knowledge and innovations, and in most cases, this new knowledge and innovation was diffused to other actors. An important remark to be made here concerns the usage of knowledge. Although much innovative knowledge was produced, and many dissemination strategies were applied to diffuse this knowledge to receivers, this did not automatically result in the usage of the knowledge. Further, the knowledge itself was perceived as being too scientific, abstract, long term and not applicable enough – arguably because of what several project leaders dubbed the 'not invented here syndrome'. The diffusion of knowledge and innovations was thus successful, but there was significant room for improvement as far as adoption and usage were concerned.

The second impact function of the programmes was to **create an awareness and acceptance in the sector** for the need for change, transition, and stronger, more innovative solutions. Both KAIPs put much effort into this, and were successful in sparking debate and discussions. They stimulated awareness and acceptance of change and transition by organising workshops, discussion meetings, bilateral contact moments with stakeholders, and much more. Both programmes succeeded in assembling a group of enthusiastic innovators and thinkers who shared their ideas and ideals. Both sectors nurtured their accomplishments and successes in such a way that anything diverging from the maintenance

of existing structure became challenging. Nonetheless, several differences existed between the cases. In the mobility sector, change was often seen as problematic, and all policy arrows were aimed at maintaining the existing system as far as possible. In contrast, the water system was already swept up in a period of change, which made the acceptance of changes recommended by the projects somewhat easier, but the sector as a whole was still highly attached to its technocratic inheritance and the programme had to tread carefully. The second function thus had mixed results.

The third function of the KAIPs was their **network function**. Both cases were successful in involving a large variety of relevant stakeholders from their sectors. The mobility KAIP did relatively well in involving (executive) business. A noteworthy accomplishment - considering the short-term focus of many business actors. The water KAIP was especially successful in involving governmental actors. They were even able to get governmental actors to see parallels between their innovation trajectory and the national policy trajectory. Both programmes were also highly connected to the science world, and were successful in involving consultants and advisory businesses to some extent. The knowledge supply side was thus well involved. However, the demand side, most notably, executive business and governmental actors were less involved.

The mobility programme encountered substantive problems in involving governmental actors, including their own principal agent (the Ministry of Transport, Public Works and Water Management). Local and regional governmental actors were also involved on a limited scale. A tension came about between the programme and its partner ministry, primarily because of differences in approach, thinking and working, as demonstrated from the interviews with both programme senders and receivers. First, the programme was seen as too abstract and too scientific by many governmental actors. They felt that the KAIP had diverged too much from their daily policy practices. Second, the involvement of both business and governmental actors was challenging from the start, because of complex regulations surrounding open tendering and contracting out, and the dual role of the government as both the principal and a participant. Third, an important cultural difference existed between the KAIP and the governmental actors. Whereas there was a strong societal trend toward control and accountability (and hence, less complexity and uncertainty) the KAIP struggled with these demands. While their principal (the government) continued to desire a degree of control and predictability, programme managers argued that innovation and experimentation required a degree of open space and tolerance of uncertainties and were reluctant to be judged by the standard and limited evaluation practices.

In contrast to Transumo, Living with water was more successful in including these governmental agencies in and staying close to governmental policy. However, they were less successful in involving executive business. The orientation and focus of the programme was different from the orientation and focus of executive business. Business executives saw the inclusion of gamma disciplines as a problematic development. Furthermore, there

was too large a difference between the hourly pay allocated under the joint financing arrangement, and the rates that business executives were accustomed to. This made it difficult to justify significant time contributions to the programme.

The conclusion for this section is that despite the fact that both KAIPs developed strong and diverse networks and were rather successful in the knowledge production and dissemination function, they faced some barriers in the execution of their second function (the creation of awareness and acceptation of the need for change) and third function (the network function).

9.3 Causes and consequences

The public administration literature frequently discusses barriers to change and innovation (for instance Termeer 2009a and Klijn & Teisman 2003). Innovations are particularly vulnerable to problems because of the high degree of uncertainty involved in their developmental trajectory. These tensions are predictable in their consistency - virtually all innovations encounter them. The figure below summarises the effect of the four main tensions visible from the two cases on KAIPS, and the relations between them.

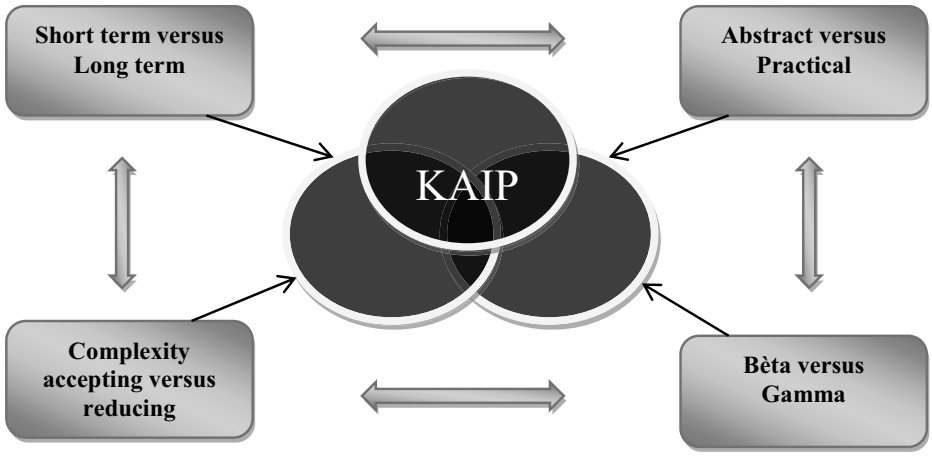

Figure 9.2: Sources of tension in KAIP functioning

The arrows can refer to both positive and negative influences on innovation. Although the tensions have a negative effect as summarised in the table that follows, they also played an important role in the realisation of the fourth triple helix phase, and in the fulfilment of the three functions discussed in the previous section. For example, the tensions arising

from the interaction between varying actors can also serve as important sources of change and innovation (Leydesdorff 2006: 214; Stacey 1995: 278; 287). Awareness of the need for change and of the urgency of the problem is often a by-product of such interpersonal tensions as they tend stimulate debate. Another important result is discussions on differences in actor opinions as these tend to stimulate mutual receptivity.

However, as previously mentioned, such interpersonal tensions also exert negative influences on the functioning of the KAIPs. The table below summarises some of the negative consequences of the tensions as observed from the programmes described in Chapters Six and Eight.

Table 9.1: Consequences of tensions

CONSEQUENCES OF TENSIONS			
Short term/ Long term	Abstract/ Practical	Beta/ Gamma	Complexity accepting/ reducing
Lacking commitment of actors with different perspectives	Participants speak different languages: less mutual understanding	Each side remains convinced of their 'own right' – the other has to accept them	Differences indicate a paradigm difference between actors, which means differing expectations
Dichotomising of actors on various topics, based on ST/LT differences	Instead of connecting science and practice they remain two separate worlds, causing less applicable knowledge	Improvement of quality of knowledge not realised because of lacking beta-gamma cooperation	Tension between control vs complexity means association with struggle and bureaucracy for KAIPs
Less preparedness to invest on ST basis, for LT benefits	Chances of dissemination knowledge and realising societal changes become limited	Conflicts between sides serious enough to limit involvement of certain actor types in KAIP	Existence of differing demands in terms of complexity leads to conflicts between projects and programme

If a KAIP's management is aware of these tensions and their consequences from the start, they may be able to pre-empt the negative effects and maximise positive ones. However, learning of these tensions requires that they be open and flexible in their attitude to programme learning and adaptation as discussed in subsection 3.4. The next section will discuss how KAIPs can incorporate such learning.

9.4 How to enhance well-functioning?

To recap from Section 3.4: *A good KAIP with high impact potential involves the entire triple helix (business, governments, knowledge actors), is flexible and adaptive to changing circumstances, has an interactive nature in which perceptions, interests and ideas are openly discussed, and is well intertwined between and among the helices.* The

lessons and suggestions in this section are based on these conditions, and will draw on the performance of our two cases in ensuring these conditions of success. The discussion starts in the first subsection by reviewing the KAIPs of this specific joint financing arrangement. The second subsection will discuss lessons learnt regarding the KAIPs' impact potential. The third subsection will put forward a number of management suggestions to improve the outcome of the KAIPs.

9.4.1 Lessons on the joint financing arrangement

Although it is not uncommon for project consortia to continue to cooperate well after the official programme ends, the 37 KAIPs from the entire joint financing arrangement generally did not see such a continuation. By the end of 2009, more than 20 programmes had been finalised, with the remaining ending by 2011. Of these, only a few have continued with new sources of programme financing. This is not for a want of trying. Many applied for money from the FES-subsidy rounds, but most were rejected. Some programmes got around this problem by combining efforts with other KAIPs to continue partially as part of a broadened programme (Kennis voor Klimaat: Knowledge for Climate) (Speelman & Maas 2010: 28). Overall however, one can conclude that the projects developed through the joint financing arrangement have largely come to an end. Their future progress is further hampered by the current Dutch government's (Rutte-I) decision to stop granting FES-money for investments in environment and innovation (NRC 27-10-2010). With money for innovation becoming scarcer, the need to use it well becomes all the more salient.

The BSIK joint financing arrangement was designed to strengthen the Dutch knowledge infrastructure by means of knowledge development and dissemination in networks of supply and demand actors. While most of these objectives were realised in the two cases assessed in this thesis, the same cannot be uniformly said about all 37 programmes. Differences in the programmes and projects were visible well before the KAIPs had even started. Some had beta-scientific and very tangible objectives, which were easily measurable in terms of success and failure. Others had less tangible objectives that involved societal transition and process changes. Nonetheless, they all shared several central characteristics, including the joint financing arrangement, the requirement that there be supply-demand cooperation, and the same focus on knowledge and innovation development for the purpose of strengthening the knowledge infrastructure.

A prominent lesson from the mobility and water KAIPs was that the joint financing arrangement sometimes stood in the way of its own objectives. Its ability to stimulate innovative knowledge development and dissemination was challenged by financial and organisational requirements of the arrangement. Instead of stimulating and facilitating cooperation between supply and demand actors to realise applicable knowledge, the joint financing arrangement created tensions between some of the actors. For example, governmental actors balanced a dual role in these programmes, both as principal and participant.

Actors also had different expectations of their participation, due to the somewhat vague nature of the arrangement. Some expected the focus to be on (scientific) knowledge; others expected (product) innovation. These differing expectations were further fuelled by a combination of the expectation of 'free money' and a reality in which this 'free money' came with many obligations and co-financing agreements. Also, the financial arrangement scared business actors away with its complexity and insistence that their work on the project be done below usual tariffs. Because of these issues, the triple helix was not always present in a complete and committed form.

However, from the point of view of the arrangement itself, these obligations and co-financing agreements were very understandable. The investment of public money requires careful and prudent pre-consideration, and elaborate and solid monitoring once the programme has begun. Attempting to regulate and structure the development of the programmes and their projects makes sense in this light. However, as earlier indicated, these requirements stood in the way of realisation of core objectives and an important lesson on the level of the arrangement thus is to assess the expectations of programmes and projects and communicate clear arrangement objectives and obligations. This should be complemented by a simplification of procedures and agreements, and better and clearer communication about expectations, realisation, and obligations.

Another area of improvement pertains to the role of the arrangement in the tensions mentioned in section 9.3. The tension between complexity absorbing organisations and complexity reducing organisations is particularly prominent here. Perhaps this is not surprising as almost by definition, public-private partnerships embody a tension between control to assure public interests, and effective programme delivery to increase welfare (Skelcher et al. 2005: 574). The joint financing arrangement attempted to control uncertainties in the KAIPs, and did not regard them as an inevitable part of complex networks. The arrangement attempted to reduce uncertainty by controlling the plans and strategies of the programmes. However, this approach runs the risk of limiting effectiveness of networks (Van Kersbergen & Van Waarden 2004: 156), and it effectively limited the potential of the two KAIPs examined to be flexible, adaptive, and hence, receptive. If an important objective of the arrangement was to stimulate innovation and knowledge development, a certain degree of not-knowing and uncertainty should have been accepted. The arrangement should not attempt to reduce all risks and uncertainties.

However, such flexibility does not equate to zero control, and free-reign for the KAIPs. It simply calls for a measure of acceptance that some level of uncertainty and even failure is inevitable, and that this is very much a part of the innovation process. The controlling actor needs to be as complex and diverse as the network it is attempting to control (Kooiman 2003: 117). The joint financing arrangement completely neglected to give credit to the 'market accountability' (see Koliba et al. 2011: 25), or the shared responsibility and accountability of all investing actors. Investing stakeholders tend largely to seek out solid outcomes

and invest effort in fostering good results and the over-seeing body. The arrangement either intentionally or unintentionally ignored its interest and role in ensuring quality outcomes. Suffice it to say as a conclusion to this section that in a changing system, the mechanisms of control and accountability also needs to be reformed (Hirst 2000: 21-22).

9.4.2 Lessons on KAIP impact potential

No KAIP can be expected to change the world and revolutionise thinking and working in their sector. Further, it has even been stated that their real strength does not lie in delivering output, but in formulating objectives that suit the complexity of the network and its environment (Sørensen & Torfing 2009: 240). Although they can play an instrumental role in stimulating and facilitating change processes*, their role is 'soft' and their effects are often not explicitly visible - but that does not mean no effects have occurred*. This chapter has listed three prime functions KAIPs serve in the quest to realise impact: knowledge and innovation development and dissemination; stimulation of societal change processes; and the creation and maintenance of vital alliances between diverging actors. In all these tasks, *the need to balance objectives and perceptions of the actors involved is clear*.

This balancing act requires a distinct set of *competencies and interactions*, which need to be flexible and adaptive to changing circumstances. A continued interaction between senders and receivers is required to balance each side's objectives and perceptions. However, this interaction is not only an instrument in the realisation of successful impact, but also a source of tensions. These *tensions* are extensively described in the social science literature and include tensions between short term and long term, between science and practice, between beta and gamma, and between complexity absorbing and complexity reducing organisations. What is necessary is to deal with them in an adaptive and flexible manner to realise receptivity. The KAIP needs to work skilfully amidst these tensions in an attempt to align different viewpoints by facilitating cordial interaction.

A KAIP thus realises success by *enabling mutual receptivity* between the innovators (the senders) they involve in developing the innovations, and the target recipients of this. This enabling process thrives on interaction, and requires an open and reflexive attitude. To ensure success, a KAIP needs not only to be adaptive and open, but it also needs to inhabit an environment receptive to their ideas. The absence of this is difficult for the KAIP to change completely, but they can play a role in strengthening ties with enthusiastic potential receivers, provide enough attention to the needs and requirements of receivers, and develop their ideas in correspondence with the laws, agreements and institutional rules and arrangements of their environment.

The environment itself needs to become aware of their shared investment in the KAIP. This investment can be financial, organisational or managerial. Simply paying attention to the KAIP and either supporting it or fighting it constitutes such an investment. The amount of time and money invested in KAIPs is substantive, and often receivers are insufficiently

aware that their shared resources are placed in the KAIPs, even if they do not individually participate in the programmes. Perhaps greater awareness of this may lead to greater individual involvement. Ultimately, the realisation of a KAIP impact relies on true commitment of actors, an open attitude among both senders and receivers, and a flexible, open and transparent way of dealing with tensions that inevitably arise. Under these conditions, mutual receptivity grows and impact can be realised.

9.4.3 How to: management suggestions for knowledge and innovation programmes

As outlined in previous sections, this thesis offers several suggestions to future KAIPs. First, be clear of the potential impact of a KAIP in your chosen sector, taking into account both the substantial difficulties associated with realising societal change, and the power of a good network. A second related suggestion is to be very familiar with both the strengths and weaknesses of KAIPs. A KAIP can be especially successful if it draws on its strengths as a connector, inspirer and knowledge hub. Third, be familiar also with sources of tension and possible pitfalls as was discussed in section 9.3. Fourth, it is important to invest from the onset in efforts to foster an understanding of KAIPs and their function among potential receivers, as this will better align the interactions and expectations of senders and receivers. Fifth, recommendations can be made about the usefulness of KAIPs and the relevance of the investment, i.e. their impact and the usage of the financial arrangement's means. This fifth point will be discussed in Chapter Ten.

The management of a KAIP requires adaptive leaders, with a clear vision, an eye for business and a flair for networking. These leaders need to create a structure for the programme and its projects to function, and this means primarily the establishment of a shared storyline with which to stimulate open debate and discussion. Such debates and discussions would help to clarify the participants' expectations, and thus help avoid disappointment later on in the programme. The programme also needs to set clear objectives, both short term as well as long term, and allow for deviation from these objectives if new opportunities or problems present themselves along the way. Adaptivity is essential here, but at the same time the participants in the programme should not feel as if the programme freely wanders around without much structure and perseverance.

From the examination of the cases presented in this thesis, another management requirement becomes apparent: stability. Stability is as critical a factor as adaptability, as seen in the mobility programme. Transumo reacted in ad hoc way to opportunities that arose, for example, by introducing new elements over the course of the programme and by responding in extreme ways to the monitoring regime (their monitoring was very intensive in the first years, but became minimal over time). In contrast, Living with Water introduced changes they desired more gradually, and as a result, faced far less resistance from its participants (although the increased emphasis on beta/gamma was reason for some business actors to leave).

One way to ensure greater stability is to develop a storyline prior to programme set-up. This story line should dictate a few objectives from the start, but keep room for new ideas along the way. Projects should be selected very carefully along this storyline. The project should not be guided solely by the robustness of its financial planning, or the creativity of its project idea. The match between these and the programme's ideals is equally important. This also helps the programme to be more than a subsidy distributor. The mobility programme learned this lesson over its course, but might have encountered fewer problems if it had anticipated this problem from the start. One last recommendation is for programme managers and project leaders to establish a solid relationship. Consistency in the relationship between projects and programmes helps to increase the projects' participation in the programme's objectives. Both programmes examined in this thesis were rather successful on this account.

Chapter 10

Conclusions and evaluation assistant

Chapter One discussed the rise of knowledge and innovation programmes, and the complex context in which they operate. The co-creation process involving knowledge and innovation actors does not allow for evaluation by the classical methods or through standard means of monitoring (see Chapters One and Two). As discussed in Chapter One, a more sensitive means of evaluation was needed, a systemic evaluation, that included all relevant perceptions in the analysis and that lent itself to learning. Further, the evaluation needed to be carried out ex-durante in order to make evaluation results available for programmes during their duration. This would allow them to improve and steer themselves more clearly towards the realisation of greater impact. The evaluation approach formulated in this thesis was dubbed the applied systemic programme evaluation (ASPE), and it was described at length in Chapter Two and Three.

This impact evaluation framework was applied to two cases: a mobility KAIP and a water KAIP. The development and application of this impact evaluation framework led to *three main contributions of this thesis*: The first is the furthering of the impact evaluation literature. The second is the assessment of the impact of knowledge and innovation programmes in general, and two cases in the fields of mobility and water management in particular. The third contribution was to refine the developed method of conducting KAIP-related impact evaluations. Chapter Ten aims to provide a complete account of the main conclusions of the preceding chapters. This means it can be read independently from the previous chapters.

The first contribution is to the scientific debate on evaluation (*§10.1*). The second message is primarily oriented at investors and practitioners involved in the two knowledge and innovation programmes examined, as it directly answers their questions on the impact of these mobility and water related KAIPs (*§10.2*). The third message is primarily oriented at evaluators of KAIPs in general, as it provides a review of the impact evaluation framework applied in this thesis, and assistance in the planning future evaluations (*§10.3*).

10.1 The development of impact evaluation: theory and practice

10.1.1 Evaluation studies further developed

Evaluation literature has developed from an explicit emphasis on goal reaching towards more elaborate accounts of organisational or programme impact. Goal reaching remains important, but is now complemented with additional emphasis on learning, systemic perspectives, and the dynamics of networks in complex environments. Solely focussing on goal-reaching is no longer sufficient in many evaluation studies today. Many policy plans and programmes are complex and entangled with other plans, programmes and actors, making it much harder to distinguish between cause and effect, and attribute these causes and effects to specific plans, programmes or actors. Although this problem was already

recognised by classic evaluation scholars, see section 2.1, it has become even more pressing today than it was several decades ago.

Impact evaluation in such complex, dynamic and entangled environments should be carried out in such a way that they correspond with these system characteristics. Measurement as such becomes impossible: to measure or determine with certainty what effects have occurred because of the interference of knowledge and innovation programmes requires objective data with high reliability and verifiability. This type of data does not exist. The causality problem can be addressed by focusing on actors' perceptions of impact and their receptivity towards each other. This way changing objectives, large numbers of actors and interests, and actor entanglement are not a problem. This approach has been developed in this thesis as the *applied systemic programme evaluation*, or ASPE. This approach differs from classic evaluations and monitoring activities.

Evaluation and monitoring is often based on pre-set objectives. These evaluations can be either qualitative or quantitative, but are often quantitative. This means that the complexity of the system is reduced to a limited set of numbers and figures. Awareness is rising that these evaluations have severe shortcomings in assessing complete and in-depth impact of policy and programmes. However, especially in yearly policy evaluations or ongoing programme monitoring these quantitative and simplified evaluation procedures are still the method of choice for many evaluators. An important example of this approach is the monitoring carried out by the evaluation authority of the Dutch government for the joint financing arrangement. This monitoring occurred primarily to provide for accounting and control of the programmes and it allowed the principal of the programmes (ministries of the national government) to have some degree of control over the course of events in the programmes and the way they spend their state financing. Working from the requirements of the general monitoring framework, programmes could develop their own monitoring indicators and milestones. These were to be selected at the start of the programme and then be used throughout the programme's duration for monitoring that was to be conducted on a yearly basis. This ensured continuity, which allowed the principal to witness progress.

Milestones included objectives related to scientific output, economic output, societal output and innovation output. Each programme developed its own set of indicators within these categories which provided quantitative ways of measuring aspects of each of the four categories. Common indicators were the 'number of PhD projects', 'level of participation in multi-actor trajectories' and 'number of workshops and seminars'. An example of the control usage can be found in meetings between the water KAIP and the working group of the Ministry of V&W, in which the indicators were used to discuss KAIP progress and accentuate certain aspects of the KAIP agenda more than other aspects. Although the water and mobility KAIP indicators were largely alike, there were several differences because of each programme's specific demands and topics. Regardless of this, both programmes noted

in their final reports and other publications that these indicators had little predictive value and said little about the success of the programmes and the realisation of their objectives (see for instance Transumo 15-04-2010: 47).

The Dutch evaluation authority operated as an intermediary between the responsible ministries and the programmes. Their focus lay on measurable, quantifiable output. The programme output was judged against the pre-set objectives. This meant the programmes had an initial choice of setting the bar high, and risking failing to reach it, or setting the bar low, and appearing uninspired and lacking chances for realisation of significant change and improvement in their sector. The cases in this thesis chose to set the bar high, but within reach, and were both successful in reaching these pre-set objectives. However, as this thesis argued, the programmes were also deeply disappointed by the monitoring and found it to be largely meaningless. The main concern was that it did not provide them with any in-depth information on the successes or shortcomings of their programme. To meet this need, they developed other means of monitoring, many of which involved intensive interaction and consultation with stakeholders and participants on their perceptions of the programme.

This thesis does not argue that the monitoring applied by the joint financing authority should be stopped. Rather, it should not be the only evaluation strategy applied. In applying the classic monitoring strategy the evaluator should be aware, though, that the results of that monitoring should not be confused with complete and objective data on programme impact. Even these quantifiable monitoring results have a large degree of subjectivity, and they say little about the impact of the programme as a whole. A dual or plural strategy (Teisman 2005: 155) or a two-track approach (Bressers & Teisman 2009) can help to fulfil the desire to learn and improve without neglecting other requirements such as financial transparency, accountability and efficiency. These trajectories do not have to be separated from each other; a combined approach might also be very helpful in improving evaluation strategies of KAIPs, while maintaining all functions of evaluation studies. However, if the two tracks appear incompatible they can also be carried out individually from each other.

10.1.2 A comparison of evaluation approaches

The approach taken by the joint financing arrangement's evaluation authority, and the other traditional methods of evaluation and monitoring, is different from the evaluation approach proposed in this thesis: the applied systemic programme evaluation. ASPE is derived from ideas such as fourth generation evaluation (Guba and Lincoln 1989), systemic evaluation (Flood 1999) and, most notably, learning evaluations (for instance Van der Meer & Edelenbos 2006). These evaluation approaches combine a focus on the system as a whole, as well as on learning and interaction. Evaluation framework development occurs in an iterative process and incorporates both inductive and deductive research, and indicators are based both on theory and empirics. This makes the approach more dynamic, and therefore more

suitable for analysing complex systems and networks, such as knowledge and innovation programmes.

ASPE allows for programmes to evolve and adapt, and gives credit for positive changes. It acknowledges that objectives change, and takes a flexible approach to them, and is in this sense more dynamic and adaptive than a classic evaluation. It also examines the realisation of the programme network and values this just like the achievement of goals. Further, it takes into account perception, and does not attempt to measure impact but rather provides an educated estimate of this through its assessment of perception. Most importantly perhaps, the method does not attempt to reduce complexity and uncertainty but embraces it as part of the evaluated object's nature and environment.The table below summarises how this approach differs from a classic evaluation.

Table 10.1: A comparison of evaluation approaches

Characteristic	**Classic Evaluation**	**ASPE**
Procedures	Clear and fixed procedures	Iterative and adaptive procedures
Objectives	Goal reaching	Network building and goal reaching
Mode of analysis	Measurement	Educated estimate/ assessment
Primary data source	Facts	Perceptions
Research notion	Order seeking	Complexity embracing
Research design	Fixed design	Dynamic design
Definition of variables	Pre-defined set of variables	Set of variables based on contingency

We are living in a time of rapidly increasing complexity, and change can be noticed in all levels of society - from global changes (for instance globalisation, international markets, economic connectivity, climate change) to local changes (for instance participatory restructuring projects in spatial planning or public private partnerships in infrastructure development). Even individual actors have become more complex - for instance citizens are increasingly aware of the issues that affect them, and are more outspoken in these regards. Similarly, businesses have started to include societal concerns in their actions (through Corporate Social Responsibility efforts), and governmental agencies increasingly realise that they can no longer work alone – the success of their projects requires the cooperation of others, both for support and for required expertise. This development coincides with increased cooperation between actors, leading to new organisational forms such as the triple helix organisations that form the bedrock of knowledge and innovation programmes (the KAIPs).

Because KAIPs tend to cover multiple objectives, and involve many actors who have to cooperate to meet their shared objectives, the exact cause of a certain effect may be uncertain. It is important therefore, for any evaluation attempt to be preceded by an examination of the scientific literature on impact evaluation, doorwerking and complexity, include em-

phasis on interaction between senders and receivers, acknowledge the variety of patterns impact can take, and integrate these ideas into a systemic complex adaptive evaluation framework. By using receptivity as intervening variable the researcher creates an almost automatic space for emphasis on sender-receiver interaction and assembling ideas and knowledge between senders and receivers. Furthermore, receptivity as central concept in the impact evaluation leaves much space for including developments and changes in the evaluation process, as receptivity is, almost by definition, a dynamic concept. A KAIP with high sender and receiver receptivity will have high impact; a KAIP with little sender and receiver receptivity will have little impact.

10.1.3 The added value of applied systemic programme evaluation

The ASPE evaluation method as developed and applied in this thesis has enabled the evaluator to overcome several disadvantages of more classic approaches to evaluation, such as discussed in Chapter Two. The most important limitation of such approaches is the assumption of traceable causality. The complexity of the environment and the programmes themselves means that causality is complex by definition (cf. Byrne 2005) and that it is difficult if not impossible to find clear-cut limited cause-and-effect chains. Effects cannot be attributed to a KAIP with full certainty, as simply the occurrence of a desired effect does not automatically mean this occurrence was caused by KAIP actions. ASPE handles this problem by shifting evaluation focus from output and outcomes to perceptions and opinions. By investigating a wide range of perceptions about KAIP impact one can get a more comprehensive view on the sender and receiver receptivity of KAIP's.

This emphasis on receptivity rather than on output or outcomes is one of the main contributions of ASPE to the body of knowledge regarding the evaluation of complex knowledge and innovation programmes. By studying receptivity as an intervening variable for impact, the evaluator includes intangible and implicit matters that would otherwise be overlooked. Receptivity, after all, concerns the degrees of openness, willingness, capabilities and actions of senders and receivers. These stages, ranging from openness to actions, are especially useful for ongoing or recently finalised programmes. Visible and tangible impact may not yet be present due to the long time horizon of knowledge and innovation adoption, but openness and willingness can be studied in the receptivity analysis. This means earlier signals of future impact can be analysed before the tangible impact starts to occur.

In studying receptivity of senders and receivers ASPE calls for a systemic perspective on the programmes and their environment, as they are embedded in many complex relationships between actors. This will contribute to a more comprehensive understanding of the place of KAIPs in their contingency. Many common approaches are more geared towards senders and tend to limit themselves to that, i.e. they are not focused on the environment of these senders (the receivers and their perceptions). Furthermore, by emphasizing the importance of learning, ASPE becomes a valuable instrument for not only the evaluator,

but also the evaluated programme. As the evaluation is carried out in interaction between evaluator and evaluated programme the potential to learn from the evaluation process and outcomes is greatly increased, leading to greater larger likelihood of adoption of evaluation outcomes and increasing programme success.

10.2 Detecting impact: answers to the research questions

10.2.1 Towards impact of KAIPs

Chapters Two and Three provided a discussion of the development of the literature in the areas of evaluation studies and complexity. The chapters concluded that standard, classic, impact evaluation methods and approaches were no longer satisfactory for the evaluation of KAIPs operating in complex systems. A new conceptual framework needed to be developed in order to meet the needs of such programmes. Receptivity was proposed as an intervening variable in impact evaluation based on the idea that the willingness to learn is a key factor in the success of such programmes, an idea incorporated in receptivity literature. Learning was deemed especially important because of the dynamic nature of the environment the KAIPs operated in and the importance of learning from experience and adapting appropriately to the changes. Furthermore, the focus on receptivity allowed for the dynamic development of objectives and opportunities to be taken into account instead of focusing solely on the achievement of pre-set objectives (as classic evaluation studies generally do). In Chapter Three, it became clear that impact evaluations of complex networks in dynamic systems should to be executed with a focus on the receptivity of both the senders (the KAIPs) and receivers (the stakeholders/ recipients).

The explicit focus on interaction (both as a cause of complexity as well as a potential stimulant of societal change) allows the researcher to investigate the most important, yet most difficult aspects of the KAIP's realisation of impact, which is the progress from the development of knowledge and innovation, to its actual application. With its explicit focus on interaction, the concept of receptivity applies to the entire process from development to application. Because it is a core variable in research into the impact of complex networks in complex systems, receptivity has been operationalised as the combination of awareness, association, acquisition and application (see Jeffrey & Seaton, 2004). In Chapters Two, Three and Four, these variables were broken down into a set of indicators specific and relevant to the cases at hand. Interviews were found to be the most suitable technique for investigating actor's perceptions, viewpoints, ideas and beliefs and so, as discussed in section 4.2, in-depth semi-structured interviews were selected to form the backbone of the data collection effort. The interactive interviews allowed the dynamics of the programmes and the environment in which it operated to be reflected, and interview respondents provided significant insight into the learning that had occurred during the programme's

duration. Surveys, observations and document reviews complemented this approach to the assessment of specific indicators, and allowed for several indicators to be assessed more holistically.

Both the domains studied in the thesis, mobility and water management, were public sectors with an explicit focus on delivering public goods and services. Governmental agencies (both on the national level, as well as regional and local agencies), were therefore seen as very important actors in this field. Private actors such as the representatives of large companies had a somewhat larger degree of decision-making power in the mobility sector, whereas the water sector had the strong influence of the water boards, which made up a fourth layer of government (in addition to the local, regional and national government departments). The two network surveys demonstrated that the KAIPs studied were rather good at including all the actors, along with their specific interests and issues, but that each KAIP also had problem areas. For the mobility KAIP, this was the minimal involvement of governmental actors, and to a lesser degree, the distance of executive business, and for the water KAIP, it was the struggle to involve executive business at all.

The mobility KAIP realised impact in its first receptivity phases in that awareness was fostered between senders and innovative receivers about the need for change. In addition, there was a good deal of association as seen by the alignment between senders and receivers on the benefits of change and innovation. However, the costs of change, the high level of uncertainty, and the differences in the approach of senders and receivers led to a rather low degree of acquisition and application. The overall mobility sector was rather closed and little acquainted with change processes and innovation. The water KAIP scored somewhat better. Senders were aware of the issues and needs of the receivers; they were able to demonstrate to receivers why their work was important; and they were able to limit costs of change and innovation and reduce disagreements about the content of change and innovation. Most importantly, they achieved a visible degree of application. Receivers were experienced with change processes and innovation; they also experienced it as beneficial for them to participate in the KAIP; they were generally convinced of the applicability and practical benefits of the developed ideas; and in some cases, they applied the concepts and products developed by the KAIP. However, a limiting factor in the KAIP's success was the difficulty it had in convincing executive business to participate. This was mainly because of the complex financing arrangements and a difference in focus (beta versus gamma). The context of the water sector was thus different from that of mobility in that it was more open to change and more used to innovation.

In the two cases, the impact realisation process occurred through the interaction between a tripartite set of senders and receivers. The impact of this interaction was mostly 'soft' or intangible and indirect, but it was present and important nonetheless. Three KAIP functions can thus be formulated based on the empirical chapters: the knowledge and

innovation development and dissemination function, the stimulation of societal awareness and change function, and the network and alliance function. The two cases had impact via all three functions, but also experienced a fair share of problems. Overall, the realisation of an interface between senders and receivers increases mutual understanding, which helped in facilitating and stimulating dialogue about potential tensions, problems and differences in interests.

10.2.2 Impact of the KAIPs

The main research question of this thesis was: *How did the knowledge and innovation programmes evolve in relation to their objectives and their changing circumstances, what were their outcomes, and how can their impact be explained?* Objectives included developing ideas for the sector as a whole ('vision on sustainable mobility'/ 'a new position for water'), developing ideas for improving the relations in that sector ('multidisciplinary, transdisciplinary, demand driven'/ 'building bridges between science and practice, beta and gamma'), and ideas on the ways of working and the focus in working ('sustainability, transition, participation'/ 'participation, social learning, vital alliances'). These objectives served as instruments in the programme's development: the development of programmes and of their objectives went hand in hand. The programmes were influenced also by the demands and desires of the consortium partners, by changes in their context, by pragmatic considerations relating to financing and co-creation, and by the programme management's own evolving ideas.

Not all objectives were realised towards the end of the programmes. But because of the nature of the objectives (especially the more systemic objectives) this was not surprising. Realising sustainability or beta/gamma cooperation takes more time than the programmes duration allowed. Innovations and innovative knowledge often takes decades to become fully diffused and adopted (Rogers 2003; Valente 1995), especially when aimed at societal change. One of the most visible effects the KAIPs had on society was the cooperation that it fostered among actors. This impact was less tangible, but invaluable to the sector. Ultimately, the programmes allowed for the construction of the 'infrastructure for future societal change', through knowledge and innovations. This enlarged the programmes' chances of fostering societal transitions towards a more sustainable and innovative water and mobility sector.

The framework developed in Chapter Three emphasised receptivity as an intervening variable in impact evaluation. From the resulting receptivity analysis, it is clear that receptivity between senders and receivers has been realised to varying degrees. *The programmes have had and will continue to have impact.* Senders were receptive overall to the needs and desires of the receivers, and this enlarges the applicability and feasibility of their knowledge and innovation. Receivers were somewhat less receptive than the senders.

However, they still demonstrated clear signs of awareness of the need for knowledge and innovations, awareness of the products produced by the programme, and sometimes also viewed the knowledge and innovation of the programmes as adequate for addressing the need for change.

The receptivity of the senders and, to a lesser extent, the receivers means there is a real chance that the knowledge and innovations produced by the programmes will see adoption. New high quality knowledge and innovations have certainly been developed, and the receptivity measured in this thesis indicates that there is a real chance of meaningful impact. Because the KAIPs aimed for systemic changes, the acceptance of their products over the long run may actually lead to real systemic change, and more robust, resilient and effective means of water and mobility management. Evidence of application is already visible in some projects. Even without the adoption of the projects, a cooperation infrastructure of networks and connections has been developed and stimulated by the programmes, and this will impact the chances of future attempts to change the sector. The programmes were thus a first step in a long, non-linear, process towards the realisation of societal change and the application of knowledge and innovations. Overall, it appears that the programmes were useful investments.

One can, and perhaps should, wonder what this means in terms of the quest for knowledge and innovation discussed at the beginning of Chapter One. Intangible impact, such as cooperation, is a good result in light of the acknowledged complexity of KAIPs and their environment. However, this does not erase the question about the direct impact of KAIPs on the knowledge infrastructure. After all, this impact on the knowledge infrastructure, through the inclusion of demand actors in the knowledge development process, was the primary aim of the joint financing arrangement.

In the two cases investigated, demand actors did not always recognise their ideas and requirements in the outcomes and processes of the programmes. They deemed it abstract, gamma, and academic, and did not see them as corresponding with their own preferences. Both programmes contained projects, pilots or programme ideas that were highly successful, and therefore had demonstrable impact. However, many other projects and programme ideas had less demonstrable direct impact. *The direct impact of the knowledge infrastructure was therefore more limited than the impact of the cooperation infrastructure*.

It is important to remember that these KAIPs were temporary programmes; designed to allow for experimentation, testing, development and new ways of thinking. The creation of directly applicable, deliverable and ready-to use products was not, could not, and should not have been the objective of such a programme. In this light it is intriguing that the joint financing arrangement itself required such an extensive monitoring and accounting procedure. This indicates that the investors desired more tangible outcomes and products

than the new, sometimes controversial and still-developing ideas that emerged from the programme.

Overall, the general conclusion therefore is that the investment in the KAIPs was useful, and was that it was used by the KAIPs and their participants in the best way they saw possible. This was not the most optimal path thinkable. The programmes had to deal with existing habits, relations, and perceptions and had to influence their environment in order to optimise conditions for the introduction of their novel, systemic forms of knowledge and innovations. The programmes were unable to (intensively) involve executive business, despite this being a requirement of the joint financing arrangement. In one of the cases governmental actors remained at a distance as well, despite their involvement as primary principal of the programme. Further, the programmes did not always handle the arrangement's requirements well, despite their solid financial accounting, which created tensions between projects and programme. However, the end-result, as far as visible in 2011, was that new connections were created between actors, new knowledge and innovations were developed and adopted, and new lessons on the process of KAIP management had become clear.

10.3 Evaluating knowledge and innovation programmes: a review and an evaluation assistant

10.3.1 Towards recommendations on impact evaluation: reassessing the framework

The conceptual framework applied in the assessment of the two cases was based on receptivity as an intervening variable. Four variables were borrowed from the receptivity literature (most notably, Jeffrey & Seaton 2004). Although these were called 'phases' in the receptivity literature, they are named 'variables' here because they functioned as such in the framework. Each variable was attached to a set of indicators derived from the scientific literature (on knowledge, innovation, societal change and diffusion), and from empirical observations in the programmes. The application of these variables and indicators points to several areas of improvement that would benefit future efforts.

First, the list of indicators became quite long and some indicators could have been merged. Although the idea behind the indicators was sound, the effectiveness and coherence of the indicators could have been improved. Second, the number of people involved in the knowledge and innovation programmes was much larger and more diverse than consumers involved in Jeffrey and Seaton's research. The senders and the receivers of the knowledge and innovation programmes hence had to go through a fifth phase of receptivity that was not covered in the author's framework. This fifth phase occurred in between the stakeholders' association with the benefits of the knowledge and innovations, and their ability to acquire the knowledge and innovations. In this added phase, which will

be dubbed *alignment*, actors had to align their perceptions, perspectives and interests enough to cooperate on their shared objective. This alignment phase was missed in the receptivity framework, despite it being researched through the network surveys and the triple helix discussion in Chapter Nine. It would be an improvement to the receptivity framework if it could be discussed within its structure, instead of outside.

The new list of variables thus numbers five, and is discussed below:

Awareness. Awareness was defined by Jeffrey and Seaton as the capability to search and scan for new knowledge, therefore the first indicator is defined as follows: *Search and scan for new knowledge and innovations*. The second indicator was prompted by a similar one used under the old framework to give information on what problems senders and receivers saw as urgent, and how well these perceptions fit. Such an indicator provides valuable information on the relevance of projects. The second indicator is therefore: *Agreement on urgent problems*. Some problems, however, do not require innovative solutions, and can be handled with a continuation of existing policy or actions. When this is not the case, sender and receivers need to agree that innovation is actually necessary to tackle urgent problems. The third indicator is therefore*: Agreement on the need for knowledge and innovation*.

Association. Association was defined by Jeffrey and Seaton as the recognition of potential benefits of knowledge and the relation of it to existing needs and capabilities. Such association requires three steps to realise. First, there needs to exist a degree of learning and an open attitude among both the senders and receivers: *Presence of learning and open attitude*. Second, the cost-benefit consideration of the innovations needs to be in order, and it needs to be perceived as a good division: *Cost-benefit consideration of knowledge and innovations*. These costs and benefits then relate to costs and benefits for individual actors, overall not to general societal costs and benefits, only when actors incorporate these in their own cost/benefit considerations. Third, when these steps have been taken senders and receivers need to engage in dialogue and agree on the content of the innovations: *Agreement on content knowledge and innovations*. This last step is necessary to realise the recognition of potential benefit of innovations.

Alignment. This variable was added to the Jeffrey and Seaton model by the author of the current thesis in order to better reflect the reality of the KAIPs. The indicators used in the network analysis survey in Chapters Five and Seven proved to be very helpful in highlighting the successes and problems of network creation in the programmes. These indicators will therefore be preserved. The indicators are thus the *frequency of contact between senders and receivers*, *the match of this frequency of contact with initial expectations*, *the commitment of contact between senders and receivers* and *the match between this commitment and initial expectations*. These questions were asked to the senders involved in the two projects, but should ideally be asked also to receivers so that opinions can be checked against each other (see for instance Arts 1998).

Acquisition. Jeffrey and Seaton defined this variable as the ability to acquire new technologies or learn new models of behaviour which support the exploitation of knowledge. The ability to acquire knowledge is influenced by several indicators. First, the *realism and feasibility of innovations* proved an interesting indicator in the applied receptivity analysis, and said a lot about the ability to acquire. Second, senders and receivers need to agree on the degree to which they should influence each other in this acquisition process and so *agreement on mutual influence* is another important indicator. Furthermore, the senders need to be able to develop innovations in a safe environment, and the receivers need to be able to adopt and use the innovations without much risk. Therefore a third important indicator is *acquisition to develop and use knowledge and innovations*.

Application. This variable is often hard to assess when an evaluation is carried out ex durante or very shortly after the finalisation of a KAIP. Perception assessment is therefore the most important indication of the KAIP's potential application. Previously used indicators will be retained in a summarised version to assess the perceptions of senders and receivers of the (potential) impact of the programmes, specifically, *perceptions of the impact of the programme/ project*, *appreciation of the programme/ project* and *agreement on implementation possibilities*.

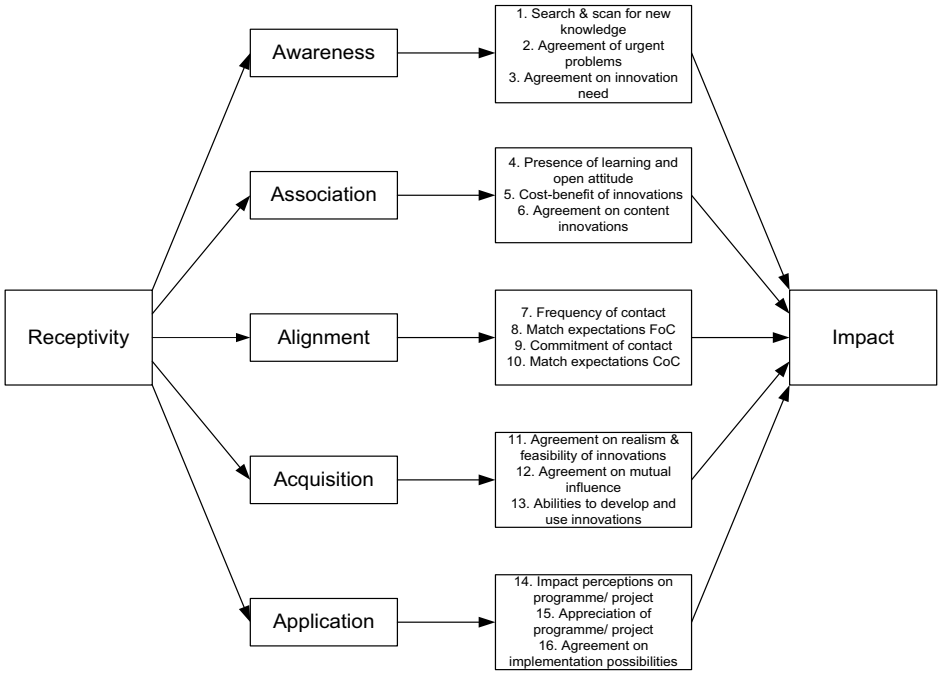

Figure 10.1: Conceptual framework of variables and indicators

The variables awareness and association are logically placed before acquisition, application, but the reality is that programmes may not always follow such a pre-set order. As previ-

ously discussed, the KAIPs evaluated are dynamic and ever changing, and do not always follow predicted schedules. The evaluation is therefore always carried out from a systemic perspective, hence: including both senders and receivers and always taking the context in which the knowledge and innovation programmes operate into account.

10.3.2 An evaluation assistant: a guide for future evaluations

In this section a guide for future evaluators of KAIPs is provided that builds upon the applied systemic programme evaluation method (ASPE) that was developed and piloted in this thesis. The ASPE was designed to evaluate programmes with a great number of participants, that are focused on a variety of topics, that involve an interaction between science and practice, and that have a definite learning focus. The objective of the evaluation is to increase learning outcomes of the programme, primarily by providing insights into the receptivity of both senders and receivers to the knowledge and innovations that are being developed. Because the assessment method values learning, the evaluation does not focus just on evaluating KAIP impact, but also places itself in a position to enlarge this impact. The evaluation is thus carried out not just to serve the needs of external financiers, stakeholders, and other interest parties, but to help the programme improve itself.

The ASPE has to be carried out ex durante. Ex durante evaluation with a high degree of interaction between evaluator and evaluated can only be carried out if the KAIP is truly interested in and committed to the evaluation (outcomes). For the evaluation to be useful from a learning perspective, the KAIP has to be involved in the construction of the evaluation process. Although the KAIP should not take the lead or control the evaluation, their input is of vital importance to the applicability and accuracy of the evaluation. Evaluation thus becomes a tool for interaction and communication in this approach, rather than purely an instrument of enforcement.

The evaluator has to be someone from outside the KAIP, but who is close enough to be able to experience first hand its interactions and observe its workings. Such an evaluator can be a consultant, a researcher, a government evaluator, or someone else with an objective stance. Because of the extent of the work and commitment required in such an evaluation, it is not unthinkable that the KAIP itself be the sponsor of the evaluation. Such an arrangement would be beneficial, as long as the KAIP is open to all outcomes, and does not attempt to influence the evaluation in a more positive direction. Nonetheless, it is important to remember that the evaluator is part of a dynamic whole, and would also be influenced by the dynamics of the programmes and the environment.

The evaluation guide presented here includes five phases, which can take place in an *iterative* way. The phases have an order, but it is a continuing process. In the first phase, the evaluator gets oriented to the KAIP and its environment. He finds out, for instance, what issues and problems are most pressing. In the second phase, the evaluator interacts with

the KAIPs and their potential receivers about their expectations of the evaluation, and of each other. Third, the evaluator develops an evaluation framework and approach in an iterative process of interaction with the KAIPs. Fourth, the evaluator applies the developed framework onto the senders and receivers in the evaluated case. Fifth, the evaluator revises the framework based on lessons learned from the evaluation.

The evaluation is cyclical and dynamic (see also Edelenbos & Van Buuren 2005: 606; Wadsworth 2001: 55). The evaluation will always start with the orientation and interaction phases, and always end with the application and revision phases. During the evaluation, however, application can occur simultaneously with, for instance, a new orientation round. The evaluation phases can be seen as *helices*: entangled yet separately definable processes. They are further focused on the actions of the evaluator, and can be seen as the routines an evaluator has to go through to come to a thorough evaluation of knowledge and innovation programmes.

Phase 1: Orientation

The objective of phase one is to orientate on the programme and its environment, in order to create a basic understanding of the to-be-evaluated object. This orientation consists of document exploration, preliminary conversations with programme and environment, and a study of the sector the programme operates in. Furthermore, this phase serves as an opportunity to talk to and identify possible interviewees. A variety of activities would be appropriate in this phase, including interviews/ conversations with sector actors and KAIP leaders, document study (policy documents, business strategies, KAIP project plans) and observations of interactions amongst individuals and groups. In this phase, a survey can also be carried out to investigate problems that are most urgent in the sector, the solution directions that are most appealing to stakeholders, and which ways of working are currently most prominent in the sector. This phase should ideally recur many times throughout the evaluation as a means of maintaining and updating the evaluator's knowledge of the programme and sector.

Phase 2: Interaction

The objective of phase two is to intensify the conversation from phase one, in order to create an in-depth understanding of the objectives of the programme, its actions, and the way their knowledge and innovations are received by their environment. Interaction should take place with the programme and with people in the programme's environment. Interactions with the programme management would generally concern their view of the sector they operate in, the problems and risks they foresee, and the future they want to work towards. Interactions with the people in the programme's environment would focus generally on their expectations of the programme, their potential interest in it, and their needs and desires for new knowledge and innovation. The research technique is this phase

is predominantly the (open or semi-structured) interview. It can also include workshops involving both parties. Like the first phase, this phase will also keep recurring during the evaluation because objectives of programme or environment may change, and the evaluator needs to stay in touch with these evolving objectives.

Phase 3: Development

The objective of phase three is to develop the conceptual framework for the evaluation, based on the knowledge acquired in phases one and two. Programme indicators will be formulated in this phase, based on which the evaluation will proceed. To fit within the receptivity variables presented in this thesis, these indicators should cover the entire process from awareness, to alignment, to application. This phase is not connected to a specific research technique. It is carried out predominantly by the evaluator, who interacts with the programmes in order to develop the most adequate indicators. In this phase, the evaluator should be aware of the dual role of the KAIPs: they will be evaluated, but are also consulted about the way they will be evaluated. Their input is essential for the abovementioned reasons, but should not result in an evaluation purely used by the KAIPs for marketing purposes. This phase will keep recurring during the evaluation, because the framework is dynamic – aspects of the framework may need to change during the evaluation, based on lessons learnt in other phases.

Phase 4: Application

The objective of phase four is to apply the developed framework and hence carry out the evaluative part of the evaluation. During this phase, the programme will need to maintain somewhat greater distance in order not to influence evaluation outcomes. However, interaction between evaluator and programme is maintained through the other evaluation phases. The research technique in this phase is the in-depth semi-structured interview. If preferred, an open interview can also be applied here, as long as a list of catchwords is developed to check whether all relevant themes have been covered in the interview.

To enhance dissemination chances, a mixture should ideally be sought among scientific and practice-oriented publications, and presentations of preliminary findings. In particular, person to person interactions are very effective in increasing attention to the outcomes of the evaluation. This phase will keep recurring during the evaluation because the application is likely to occur over a long period of time, and interviews should be done with a large number of programme participants and stakeholders.

Phase 5: Revision

The objective of this phase is to refine the framework developed in phase three, and to reflect on what went well in the evaluation, and what went less well. This phase requires intensive interaction with the programme, because the reflection is most complete when

multiple perspectives are taken into account. There is no specific research technique for this phase, but the emphasis is on reflection and interaction. This phase will keep recurring during the evaluation because the objective of the evaluation as a whole is to learn both about the programmes journey toward creating impact, and about how evaluations can be done most effectively.

An evaluator of knowledge and innovation programmes can use this as a guide for the evaluation of multi-faceted and ever developing organisations. The evaluation takes a systemic perspective, and focuses on interaction, context, and the dynamics of the programme. In this sense, *evaluation is never a static activity, and has to be as dynamic and adaptive as the knowledge and innovation programmes it is studying*.

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Relevant websites for more information

http://www.transumofootprint.nl
http://www.transumo.nl/NL/Home.aspx
http://www.levenmetwater.nl
http://www.senternovem.nl/bsik/index.asp

Appendix 1

A presentation of the joint financing arrangement BSIK

This appendix discusses the BSIK joint financing arrangement and the two arrangements that preceded it. In this appendix the reader can find information on organisation and monitoring of the joint financing arrangements, on knowledge and innovation themes in the arrangements, and on the selected cases (as parts of the arrangement).

Three generations of joint financing arrangements

The *first generation* of the three generations of the joint financing arrangement consisted of 8 programmes, for which in total a sum of 113 million euro was provided. This generation started in 1994. The *second generation* of KAIPs under ICES/KIS was somewhat larger, as 211 million euro was provided in this arrangement, for 12 programmes. This generation of KAIPs started in 1998, and contained several programmes that were either extended into the third generation, or concerned topics and/ or people that were present in the third generation of programmes. In other words, some overlap existed between the generations.

The second generation was evaluated in 2008 by Technopolis. It was concluded that a majority of the second generation KAIPs had a positive impact on the reinforcement of the knowledge infrastructure; almost half of the KAIPs demonstrated economic returns (plus a quarter which did not demonstrate this yet but did have good potential of realising this later on); and three-quarters of the networks of the KAIPs had been continued after the subsidy ended (Technopolis 2008: iii). On the other hand, the report also concluded that the organisation of the generation was ad hoc[95], and that the role of business actors was a bit troubled, as quite some business actors had ended their participation in the networks (ibid.: v).

The *third generation* of KAIPs was larger than the previous two. A total sum of 800 million euro was allocated to 37 programmes. The objectives were similar to the earlier generations, and concerned the development of innovative knowledge, developed in cooperation between supply and demand actors of this knowledge. This third generation was named BSIK: Besluit Subsidies Investeringen Kennisinfrastructuur[96]. This thesis has investigated the impact of knowledge and innovation programmes by studying two cases from this third generation joint financing arrangement.

95 This is not unique for the second generation, as evaluations of similar arrangements also concluded that the organisation was too ad hoc and fragmented (Meijerink et al. 2010)

96 Decision Subsidies Investments Knowledge infrastructure

The third generation: BSIK

In December 2002 the Staatsblad (the official governmental bulletin) published the decision BSIK[97]. In this publication the characteristics and agreements of this generation were distinguished. The Ministry of Economic Affairs (EZ) was the core principal of this generation, in close cooperation with the ministries of 'Finance', 'Education, Culture and Science' (OC&W), 'Agriculture, Nature and Food Quality' (LNV), 'Health, Welfare and Sport' (VWS), 'Transport, Public Works and Water Management' (V&W), and 'Housing, Spatial Planning, and the Environment' (VROM). These ministries functioned as principals of the proposals submitted to the third generation of subsidy.

Organisation and monitoring

Monitoring was carried out by then-called SenterNovem (early 2010 SenterNovem merged into the agency Agentschap NL, part of the Ministry of Economic Affairs), which falls under the umbrella of the Ministry of Economic Affairs. SenterNovem reported to the 'Commissie van Wijzen' (Commission of Elders) of ICES/KIS. The Commission had as prime task to advise the ministers about the project applications and progress of subsidy requests. The members of the CvW were experts in the relevant knowledge fields. The Ministry of Economic Affairs was in charge of the Commission. EZ was therefore main principal agent, and reported to the Cabinet about the developments. The following figure has been copied from the website of the former SenterNovem[98], in a slightly adapted form. The figure describes the various parts of the BSIK arrangement in relation to each other.

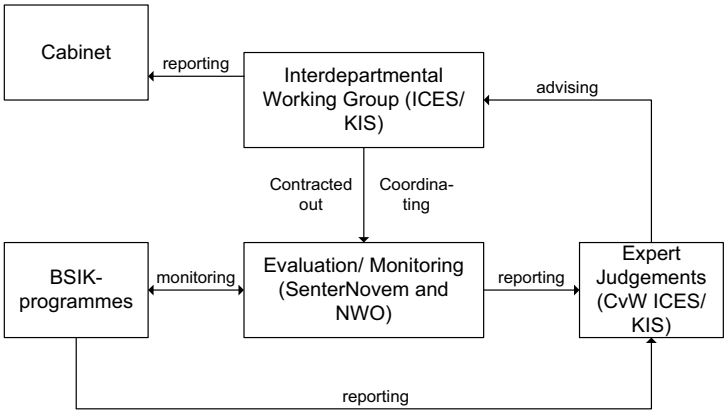

Figure A1.1 Organisation structure of BSIK

97 Staatsblad van het Koninkrijk der Nederlanden, Year 2002, 649

98 http://www.senternovem.nl/bsik/algemeen/organisatie/index.asp

The deadline for application was February 2003. By then 67 proposals were submitted. All proposals were judged on their scientific merits, their societal and economic contribution, and the quality of organisation and financing in the proposal. These three aspects were judged by three different organisations. KNAW judged the scientific merits, several planning offices evaluated the societal and economic contribution, and Senter assessed the organisation and financing of each proposal. Each judged the proposals with a grade between 1 and 5, after which the results were weighed equally and a total grade for the proposal was generated.

Knowledge and innovations on themes

Consortia could submit to five knowledge themes:

1. *Information and communication technology*, in which the main themes were broadband technology, information and software, embedded and distributed systems, and ICT-networks and grids.
2. *Spatial planning*, with main issues system innovation in spatial use, water and space, climate and space, geo-information, sustainable use of the soil, and connected networks.
3. *Sustainable system innovations*, on knowledge and competencies of sustainable system innovations, system innovation in building and construction, transition to sustainable mobility, transition to sustainable agriculture, transition to sustainable energy, and sustainable chemistry and raw materials.
4. *Micro system technology and nanotechnology*, of which the two themes were incorporated in its name (nanotechnology and micro system technology).
5. *Health, food, genetics and biotechnological breakthroughs*, with focused on three main themes: genomics, food and food integrity, and biomedical technology.

The lowest total score a proposal received was 1.3, the best score 4.3. The general rule was that only proposals with a grade above 3.0 would receive subsidies. 33 out of 67 project proposals received a grade of 3.0 or higher, and were therefore granted subsidies. Of the submitted proposals the Commission expressed its concern about the proposals for the theme 'Sustainable System Innovations', which they considered a very important theme, but with so far mostly insufficient proposals. They requested three new proposals in this theme: on knowledge and competencies of sustainable system innovations; transition to sustainable agriculture; and transition to sustainable mobility. All in all, four more proposals were granted subsidy, which resulted in a total set of 37 accepted proposals.

Accepted straightaway were 12 programmes on health, food, genetics and biotechnological breakthroughs (of the submitted proposals), 3 programmes on nano- and micro system technology (100% of the proposals), 8 programmes on ICT (42.1% of the proposed

projects), 5 programmes on spatial planning (62.5% of the proposals), and 5 programmes in the somewhat troubled theme sustainable system innovations (26.3% of the proposals).

Table A1.1: Subsidies per knowledge theme

Health, Food, Genetics and Biotechnology	**Nano/Micro technology**	**ICT**	**Spatial Planning**	**Sustainable system innovations**
€164,7 million	€130 million	€163,2 million	€134 million	€156,1 million This includes a reservation of €70 million for the projects to be resubmitted

The largest amount of subsidy was €90 million for NanoNed (in the Nanotechnology theme). The smallest subsidy was €6.5 million for SmartSurroundings (in the ICT theme). Hence, all programmes were granted at least several millions of euros. Furthermore, to make sure demand parties would be included in all programmes, and cooperation between business, knowledge institutions and governmental actors would emerge, the subsidy amount accounted for only maximum 50% of the total project budget. The remaining 50% had to be brought together by the consortia partners of each programme (co-financing).

Investigating BSIK: case studies from BSIK

This thesis focused on two BSIK programmes. The first case study was *Transumo*, which worked on stimulating a transition towards more sustainable mobility. The second case study was *Living with Water*, which worked on stimulating innovative water management. They were part of two different clusters: Transumo belonged to 'Sustainable system innovations', and was one of the proposals that was accepted only in revised form. Living with Water was part of the cluster 'Spatial planning'. Both cases are finished today (ended in 2009/2010), and have been followed by the author throughout most of their duration.

Both the Dutch water management sector and the Dutch mobility sector are public sectors, with a large role for governmental actors. However, this is even truer for the water sector than for the mobility sector. The institutional arrangements of each sector are constructed around this setting; the institutional context will therefore co-determine the assessment of the cases (Bouma et al. 2009: 205). Assessment has to take into account the specific setting which the programmes functioned. The origins and construction of these programmes meant that roles started shifting, and that actors had to learn new ways of cooperation. As each participating actor enters into a contractual arrangement with the other participating actors, in order to develop system knowledge, many parties will have to outside of their comfort zone. Old ideas on property rights on developed knowledge are less easy to maintain, as the knowledge is co-produced. The actors with the largest amount

of process and procedural knowledge have head start in comparison to actors new at the cooperation game.

In this sense the two cases differ from several other programmes in the arrangement. Programmes on for instance genetics and nanotechnology focus much more on product innovation. The two studied cases in this thesis both looked at spatial aspects, and hence involved much more system innovation. This made impact realisation more difficult (since the knowledge is less tangible and directly applicable). The large role of system innovation also increases the complexity within the programmes. Most actors were direct stakeholders or otherwise relevant parties, and realised change in the spatial system was closely intertwined with other systems and actors. Evaluating such complex cases required an evaluation framework which acknowledges this complexity, and assesses impact in such a way that indirect, soft or intangible effects are also made visible.

Appendix 2

Lists of Interviewees

Transumo

Sender interviews

Below are listed all interviews with Transumo project leaders and programme management.

Table A2.1

Nr.	Date	Name project	Name interviewee
1	13-01-09	Van Maasvlakte tot Achterland (A15-project)	Harry Geerlings
2	23-01-09	Betrouwbaarheid Transportketens	Joost de Waal
3	03-02-09	Ketensynchronisatie in Logistieke Netwerken	Tom van Woensel
4	10-02-09	Gebiedsgericht Integraal Veiliger	Rob Eenink
5	17-02-09	Europese Netwerken	Rob van der Heijden
6	23-02-09	Integraal Collectief Personenvervoer	Pieter Hilferink
7	12-03-09	DESSUS	Luca Bertolini and Marco te Brömmelstroet
8	19-03-09	Marketing voor Duurzame Mobiliteit	Rien van der Knaap
9	25-03-09	ATMO	Hans van Lint
10	26-03-09	Intelligent Vehicles	Richard van der Horst
11	01-04-09	Spitsmijden	Paul Manders
12	02-04-09	PILOT	Gabriël Lodewijks
13	06-04-09	Verzekeren per Kilometer Bereikbaarheid en Vastgoedwaarde	Daan van Egeraat
14	14-04-09	ATMA	Eric van Berkum
15	12-10-09	Transumo Programme	Jan Klinkenberg and Teije Gorris

Receiver interviews

The table below lists all receiver interviews for Transumo.

Table A2.2

Nr.	Date	Organisation	Interviewee
1	26-08-2009	KNV	Ad Toet
2	26-08-2009	DHV	Huib van der Kolk
3	02-09-2009	CEND SKI/ Ministry of Transport, Public Works and Water Management	Hedi Poot
4	15-09-2009	DG Mobility/ Ministry of Transport, Public Works and Water Management	Siebe Riedstra
5	12-10-2009	Dienst Verkeer en Scheepvaart/ Rijkswaterstaat	Joris Al
6	19-10-2009	Hogeschool van Amsterdam	Willem Verbaan

Living with Water

Sender interviews

Below are listed all interviews with project leaders and programme managers. The rows coloured grey are the interviews that were selected in the smaller sample group.

Table A2.3

Nr.	Date	Name project	Nr. project	Name interviewee
1	08-01-08	Bewoners aan de Bak!	P3068	Jan Spit
2	08-01-08	Leven met Bagger	P2047	Gerald Jan Ellen
3	09-01-08	Dialoog over Water in Gebiedenbeleid	P1004	Erik van Slobbe
4	09-01-08	Institutionalisation of social learning in water management	P3077	Erik van Slobbe
5	22-01-08	WaterTekens	P1009	Arjen Buijs
6	25-01-08	Delta	P1010	Tjitte Nauta and Henriette Otter
7	25-01-08	Interactieve Uitvoering	P1018	Berto Meeuwissen and Eric Versteeg
8	25-01-08	Kennistransfer Blauwe Diensten	P3061	Berto Meeuwissen
9	25-01-08	Deventer Uiterwaarden	P2040	Berto Meeuwissen
10	12-02-08	Waardering in Coproductie	P3065	Jurian Edelenbos
11	12-02-08	Routeplanner	P2054	Aalt Leusink
12	13-02-08	Leven met Afgekoppeld Regenwater	P2044	Niels van Oostrom
13	13-02-08	Leerarrangement Leven met Water	P3059	Agnes Maenhout
14	20-02-08	JONAS	P4088	Ludolph Wentholt and Joost Jongerius
15	26-02-08	Hollandse Waterstad	P2037	Marjo van Loon
16	27-02-08	KRW-Verkenner	P1007	Norbert Cremers
17	12-03-08	Spaarkaart	P2050	Ludo Boeije
18	13-03-08	Grenzen aan Participatie	P1012	Erna Ovaa
19	25-03-08	Het Waterschap in de Stad?!	P1021	Bert Palsma
20	28-03-08	MKBA in de Regio	P3078	Robert van Cleef
21	20-08-08	Zilte Landbouw Texel	P2057	Jelte Rozema
22	26-08-08	Van Dreigend Hoogwater tot en met Evacuatie	P3072	Bas Kolen
23	29-08-08	Eerst Zuiveren Dan Bergen	P1011	Adrie van der Werf
24	02-09-08	Waalweelde	P4091	Toine Smits
25	02-09-08	Healthy Yangtze River	P4090	Toine Smits
26	09-09-08	Rijke Delta	P5096	Tjard de Cock Buning
27	12-09-08	Wetlands in het IJsselmeer	P2038	Marc Beets
28	12-09-08	Water Economie	P1001	Roy Brouwer

Table A2.3: Continued

Nr.	Date	Name project	Nr. project	Name interviewee
29	12-09-08	Bestuurlijk Schakelen	P1005	Kris Lulofs
30	27-10-08	Waarheen met het Veen?	P1006	Cees Kwakernaak
31	29-10-08	PROmO	P3062	Herman van der Most
32	03-11-08	Perspectieven in Integraal Waterbeheer	P1015	Pieter Valkering
33	12-11-08	Van Neerslag tot Schade	P2034	Matthijs Kok
34	14-11-08	Aquaterra	P1027	Jos Brils
35	07-01-09	Sponge Job Zuidas	P3080	Maarten Claassen
36	13-01-09	Urban Flood Management	P3075	Ellen Kelder
37	20-01-09	Bouwen met Water	P1019	Steven de Boer
38	21-01-09	KRW-Pilots voor Gemeenten	P3069	Gert Dekker
39	23-01-09	Symbiose tussen Veiligheid en Natuur	P1023	Emiel Kater
40	09-03-09	Leven met Zout Water	P1026	Jouke Velstra
41	16-03-09	Transities Duurzaam Stedelijk Waterbeheer	P1002	Frans van de Ven
42	16-03-09	Beter Bouw- en Woonrijp Maken	P2048	Frans van de Ven
43	16-03-09	Transformability of Water Management Regimes	P4085	Frans van de Ven
44	16-03-09	Urban Water sustainable case studies	P4086	Frans van de Ven
45	16-03-09	Living Waterproof in Lowland Areas	P4087	Frans van de Ven
46	16-03-09	Doorwerking van Kennis	P2058	Maura Soekijad
47	23-02-10	Programme Living with Water	-	Bert Satijn

Visible in this list are the 16 selected interviews with project leaders (about 22 projects) and the programme management interview in 2010. The selection criteria for the condensed set of project leader interviews were listed in Chapter Four.

Receiver interviews

The table below lists all receiver interviews for Living with Water.

Table A2.4

Nr.	Date	Organisation	Interviewee
1	27-08-2009	University of Twente	Suzanne Hulscher
2	28-08-2009	Twynstra Gudde	Frederik de Vries
3	02-09-2009	CEND SKI/ Ministry of Transport, Public Works and Water Management	Hedi Poot
4	29-09-2009	Boskalis	Frank Verhoeven
5	17-03-2010	DG Water/ Ministry of Transport, Public Works and Water Management	Annemieke Nijhof

Appendix 3

List of Abbreviations

ASPE	Applied Systemic Programme Evaluation
BSIK	Decision Subsidies Investments Knowledge infrastructure
CvW	Commissie van Wijzen (Commission of Elders)
EZ	Ministry of Economic Affairs
FES	Fonds economische Structuurversterking (Fund Economic Structural empowerment)
ICES/KIS	Interdepartmental Commission Economic Structural empowerment/ Knowledge InfraStructure
Inwat	Innovative water management
KAIP	Knowledge And Innovation Programme
KI	Knowledge Institution
KNAW	Koninklijke Nederlandse Akademie van Wetenschappen (Royal Dutch Academy of Sciences)
LwW	Living with Water
LNV	Ministry of Agriculture, Nature and Food Quality
NGO	Non-Governmental Organisation
OC&W	Ministry of Education, Culture and Science
Susmob	Sustainable mobility
S&MS business	Small and Middle-Sized Business
VROM	Ministry of Housing, Spatial Planning, and the Environment
VWS	Ministry of Health, Welfare and Sport
V&W	Ministry of Transport, Public Works and Water Management

Samenvatting

Dit proefschrift gaat over de evaluatie van de impact van kennis- en innovatieprogramma's in een complexe en dynamische context. Het proefschrift presenteert een methode om deze evaluatie aan te pakken en daarmee bij te dragen aan de gaande ontwikkeling van klassieke doelbereikevaluatie naar meer dynamische lerende evaluaties. Twee kennis- en innovatieprogramma's worden als casussen besproken, namelijk Transumo (op het gebied van duurzame mobiliteit) en Leven met Water (op het gebied van innovatief waterbeheer). Beide programmes waren onderdeel van een financieringsarrangement op basis van de aardgasbaten, welke in totaal 37 kennis- en innovatieprogramma's financierde. Beide programma's waren opgebouwd uit een programmalaag, waarin algemene programma-ideeën vormgegeven werden, en een projectenlaag, waarin specifieke kennis en innovaties werden ontwikkeld.

Het proefschrift heeft drie doelen en kernboodschappen: 1. Bijdragen aan de gaande ontwikkeling van evaluatieliteratuur, 2. Impact van de twee cases onderzoeken en presenteren, 3. Leren van de toepassing en de evaluatiemethode verder aanscherpen om uiteindelijk tot een meer generieke methode voor de impactevaluatie van kennis- en innovatieprogramma's te komen. De hoofdvraag die in dit proefschrift is onderzocht luidt als volgt: *Hoe zijn de kennis- en innovatieprogramma's geëvolueerd in relatie tot hun doelstellingen en hun veranderende omstandigheden, wat waren hun uitkomsten, en hoe kan hun impact verklaard worden?*

1. Evalueren in een complexe en dynamische context

Een kennis- en innovatieprogramma is een programma met een netwerk van zowel vraag- als aanbodpartijen, die intensief samenwerken in het tot stand brengen en verspreiden van kennis en innovaties, ten einde maatschappelijke verandering te stimuleren. Hierbij gaat het om met name actoren uit de wetenschap, het bedrijfsleven en de overheden (zogenaamde tripartiete samenwerking). In dit proefschrift gaat kennis over het 'weten wat te doen', terwijl innovatie meer over het 'doen' zelf gaat. Kennis kan dan zowel wetenschappelijk als niet-wetenschappelijk zijn, en zowel tastbaar als niet-tastbaar (bijvoorbeeld ervaringskennis). Innovatie is meer dan productinnovatie, omdat het ook gaat om procesinnovaties, bijvoorbeeld innovaties in samenwerkingsvormen.

Tripartiete samenwerking is vaak geen simpel en rechtlijnig proces. Het vindt plaats in een complexe en dynamische omgeving, waarin soms wel honderden actoren met hun eigen doelstellingen deelnemen aan een proces, waarin zij een gezamenlijke doelstelling nastreven. De grote variëteit in actoren en hun doelstellingen is één van de belangrijkste redenen van de complexiteit in de omgeving van het kennis- en innovatieprogramma. Andere factoren die deze complexiteit vergroten zijn de invloed van mondiale trends (zoals globalisering, klimaatverandering, economische vooruitgang of crisis, enzovoorts), de in-

gewikkelde causaliteit in veranderingsprocessen (wie veroorzaakt welke ontwikkeling als het voortkomt uit een onderhandelingsproces met vele actoren), en de relatieve nieuwheid van samenwerkingsorganisatie zoals kennis- en innovatieprogramma's.

2. Een nieuwe manier van evalueren: de methode

2a. Kernwaarden van de evaluatie

De evaluatie van deze programma's moet daarom tegemoet komen aan de complexe dynamische omgeving waarin de programma's opereren, en die ook de complexiteit van de programma's zelf beïnvloedt. Door deze complexiteit wordt de causaliteit vertroebeld, waardoor het lang niet altijd duidelijk is welke ontwikkeling voortkomt uit een bewuste handeling van het programma, en welke voortkomt uit een toevallige samenloop van niet-bewuste handelingen of handelingen door andere actoren dan het kennis- en innovatieprogramma. Zo kan het zijn dat doelstellingen van het programma worden gehaald terwijl dit niet komt door het bewuste nastreven van dit doel door het programma. Een klassieke doelbereikevaluatie zou in een dergelijk geval kunnen constateren dat het programma succesvol is geweest door het halen van de doelen, terwijl dit niets met het programma te maken had.

Wanneer de evaluator zich beperkt tot meetbare eenheden van programma-impact kan er uit de evaluatie naar voren komen dat deze impact goed of slecht is geweest, zonder dat het werkelijk veel zegt over het algehele programmasucces. Natuurlijk kan ook een klassieke doelbereikevaluatie de evaluatiemethode zo uitbouwen dat er ruimte komt voor kwalitatieve toevoegingen. Echter, dan ontbreken nog steeds enkele belangrijke kernwaarden voor het evalueren van kennis- en innovatieprogramma's. *Meten* van impact is dus niet mogelijk in geval van complexe kennis- en innovatieprogramma's.

Twee redenen hiervoor zijn hierboven reeds aangestipt. Ten eerste, de multi-actor component leidt tot een serieuze afweging voor de doelbereikevaluator. Wiens doelstellingen zie je als leidend voor je evaluatie, en weeg je ook informele doelstellingen mee? Ten tweede, de complexe en dynamische context levert een causaliteitsprobleem op. Wie is verantwoordelijk voor welke uitkomsten, en kan doelbereik zonder twijfel op het conto van het programma worden geschreven? Er is echter nog meer wat de klassieke doelbereikevaluatie ongeschikt maakt voor kennis- en innovatieprogramma's. Deze programma-evaluaties vereisen een meer holistisch beeld van evaluatie – het programma moet als dynamisch systeem worden beschouwd in plaats van als statisch lijstje doelen.

Daarnaast kan een programma veel hebben aan een lerende component in de evaluatie. Zowel het evalueren zelf als de uitkomsten kunnen hierin instrumenteel zijn. Het evaluatieproces schept door intensieve interactie tussen evaluator en geëvalueerde inzicht in de hoofdlijnen van het programma en brengt structuur aan die voorheen mogelijk weinig

zichtbaar was. De uitkomsten van de evaluatie leveren informatie op over de sterke en zwakke punten en bieden houvast voor het opstellen van concrete aanbevelingen voor verbetering.

Al met al bestaan de kernwaarden van de voorgestelde evaluatie dus uit een systemisch en holistisch perspectief, met aandacht voor complexe en dynamische causaliteit, en een nadruk op het stimuleren van leren, in plaats van sec oordelen. Dit proefschrift heeft deze evaluatieaanpak 'applied systemic programme evaluation' (ASPE) genoemd; in het Nederlands te vertalen als 'toegepaste systemische programma-evaluatie'.

2b. Dynamische variabelen

De erkenning van de noodzaak tot een systemische en lerende evaluatie in het evalueren van kennis- en innovatieprogramma's roept de vraag op hoe dit dan vormgegeven dient te worden. Waar klassieke evaluatiemethoden wellicht tekortschieten in termen van bewustzijn over complexe interactie- en causaliteitspatronen in de huidige maatschappij, dient een systemische lerende evaluatie hier wel volop aandacht aan te schenken. Dit betekent dat de evaluatie moet afstappen van het idee van meten op doelbereik. Doelbereik is nog steeds een belangrijke indicatie voor programmasucces, maar kan in een complexe dynamische omgeving niet met afdoende zekerheid worden vastgesteld als gevolg van programma-acties. Impact, als zodanig, is daarmee niet meetbaar. Het duurt vaak lang voordat impact letterlijk zichtbaar wordt. Dit betekent dat ook respondenten vragen naar hun mening over impact niet alleszeggend is, omdat hun mening beïnvloed wordt door de huidige zichtbaarheid van de impact.

De uitweg voor de evaluator ligt in het kijken naar factoren die impact sterk beïnvloeden en die wel benaderbaar zijn aan de hand van percepties van betrokken actoren. Hierbij wijst dit proefschrift op het onderzoeken van *ontvankelijkheid* als interveniërende variabele in impactonderzoek. Ontvankelijkheidsonderzoek kijkt naar de openheid van respondenten ten opzichte van kennis en innovaties, de bereidheid deze over te nemen, de mogelijkheid en capaciteit om deze adoptie te kunnen uitvoeren, en de feitelijke adoptie en toepassing. Dit proefschrift heeft op basis van de bespreking van de eigenschappen van kennis- en innovatieprogramma's, welke sterk verweeft zijn met hun omgeving, beargumenteerd dat niet alleen gekeken moet worden naar de ontvankelijkheid van de ontvangers van de kennis en innovaties, maar ook naar de ontvankelijkheid van de zenders van de kennis en innovaties. De redenering is dat als beide partijen ontvankelijk ten opzichte van elkaar zijn het impactpotentieel evenredig toeneemt.

Ontvankelijkheidsliteratuur definieert vier fasen van ontvankelijkheid: awareness, association, acquisition, application. Deze komen in grote lijnen neer op de hierboven benoemde openheid, bereidheid, mogelijkheid en toepassing. De vier fasen zijn in dit proefschrift opgevat als variabelen, welke verder geoperationaliseerd moesten worden door middel van toekenning van indicatoren aan elke variabele. Voor zenders en ontvangers

zijn aparte indicatoren opgesteld. Per zender- of ontvanger-variabele zijn drie tot zeven indicatoren toegekend op basis van bespreking van literatuur op het gebied van innovatie, maatschappelijke verandering en impact. Deze variabelen en indicatoren moeten niet gezien worden als meeteenheden – zoals hiervoor beargumenteerd is de impact (noch de ontvankelijkheid) van kennis- en innovatieprogramma's niet meetbaar door de hoge mate van complexe causaliteit. De variabelen en indicatoren zijn daarom dan ook dynamische focuspunten voor analyse, op basis waarvan de respondenten van de twee cases bevraagd zijn over hun ontvankelijkheid.

2c. Methodologie

Dit onderzoek is, op basis van het eerder besproken holistische perspectief op evalueren, ingestoken vanuit een systemische benadering, waarin de programma's als hele dynamische entiteiten werden gezien en niet als kaders met daarbinnen losse onderdelen. Bij deze hele entiteit hoorden ook de interpretaties en percepties van de deelnemers. Percepties waren dan ook een belangrijke informatiebron voor de dataverzameling in dit proefschrift. Op een iteratieve manier is data verzameld over de percepties van de respondenten binnen en buiten de programma's over het de indicatoren behorende bij de ontvankelijkheidvariabelen. Respondenten binnen het programma betroffen met name programmamanagers en projectleiders: de zenders van de kennis en innovaties. Respondenten buiten het programma betroffen potentiële ontvangers van de kennis en innovaties: belanghebbenden uit de tripartiete omgeving (overheden, bedrijfsleven, wetenschap) die mogelijk de kennis en innovaties zouden willen toepassen in hun eigen werkomgeving. De scheidslijn tussen de zenders en ontvangers was fluïde: omdat belanghebbenden meededen in de projecten van de programma's werden zij automatisch onderdeel van de zenders, terwijl zij ook degenen waren die eventuele toekomstige toepassing van de kennis en innovaties moesten doorvoeren.

De zenders werden bevraagd door diepte-interviews met programmamanagers en projectleiders. Hiervoor zijn tientallen interviews uitgevoerd. De ontvangers werden bevraagd met twee dataverzamelingstechnieken: interviews met een beperkte groep ontvangers, die wel bekend moesten zijn met de casussen maar niet zelf deelnemende, en een survey waarin de brede kring rondom de programma's (op basis van het nieuwsbrievenbestand van de programma's) werd bevraagd op hun mening over diverse stellingen op het gebied van de problemen en oplossingen in de sector waarin zij actief waren, hun kijk op de casus in hun sector, en hun beeld van casus impact. In deze survey kwamen zenders en ontvangers in die zin samen dat het adressenbestand bestond uit betrokken in diverse cirkels in en rondom de programma's: de cirkel direct betrokkenen, de cirkel op afstand betrokkenen, en de cirkel niet-betrokkenen. Op basis van de hiervoor besproken dynamische variabelen en indicatoren zijn deze technieken gebruikt om inzicht te krijgen in de ontvankelijkheid

van de zenders en ontvangers ten opzichte van elkaar, en daarmee het impactpotentieel van de kennis- en innovatieprogramma's.

3. De casus Transumo

Mobiliteit is een dynamische en complexe sector, waarin problemen en oplossingen meestal niet eenduidig zijn. Vaak zijn problemen verbonden met andere problemen, zowel uit de hoek van mobiliteit als uit andere sectoren. Voor deze complexe, 'wicked', problemen bestaan geen enkelvoudige oplossingen. De kansen om problemen te adresseren en op te lossen liggen veelal in een slimme combinatie van technische en procesmatige oplossingen. In mobiliteit gaat het immers om problemen op gebieden zo divers als emissies, geluid, veiligheid en congestie. Ook de driehoek van duurzaamheid speelt hierin een belangrijke rol: oplossing in mobiliteit moeten liggen in een strategie die zowel de economische belangen van mobiliteit waarborgt door bijvoorbeeld congestie te beperken, als de sociale component van bijvoorbeeld veiligheid en geluidsoverlast maar ook mobiliteit en bewegingsvrijheid, en als de milieucomponent van bijvoorbeeld emissies en natuurbescherming. Elke duurzaamheidscomponent beïnvloedt de andere componenten, en ze zijn allemaal nodig in het nastreven van *duurzame mobiliteit*.

Om deze duurzame mobiliteit te stimuleren werd in 2004 het kennis- en innovatieprogramma Transumo opgericht. In eerste instantie werd het in 2003 ingediende voorstel voor het programma niet goedgekeurd. Omdat het thema duurzame mobiliteit door de beoordelende commissie wel als zeer belangrijk werd gezien werd Transumo uitgenodigd een herzien voorstel in te dienen. Dit voorstel werd wel goedgekeurd, al werd er voor de zekerheid een 'knip' in gebouwd, met een tussentijdse herbeoordeling door de commissie op basis waarvan een beslissing over de financiering voor de tweede helft van het programma zou worden genomen. Omdat Transumo bij deze herbeoordeling aan de vereisten voldeed werd uiteindelijk de volledige financiering toegekend aan het programma.

In hoofdstuk vijf is een netwerkanalyse uitgevoerd waarmee de betrokkenheid van actoren in het programma is onderzocht. Hieruit kwam naar voren dat de betrokkenheid van overheidsactoren bij Transumo minder is geweest dan oorspronkelijk werd verwacht. Omdat het Ministerie van Verkeer en Waterstaat de opdrachtgever was onder de financieringsregeling werd door Transumo van hen verwacht dat zij intensief betrokken zouden zijn. In de praktijk behield het ministerie relatief veel afstand. Ook met regionale en lokale overheden verliep de samenwerking niet altijd vlekkeloos. Het bedrijfsleven was wisselend betrokken bij Transumo. Ondanks klassieke bezwaren als risico's, noodzaak tot winstgevendheid, en andere manieren van denken waren er veel bedrijven, zowel kleine als grote, die participeerden in het programma. Dit vereiste wel enige inzet van Transumo, omdat de tarieven en regelingen binnen het financieringsarrangement ongunstig waren

voor bedrijven. Ook met deze inzet van het programma bleef de betrokkenheid van met name grote bedrijven vaak wel op enige afstand, maar ze zaten wel in de meeste consortia. Al met al kende Transumo een goede betrokkenheid van wetenschappelijke partijen, een aardige doch enigszins afstandelijke betrokkenheid van het bedrijfsleven, en een tegenvallende betrokkenheid van de overheid. De oorzaak hiervan lag zowel bij de natuur van het programma als bij diens omgeving.

Die beperkte omgevingsontvankelijkheid kwam ook naar voren uit de toepassing van de evaluatiemethode op Transumo (zie hoofdstuk 6). Door de abstracte, wetenschappelijke, lange termijnoriëntatie van het programma waren sommige ontvangers maar beperkt geïnteresseerd in het programma. Alhoewel zij de noodzaak voor duurzame mobiliteit en verandering in de mobiliteitswereld wel zagen, waren zij van mening dat Transumo niet het platform was dat deze verandering kon of moest realiseren. Met name als ontvangers rechtstreeks werd gevraagd naar de invloed van Transumo op henzelf, hun organisatie, de sector in het algemeen of de waardering van Transumo door de mobiliteitssector kwamen er scores die leidden tot een negatief oordeel op de indicatoren. Het programma, de zenders, scoorde iets beter dan de ontvangers. De enige negatieve indicatorscore was hier het omgaan met externe omstandigheden, vanwege de in het begin ongelukkige manier waarop Transumo omging met de knip in het programma en de complexe financieringsstructuur.

Dit leidt tot de conclusie dat de zenders en ontvangers in het geval van Transumo slechts beperkte ontvankelijkheid toonden. In beginsel stonden zij open voor elkaar en waren zij bereid van elkaar te leren, maar door verschillen in uitgangspunt en aanpak kwam het vaak niet tot toepassing van kennis en innovaties. Een aantal projecten van Transumo heeft het echter goed gedaan en de kennis en innovaties daaruit worden nog steeds toegepast door allerlei actoren. Daarnaast is het programma gedurende de jaren beter gaan draaien, waardoor de algemene tendens richting het einde toe een stijgende lijn laat zien. Echter, het impactpotentieel van Transumo is beperkt door de matige ontvankelijkheid van zenders en vooral ontvangers.

4. De casus Leven met Water

Net als mobiliteit is het waterbeheer een sector waarin meerdere componenten op elkaar inhaken en voor een complex en dynamisch geheel zorgen. Water hangt nauw samen met ruimtelijke ordening, gebiedsontwikkeling, en klimaatverandering. Daarnaast heeft het Nederlandse waterbeheer ook nog een additionele bestuurslaag: de waterschappen. Deze bestaan naast de rijksoverheid, de provincies en de gemeenten. Nederland heeft een lange geschiedenis in waterbeheer, als gevolg van de eeuwenoude strijd tegen het water en de pogingen land terug te winnen door het aanleggen van polders. Dit heeft veel technologische en organisatorische kennis opgeleverd over het omgaan met water en het

beschermen van het land. Er is in de afgelopen jaren een geleidelijke verschuiving geweest van water weren naar water in het land accepteren. Dit is ook wel geformuleerd als het zoeken naar 'een nieuwe plek voor water'.

Het kennis- en innovatieprogramma Leven met Water had dit zoeken naar een nieuwe plek voor water als leidend motto. In 2003 werd Leven met Water's programmavoorstel goedgekeurd door de beoordelingscommissie. De commissie bleef gedurende het programma positief over de gang van zaken en de uitkomsten van Leven met Water. Het programma richtte zich op het samenbrengen van bèta en gamma werelden en van praktijk en wetenschap; om zo vitale allianties te vormen voor het werken aan de nieuwe plek voor water. Deze vitale allianties kwamen voor een groot deel terug in de actorenparticipatie in het programma. De netwerkanalyse in hoofdstuk zeven laat zien hoe de kenniswereld zeer intensief betrokken was in het programma. Ook overheden, met name lokale en regionale overheden (zoals de waterschappen en de gemeenten), waren vaak redelijk frequent betrokken. Uitvoerend bedrijfsleven, daarentegen, bleef op behoorlijk grote afstand van het programma. Grote bedrijven waren het minst vaak betrokken en toonden ook de minste verbintenis en toewijding. De reden hiervoor lag met name bij het wetenschappelijke karakter van het programma en de ingewikkelde financieringsafspraken uit het financieringsarrangement.

Dat praktische overwegingen voor een groot deel leidend waren in de beperkte betrokkenheid van het bedrijfsleven blijkt uit de ontvankelijkheidanalyse. De toepassing van de evaluatiemethode laat zien dat de ontvangers van het programma over het algemeen behoorlijk positief waren over Leven met Water. Wel bestond er enige twijfel over het realisme en de haalbaarheid van de kennis en innovaties uit het programma, en ook twijfelde men sterk aan de feitelijke invloed van Leven met Water op zowel problemen in het fysieke watersysteem als op procesmatige problemen en ontwikkelingen. De zenders komen ook goed uit de ontvankelijkheidanalyse. De meeste indicatoren scoren hier positief, op enkele neutrale scores na. Wat deze drie neutraal-scorende indicatoren gemeen hebben is het verbinden met ontvangers en het realiseren van een overeenkomst en een gedeeld belang. Ook hier speelt het abstract, wetenschappelijk, denken een belangrijke rol – dit paste niet altijd bij de ontvangers.

Over het algemeen komt Leven met Water positief uit de evaluatie, waarbij wel enkele aandachtspunten blijven liggen op het gebied van betrokkenheid bedrijfsleven, realiseren van gedeelde belangen en doelen en verschillen in denkwijzen en handelswijzen. Dit betekent voor het impactpotentieel van Leven met Water dat deze relatief groot is voor een kennis- en innovatieprogramma. Er zijn voldoende paden gebaand om de kennis en innovaties uit te wisselen en de overeenkomst tussen zenders en ontvangers is voldoende gerealiseerd om wederzijdse ontvankelijkheid te creëren en te behouden.

5. Het functioneren van kennis- en innovatieprogramma's

Een kennis- en innovatieprogramma heeft drie primaire functies. Ten eerste, de ontwikkeling en verspreiding van kennis en innovaties. Ten tweede, het bijdragen aan (maatschappelijke) veranderprocessen. Ten derde, het opzetten en onderhouden van een vitaal en dynamisch netwerk. Deze drie functies zijn in de twee onderzochte casussen allemaal van toepassing geweest. De eerste functie, het ontwikkelen en verspreiden van kennis en innovaties, was in beide gevallen succesvol. Zowel op programmaniveau als projectniveau is er veel ontwikkeld wat ook daarna actief is verspreid naar ontvangers. De tweede functie, het bijdragen aan maatschappelijke veranderprocessen, was voor beide programma's lastig. Alhoewel het niet het geval is dat beide casussen deze functie niet hebben kunnen vervullen, is het wel zo dat deze functie niet voor grootschalige veranderingen heeft gezorgd. Ten dele wordt dit opgevangen door de derde functie, het realiseren en onderhouden van een vitaal netwerk. Door middel van een dergelijk netwerk kan er als het ware een infrastructuur voor toekomstige verandering worden gebouwd, omdat belangrijke connecties zijn gelegd. Beide programma's hadden een dergelijk netwerk behoorlijk succesvol opgezet, alhoewel, zoals hierboven gesteld, uitvoerend bedrijfsleven moeilijk te betrekken was en in één casus ook de overheidspartijen op afstand bleven.

Deze drie functies werden bemoeilijkt door diverse spanningen die optraden gedurende het programmaverloop. Deze klassieke spanningen omvatten spanning tussen korte termijn handelen en lange termijn plannen; abstract wetenschappelijk werken en concreet en praktisch werken; tussen een bèta-oriëntatie en een gamma-invalshoek; en tussen complexiteit reducerende partijen en complexiteit accepterende partijen. Al met al bestonden er in en rondom de programma's heel verschillende personen met hun eigen karakteristieken. Zij spraken, als het ware, 'een andere taal'. Waar deze verschillen expliciet tussen zenders en ontvangers zaten, en minder binnen de groepen, hadden deze spanningen gevolgen voor de kans op impact. Een goede overeenkomst tussen talen, handelswijzen, en werkcultuur is immers bevorderlijk voor het realiseren van wederzijdse ontvankelijkheid, en dus impact.

Om een kennis- en innovatieprogramma zo optimaal mogelijk te laten functioneren is het behulpzaam om aan diverse zaken aandacht te besteden in toekomstige kennis- en innovatieprogramma's. Managementsuggesties om naar te kijken betreffen onder andere een verbetering van het co-financieringsarrangement, welke met minder rigiditeit meer geschikt zou zijn voor dynamische en adaptieve programma's. Hierin gaat het ook om het rekening houden met partijen in het programma – zo waren de ingewikkelde financieringsafspraken en lage tarieven in het arrangement voor uitvoerend bedrijfsleven reden om afstand te bewaren ten opzichte van de programma's. Andere aanbevelingen betreffen het managen van verwachtingen van zowel zenders als ontvangers over het programma ten aanzien van de zaken waaraan het werkt en de wijze waarop het daaraan zal werken

en het vergroten van het besef dat deze dynamische programma's te maken krijgen met spanningen en uiteenlopende belangen.

6. Conclusies

6a. Evaluatiestudies verder ontwikkeld

De evaluatieaanpak in dit proefschrift, ASPE, verschilt op een aantal kernwaarden significant van de klassieke doelbereikevaluatie. ASPE is te classificeren als een evaluatie met iteratieve en adaptieve procedures, met als te evalueren doel zowel netwerkrealisatie als doelbereik, waarin de impact wordt benaderd en beredeneerd geschat, op basis van onderzoek naar percepties, in een complexiteitsomarmende manier, op basis van een dynamisch design, en waarin de gebruikte variabelen zijn gebaseerd op contingentie. De klassieke evaluatie kent vaststaande en heldere procedures, onderzoekt doelbereik, streeft het meten van dit doelbereik na, baseert zich op feiten, probeert orde aan te brengen in de evaluatie, werkt met een vaststaand onderzoeksdesign, en baseert het onderzoek op vooraf vastgestelde variabelen. Beide evaluatiemethoden hebben hun voor- en nadelen. ASPE beoogt geen vervanging te zijn voor de doelbereikevaluatie, maar eerder een aanvulling voor situaties waarin een complex programma het onderwerp van evaluatie is.

Dit maakt ASPE bij uitstek geschikt voor de evaluatie van kennis- en innovatieprogramma's, waarin doelen dynamisch zijn, veel partijen deelnemen, en causaliteit in doelbereik moeilijk, zo niet onmogelijk, vast te stellen is. De belangrijkste bijdrage van ASPE zit in het kijken naar ontvankelijkheid van zenders en ontvangers bij wijze van impactevaluatie. Door deze aanpak wordt het systemische karakter van kennis- en innovatieprogramma's benadrukt en opgenomen in de evaluatie. Door de iteratieve en interactieve aanpak in de ex durante evaluatie neemt het lerend vermogen van de programma's toe, en kan worden gestreefd naar een zo optimaal mogelijk impactpotentieel.

6b. De impact van de casussen

Op basis van de ontvankelijkheidstudies van Transumo en Leven met Water, zoals hierboven reeds besproken in deze samenvatting, kan worden geconcludeerd dat de impact van de casussen wisselend was. In de mobiliteitscasus waren de zenders redelijk ontvankelijk en de ontvangers slechts beperkt ontvankelijk. In de watercasus waren de zenders goed ontvankelijk en de ontvangers is slechts iets mindere mate ook. Voor beide casussen geldt dan ook dat zij (enige) impact zullen hebben. Deze impact kan gezien worden in succesvolle projecten die volop hebben doorgewerkt en momenteel door ontvangende partijen verder ontwikkeld worden, in de bijdrage van de programma's aan het wetenschappelijke en toegepaste debat over de toekomst van hun sector, en met name in de realisatie van vitale netwerken van actoren. De impact van beide casussen is dan ook vooral niet-tastbare

impact, welke wel een basis kan zijn voor toekomstige maatschappelijke veranderprocessen in de mobiliteit- en watersector. Al met al was de investering vanuit het financieringsarrangement dan ook een zinvolle.

6c. Een evaluatiemethode voor kennis- en innovatieprogramma's

Op basis van de toepassing op de twee casussen is gereflecteerd op de ASPE-methode en de gebruikte variabelen en indicatoren. Een belangrijke conclusie voortkomende uit deze reflectie was dat de vier ontvankelijkheidfasen weliswaar veel zeggen over de impact van kennis- en innovatieprogramma's, maar dat een belangrijk onderdeel ontbrak voor tripartiete programma's waarin het opbouwen van een netwerk zo belangrijk was. Deze vijfde fase is 'alignment' genoemd, en is geplaatst in het midden van de vier variabelen. De variabele alignment kijkt naar de wijze waarop partijen zijn samengebracht in het programma en hoe vaak en hoe betrokken zij contact hadden met elkaar. Dit komt overeen met de netwerkanalyse die voor beide casussen is uitgevoerd. Een andere belangrijke les ten aanzien van de ASPE-methode was dat er zeer veel indicatoren aan de variabelen waren gekoppeld, en dat een indikking hiervan tot dezelfde evaluatie-uitkomsten zou leiden zonder afbreuk te doen aan omvattendheid van de indicatoren.

Op basis van deze reflectie biedt het proefschrift een handreiking voor evaluatoren van kennis- en innovatieprogramma's, met daarin in vijf iteratieve fasen het evaluatieproces verbeeld. De evaluator begint met het oriënteren op het programma en diens omgeving, gaat vervolgens intensief communiceren met zenders en ontvangers om alle facetten van het programma in kaart te brengen, gaat daarna het evaluatieraamwerk voor die specifieke evaluatie opstellen in samenspraak met het programma, om deze daarna in de vierde fase toe te passen op de zenders en ontvangers, en als laatste, in de vijfde fase, te reflecteren op de toepassing en waar mogelijk de evaluatie aan te scherpen om optimale resultaten te behalen. Dit alles gebeurt in voortdurende interactie tussen evaluator en geëvalueerde, om zo te komen tot een lerende toegepaste systemische programma-evaluatie.

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When I started working my PhD I heard stories of sorrow, long working days and exhaustion of fellow PhD's. Optimistically I began my research. I jumped into my projects, without much awareness of what they would eventually mean for my thesis. I met many people and learnt more and more about the previously so mysterious world of sustainable mobility and innovative water governance. At some point during those first years the ideas for my thesis started to be shaped. Gradually, ideas started to crystallise and texts started to form.

Somewhere during the course of 2010 a thesis formed. Evolved, I might almost say. For this I owe many thanks to my supervisors. All three of them were of fundamental importance in creating and writing this thesis. Their insights and advices helped me to write chapters, learn about the importance of connecting ideas with each other, and experiment with combining theory and empirics. The reflection and knowledge they provided during our meetings helped me to see my thesis work as part of a larger picture of several strands of theory and empirical developments, instead of as an isolated text. Furthermore, they always gave me lots of freedom to find my own way, without steering me too strongly in one direction. I really appreciated that.

I also want to make some personal remarks about each supervisor. Geert, I believe you knew years before I knew it what my thesis would be about. Your ability to see the grand design of my story and the patterns and insights I was working on, but not yet seeing, amazes me. Jan Jaap, you have been a great support with your kind advices. You have definitely helped to improve my thesis through your input from other disciplines. Lasse, the day I asked you whether you would coach me in a complexity theory tutorial was a very good day, because it led to your involvement as copromotor. Our meetings and your great ideas and involvement have helped greatly in finalising the thesis.

Besides my supervisors there are many other, current and former, colleagues I would like to thank. I want to thank the people at DRIFT for giving me the opportunity to work with them in several interesting projects. Henk, Mattijs, Nele – it was much fun working with you on our shared quest to discover the realms of transition monitoring! Flor, I enjoyed our exploration of the A15-project. Let's find new projects to cooperate in! Also at my own Public Administration department I had the pleasure of having great colleagues. The research group Governance of Complex Systems has formed a source of inspiration in exploring the boundaries of my own research. I want to thank Harry for inviting me into the A15-project and providing me with better understanding of project reality in knowledge and innovation programmes through that. Arwin, your help during the last year has been great, thank you for that. I hope we will cooperate in many more (evaluation) projects. Jurian, I look forward to our future endeavours together!

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and your always consolidating words helped me to keep good faith throughout the years. Let's have many more pizza dinners in the future! Kevin, it is nice to share a room as well with someone in the first years of his PhD research. I wish you all the best with your thesis research. Another important social part of my PhD years was the EPAR-board. Guys, it was great to be part of our revolutionary, potentially world-dominating, power take-over!

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To my dear friend Elin I owe an apology. Years ago, more than a decade I assume, we were sitting on the floor, leaning against the heater in the C-wing of our secondary school, and found ourselves talking about water governance. I promised you that if I would ever write a book about something as dull as water, I would call that book 'Nanny in the Puddle'. As you can now see I have failed. Although the current title might be more accurate, drinks are on me next time we meet.

Finally, I want to thank both my families. Some people I want to mention in particular here. Robert, Angeli, Thijs and Idske, I want to thank you for all your inquiries about my thesis. I am very happy that I am now part of the Resink family! Furthermore, I want to thank my sister Sarah and her partner Theodoor for their sweet comments on my vented thesis frustrations and concerns on 'our forum'. Forum FTW *O*. My parents, Hans and Mieke, I would like to thank a gazillion times for stimulating me to get here and always being there for me. Hans, I am very pleased that we somehow ended up as colleagues! Last, I want to thank my husband Sjoerd. Your frequent requests to clarify what my thesis was about and what that meant were even more useful than you perhaps know. It helped me to clear my thoughts and focus on the main storyline. I am grateful that we have met at such young age, more than ten years ago now, because it allows us to truly spend our lives together. I am looking forward to it.