Managing knowledge in policy networks

Organising joint fact-finding in the Scheldt Estuary

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Summary

In this paper we analyse the role of knowledge management in the policy process about the Development Plan 2010 for the Scheldt Estuary (a Dutch-Flemish river basin). The conflicts of interests around this package of measures are sharp. Therefore, knowledge is often strategically used in order to defend stakeholders' own preferences. The project organisation (ProSes) that prepares the Development Plan organised a joint fact-finding process in order to reach 'shared knowledge'. In this paper we evaluate this process. Especially the relations between the joint fact-finding process and the traditional democratic decision-making process and the separate organisations, which form part of the policy network, seem to be problematic. We formulate some conclusions about the possibilities and limitations of knowledge management within complex policy processes.

Content

1. Introduction

In complex policy networks stakeholders often use knowledge as ammunition to convince one another of their own point of view. The ultimate policy option, a compromise of political and societal interests, has often a weak knowledge base. Decisions are based on assumptions and (political) intentions. Therefore, knowledge management of these policy processes in a network setting deserves our attention. In this paper we explore the role of knowledge and knowledge management in the functioning of policy networks. The structure of this paper is somewhat unconventional. We start with an empirical description of a complex policy process around the management of the Scheldt Estuary (in the Netherlands) in which knowledge plays an important but little fruitful role. Then we explore the theoretical background of knowledge battles within policy processes (section 3). Next we give an illustration of an attempt to reach 'shared knowledge' about the further deepening of the fairway to Antwerp (section 4). In addition we explore the role of knowledge management within policy processes. To make things more complex we then look at the difficult transfer of the results of joint fact-finding to the traditional political and administrative decision processes. Finally we explore the possibilities of democratic and political anchorage of shared knowledge. We conclude with some remarks on the possibilities and limitations of knowledge management in policy networks.

2. Deepening a fairway, a balancing act

Managing a river basin isn't simple. This statement could be seen as a euphemism when we look at the dynamics and complexity of the Scheldt Estuary and the rather complicated way in which the Dutch and Flemish government arrange their policy decisions. For the most important part the Western Scheldt is Dutch, but the most important function of the Scheldt is being the fairway to the Flemish Port of Antwerp.

Negotiations about deepening the fairway

The Scheldt has many conflicting functions. The economic interests of the Port of Antwerp and of the Flemish region are big. The port activities of Antwerpen determine one quarter of the Flemish economy. It's not strange, therefore, that the

Port of Antwerp regularly asks for further deepening of the fairway in which a few big thresholds hinder the access of big container ships.

But the Scheldt Estuary is also one of the most important ecological areas of Western Europe. Deepening of the fairway is an artificial operation through which the estuary can be damaged. The estuary consists of a multiple trench system. The ecological value of the system results to a large degree from this unique morphological system. Inter tidal areas with unique habitats can only exist when there is a more or less stabile multiple trench system. An unnatural deepening of one of the trenches can mean the unchangeable degradation of the estuary.

The Dutch government and environmental organisations were always careful to agree on the Flemish requests for further deepening. In the Netherlands it was in general believed that the dredging activities has seriously damaged the system and that further operations have to be avoided as much as possible. An important research report, written by a team of experts of the public research institute RIKZ (Governmental Institute of Coastal and Sea Research) and the direct responsible policy actor, Rijkswaterstaat (part of the Dutch Ministry of Transport), delivers a serious account of a deteriorating estuary (Vroon et.al. 1993). The Flemish parties looks with suspicion towards the closed 'policy-research community' in the Netherlands. They suspect that the Dutch anxiety to allow operations in the estuary was primarily motivated by the desire to protect the Port of Rotterdam for unwanted competition. Negotiation processes between Dutch and Flemish policy actors were always long, complicated and heavily politicised (Meijerink, 1998).

In the early eighties the Port of Antwerp request a further deepening of the fairway. Only in 1997, the necessary dredging works started. This difficult policy trajectory doesn't help the bilateral relations. In 1999 the two governments decide to intensify their co-operation in order to develop better relations. After a new request of the Port of Antwerp for a further deepening, both governments start an intensive deliberation process in order to reach a joint vision on the future of the estuary.

Managing information processes

In addition to the negotiations on the policy agreements, a substantial research process was organised, with a big emphasis on morphological research. Delft Hydraulics did this research, in close co-operation with RIKZ and Rijkswaterstaat. Delft Hydraulics

used a very formal, mathematical, model-based approach in order to predict future morphological developments.

The most important protagonist of a further deepening, the Port of Antwerp, mobilised its own expertise. The Port of Antwerp Expert Team (PAET) was installed and they started a research project to explore the possibilities of morphological management: a way of dredging that stimulates positive ecological developments in the estuary. The Dutch parties followed this initiative with suspicion. In fact, a 'knowledge battle' about the relation between human operations and undesirable ecological developments occurred. The Flemish actors took the stand that the Dutch negative developments within the estuary linked too easily to human operations instead of natural developments.

The Flemish experts concentrated much of their criticism about the (mainly by Dutch institutes executed) morphological research on the use of 'Cell concept'. Delft Hydraulics had developed this concept in order to model the estuary into seven comparable units. PAET sees this concept as an inadmissible simplification of reality, which could easily give rise to false and negative predictions. Flemish researchers and policy-makers do have much less confidence in mathematical models in comparison with their Dutch colleagues. They believed much more in an empirical approach, in which trail-and-error can take place. In line with this view they presented a report in which they outlined a much more historical and empirical view on the estuary and advocated a more pragmatic way of managing it.

In 2001, both governments and the involved actors agreed upon five policy goals that constitute the Long Term Vision (LTV) on the Scheldt Estuary:

- More and better bilateral co-operation;
- The safeguarding of the accessibility of the Port of Antwerp (concrete: further research and policy negotiations are necessary in order to explore the possibilities of a further deepening of the fairway);
- The safeguarding of the physical characteristics and the ecological values of the estuary;
- The improvement of the external safety of the Western Scheldt.

The Flemish Parliament agreed upon this Vision but asked for further research about the ideas of PAET in addition to the mathematical approach that has dominated the LTV trajectory. Many controversies, not only about necessary policy measures, but also about the facts and their interpretation were devised to ProSes ('Project

Organisation Development Plan Scheldt Estuary' a bilateral project organisation which had to implement the short term ambitions of the Long Term Vision. Within two years (2002-2004) ProSes has to deliver a concrete, integral package of measures (a so-called Development Plan) with which the policy goals of the Long Term Vision could be brought nearer. Support from all relevant stakeholders forms an important objective for ProSes.

3. Problems of knowledge: frames and interpretation conflicts

As became clear in the previous case study, managing knowledge for policy processes is far from unproblematic. Confronting different sources of knowledge, creating a joint base for knowledge and knowledge as basis for action are all difficult things to achieve. The reasons behind this is that problems that are tackled are often wicked problems while at the same time involved actors, necessary to solve these wicked problems, have different frames and thus different views on the problem and interpretations of information. If these aspects are not taken into account the search for more knowledge often leads to more conflict and actors looking for their own information instead of shared knowledge and subsequent actions which often is envisaged in more classical theories of decision making.

Wicked problems and cognitive uncertainty

The case that was presented in the introduction is a typical case of a wicked problem. Although there are many definitions of wicked problems (Radford, 1977; Mason/Mitroff, 1981), essentially wicked problems are characterised by (Koppenjan/Klijn, 2004):

- the involvement of many actors; because wicked problems need the mobilisation of many resources often various actors are involved mostly not restricted to public actors alone but also the involvement of private and semi-private actors are needed;
- disagreement about the nature of the problem and the desired solutions; in wicked problems often a clash of values is at stake. This and the fact that various actors are involved cause disagreement about what really the nature of the problem is or what the desirable solutions are. This problem cannot simply be solved by collecting more information as we will see later on;

- complexity of decision making; wicked problems are characterised by complex decision making not only because many actors are involved but also because mostly different networks and institutional structures are involved. Wicked problems require decisions from various arenas and governmental levels, often ask for integral solutions and policy measures which involve different (sector) networks and sometimes require the building of new organisational arrangements. This makes the decision making of wicked problems complex and standard operation procedures and organisational arrangements less suitable to tackle them (Marin/Mayntz, 1991).

The characteristics of wicked problems mean that actors are struggling about two things at the same time when it comes to improving knowledge and problem solving capacity. On the one hand actors have their own perceptions of the problem and especially about the values that are at stake. The Port of Antwerp provides a clear example. Their view upon the estuary is fundamentally different from the perception of the administrator of the estuary, Rijkswaterstaat. In the perception of the Port of Antwerp, the most important function of the estuary is to be the fairway to Antwerp. Accessibility is the most important policy ambition. For Rijkwaterstaat the ecological and morphological health of the system are crucial conditions for the management of the system. Human activities are only allowed when they are compatible with the long-term sustainability of the system.

This is certainly a struggle in which information is only one of the many things that are relevant. On the other hand actors are collecting information but this process is directed also by their perceptions and value judgements. So besides the simple fact that information may not be available or may be to difficult to collect (or to late to be relevant!) we also see that the information collecting process itself is directed by different frames (and thus different axioms) of the various actors. This frequently leads to a situation where each of the actors is collecting its own information based on different assumptions using different parameters. The result is a myriad of reports and streams of information at best but often a ‘war of reports’ in which actors continue their normative policy debate with partisan collected information (In ‘t Veld, 2000; Bueren/Klijn/Koppenjan, 2003; Van Buuren & Edelenbos, 2004). From a democratic point of view this collection of information and struggle through the collection of information does not have to be viewed as negative per se (Koppenjan/Klijn, 2004).

Monopoly of knowledge is prevented and existing taken for granted information is challenged by other information which can enhance the discussion and the democratic decision making process. We will return to this issue further on. The discussion however mostly is not about dialogue and 'truth finding' but more about winning. Information is used to back existing positions and interests rather than engage in information exchange. The result of this process is in these situations often more confusion and uncertainty instead of a robust knowledge base for policy decisions.

Actors, frames and knowledge

Frames of actor cause different interpretations of information and different search strategies for information. By frames we mean more or less stable sets of perceptions actors have of the world (Fischer/Forester, 1993; Schön/Rein, 1994; Rein/Schön, 1992; Sabatier, 1988; 1993; Van Eeten, 1999). These perceptions, that are images and interpretations, may concern aspects as the nature of problems, the desirable solutions but also judgements about other actors. They guide actors' strategies and their interpretations of actions of other actors and available information.

Frames are actor bound and are created through socialisation and experience but frames are also influenced by the institutional characteristics of networks where actors find themselves in. So one can often see that typical rules in networks about products, identities or reward rules (what is good or not) are being reflected in actors' frames and by such in the choices they make. Differences in frames between actors are often responsible for cognitive blockages in decision-making processes. Because frames cause certain selection criteria of information and colour the search for information, differences of frames cause different interpretations of available knowledge and thus can be the source of knowledge conflicts and report battles.

An example from the Scheldt Estuary is the question which factors explain the current state of the system. The environmental organisations and the administrations are inclined to accuse human activities in the estuary. The Port of Antwerp emphasise the importance of long-term developments in which each estuary lend to a less complex and dynamic form.

Adding more information in the process to clarify the confusion will not help because actors will judge this new and extra information from their own frames and this new information will simply be extra material in the knowledge conflict. So we have a clear problematic situation here. The wicked character of the problem requires actors

to share knowledge and resources but if actors have different (maybe conflicting) frames agreement on what the available knowledge is and how to interpret that knowledge will be difficult to achieve.

There is a difference between uncertainty and ambiguity of knowledge with respect to information gathering (Noordegraaf, 2000). Uncertainty of knowledge is caused by a lack of information. Reduction of uncertainty can be reached by searching more relevant information. Ambiguity of knowledge is caused by abundance of interpretations of available information. The solution is often found in integration of different interpretations and frame reflection.

The need for shared knowledge, frame reflection and learning

As has been said information sources are often spread among various actors. Finding satisfactory solutions for wicked problems described in the case needs bringing together information and resources. This is especially the case in the situation of wicked problems because there are often no standard routines and proven solutions on which actors can base their (joint) actions. In stead of a conflict situation where information is used as mean in the value struggle that is going on one would need a situation of a more or less shared body of knowledge on which actors can base their discussion about possible solutions.

Finding such a sharing of information and creating a situation of shared knowledge is far from easy. It usually needs frame reflection in which actors reconsider their frames (Rein/Schön, 1992; Schön/Rein, 1994). Therefore learning processes are needed in which actors review their strategies and interpretations and incorporate new additional information in their frames. A very important aspect of this frame reflection process is the organisation of the research that is done to explore the problem at hand. If research has to contribute to problem solving in a situation of multi-actor dependence, a certain minimum of shared starting points and agreements has to be made among involved actors how research is going to be organised, what the main starting assumptions are and what the research has to achieve. Only in this situation research can contribute to frame reflection and learning and to new solutions for wicked problems that have to be tackled.

We will look at the case again for an example of this building of a situation of shared knowledge that can form the basis for further action and problem solving.

4. Towards shared knowledge: ProSes as process architect

The long history of conflict and frustrated policy processes was an important reason for the new initiated project organisation ProSes to think about a deliberate process strategy in which consensus and co-operation could be established. Therefore, balanced process architecture for the research was developed. We name this process of knowledge search 'joint fact-finding'. In this process separate coalitions of scientists and policy-makers and other stakeholders with differing viewpoints and interests worked together in order to develop data and information, analyse facts and forecasts, develop common assumptions and informed opinions, and, finally, use the information they have developed to reach decisions together (McCreary et.al. 2000; Van Buuren & Edelenbos, 2004). In the case of the Scheldt Estuary co-operation with the most important public, private and societal actors, the formulation of the problem was determined. On the base of this document the necessary research projects were putted out to tender. When the research projects (on morphology, ecology, as well as on economic aspects) got started, they were accompanied by careful selected groups of experts. In these groups Dutch and Flemish public, private and societal actors participated.

Working towards a joint frame

In order to illustrate the way in which ProSes tried to reach consensus about 'the facts' we analyse the functioning of the Study Group Morphology, a selected group of experts that has to safeguard the quality and the acceptability of the research. They discussed the concrete design of the studies. They commented on draft reports. The Study Group accommodated some important discussions. A number of actors criticised the research about the morphological impact of the intended deepening. Some of them were Flemish (which continue the LTV discussion), other Dutch (which stress the quality of the research). In table 1 we summarise the most important criticism.

Actor	Point of view	Background / frame
PAET	Against one-sided model approach in research. Pleas for a more historical, qualitative and triangulate approach	*Epistemological*: more practical, empirical, physical. Much attention for historical development and international comparison (natural processes in estuary over a long period of time) *Pragmatic*: alternative views upon dredging activities can lead towards policy decisions in favour of the Port of Antwerp
RIKZ / RWS / Bureau Tidal Waters	Against rashly research (with very strict time constraints) and using non-validated and non-calibrated models	*Epistemological*: empirical focus upon estuary. Much knowledge about recent changes in morphological characteristics. Less affinity with mathematical modelling. *Pragmatic*: cautious about possible impacts of further deepening of the fairway.

Table 1. The main critics on the morphological research

An important contribution to the discussion came from PAET. The experts from the Port of Antwerp developed their own vision upon the morphology of the Scheldt Estuary and wrote a report about the possibilities of 'morphological management' of the system. They believed that it was possible to influence unwanted developments within the system by smartly dredging and dumping. They proposed a proof dumping to build a sandbar with dredged material; in fact a totally new strategy was formed for gaining insight into the dynamics of the estuary. After a long period of hesitation and deliberation about the possible negative consequences, Rijkswaterstaat gave permission to start the proof.

The Dutch experts questioned the use of models, which were insufficiently calibrated and validated, due to time and money constraints. In their opinion the quality of the research was sacrificed to the desire of the Flemish actors for a quick start of the deepening.

After many discussions, Delft Hydraulics had to tone down the status of their research results. The project leader was urged to take into account the opinions of the Study Group and to formulated the conclusions in such a way that all members of the Study Group agreed upon them. In the end, the morphological reports showed some remarkable characteristics:

1. there was much attention to the shortcomings of mathematical models;
2. exact data were scarcely presented. Much more general trends were given;
3. in the conclusions much attention was given to the 'expert judgement' of the members of the Study Group;

4. the conclusion was very moderate. The critical reader could read the conclusion as: a further deepening has presumably no negative consequences for the estuary, but in fact we don't know.

In the end we see more agreement among the participating actors about:

- the relative value of using mathematical modeling;
- the necessity of good empirical research (collecting data over long periods);
- the moderate impact of human operations in the estuary in relation to long-term natural developments;
- the potentials of an alternative approach (the ideas of PAET).

We see that the road to a joint frame is a difficult journey in which all kinds of obstacles has to be taken. In the case of the Scheldt Estuary we don't see this joint framework yet; actors find each other in a specific expression of the research results but the underlying frame controversies are not disappeared. However, the first contours of a shared knowledge base appear but the actors are not very willing to adjust their frames easily in the learning process of the joint fact-finding process, mainly because of the deep-rooted differences.

Strengths of the process: more emphasis on variety

When stakeholders participate in research processes, their commitment to the results is often larger then in a situation in which the research is a black box (Van Eeten & Ten Heuvelhof, 1999). After all, all experts support the main conclusions because they knew the way in which these conclusions were reached; the research process which leads to these specific results. Although some actors didn't agree with the way in which these results were reached (through mathematical models) they could support the results because they knew the merits of the research that correspond with their expert opinion.

The main conclusions of the morphological research mirror the differences of opinion of the members of the Study Group. The certainties of the model calculations were softened. The potentials of the alternative approach of PAET were mentioned. This emphasis on variety was certainly an important factor to bring parties closer together. The attempt to generate more variety in the research was also enhanced by including other judgements from experts. This was an attempt not only to validate research, but also to provide opinions from outside and thus to create more openness in the

information seeking process. One of them was the obliged judgement of the Commission on the Environmental Impact Assessment. This Commission has reacted upon the 'Announcement', the document in which the research plans were described. Their judgement was critical, but in essence positive. This was an important argument for ProSes to convince stakeholders about the correctness of the research approach. The definitive judgement of the Commission (on the Environmental Impact Assessment) will be known in the autumn of 2004.

As a reaction on the controversies between the different experts, ProSes called for a second opinion of the morphological research. An independent group of international recognised experts have adjudged the reports in order to win confidence in their validity by the different stakeholders. The judgement of this team of experts was critical but also positive. The letter in which they formulated their conclusions was distributed among the stakeholders. The conclusions of the Study Group Morphology were also disseminated towards the stakeholders.

Organising research and organisational connections

If we look at the information process that ProSes set up to reach more consensus about the available research and information we can see some interesting features who provide some telling things about organising research activities and organisational connections.

An important failure of ProSes was their a priori choice for Delft Hydraulics as contracting partner for the morphological research. This choice was not communicated with the stakeholders. Much criticism was directed towards the one-sided mathematical approach of Delft Hydraulics. It is not improbable that a more deliberate choice for a research consortium (composed of both Flemish and Dutch institutes) could have prevented this discomfort.

In the very beginning of the research process, ProSes formulated the research questions that formed the basis for the activities of the research institutes. The Working Groups began to function after the start of the research process. They were not involved in the formulation of the research questions. Much criticism was devoted to this way of doing. Many wishes of the Working Group couldn't be satisfied because of the formulated research questions.

Both the research process and the policy process had their own dynamics. The policy process started with formulating the problem definition as a starting point for the

research process and the policy negotiations. At the same time most research projects were started up and the research questions were formulated on the base of the problem definition. The advantage of this way of organising both processes lied in the possibility of making connections: new research questions that were raised during the deliberations could be picked up by the researchers and new insights from the research projects could be brought in the policy discussions. However, in the end this way of operating didn't result in the advantages people expected. Most research results became known at the end of the research process. Global results were announced in the meantime, but they lacked the necessary specificity. When the final reports were finished, four concept versions of the definitive policy plan were already discussed and some important decisions were taken (subject to eventual 'disappointing' research results). On the other hand, supplementary research questions (from for example the agricultural stakeholders) couldn't be taken into account, because of the limited available time and money. This underlines the need for good time keeping and careful connection of the research process to the general decision-making process.

Not only the temporal linking of the research and policy processes is important. The couplings regarding the content are also very important. Joint fact-finding can only be successful when decision makers use the information on which the stakeholders in the research arena agree.

Many controversies were passed on to two other arenas: the Long Term Research and Monitoring Program (an initiative raised by the Long Term Vision) and the successor of ProSes, the organisation that has to implement the package of measures. Although most of the involved actors were satisfied with this strategy it in fact it means 'postponing possible conflicts to the future'. Certainly if no process arrangements are made to solve these conflicts this can cause blockages further on in the decision making process

In order to reach consensus about the research results, Delft Hydraulics had to emphasise the uncertainties of their data. On several spots in the final report the limitations of the models were explained and the uncertainties of the results indicated. But the adverse effect of this strategy was that some critical policy actors (especially the Province of Zeeland) don't want to base policy decisions upon such soft data. This again raises the important question of the connection of the research process to the general decision making process.

Conclusion: organising the research process

In the above section we have described the organization of joint fact-finding around the Scheldt Estuary. In the next paragraph we will elaborate upon the theory of joint fact-finding in complex policy process. On the basis of our case study we present some general insights into the way shared knowledge in policy processes can be reached.

5. Knowledge management for policy processes

Reaching a sufficient level of policy-relevant information and consensus about these facts is a difficult job. Within our case, we can see several attempts for knowledge management within policy processes in complex network settings. In this paragraph we elaborate somewhat further upon these points.

We already have stressed that actors have different frames and therefore different value systems, preferences, problem definitions and opinions about information. Reaching shared knowledge and processes of mutual learning through joint actions (Schön/Rein, 1994). This can be stimulated by several knowledge management strategies. If we look at the large amount of literature on knowledge management we can see four very important themes that especially concern knowledge generating and mutual learning in complex decision processes (Lindblom/Cohen, 1979; Jasanoff, 1990; Schön/Rein, 1994; De Bruijn et al, 1998; Ehrmann & Stinson, 1999; In't Veld & Verhey, 2000; Edelenbos et al, 2003):

1) safeguarding the quality of the research (Funtowicz et.al. 2000; Van de Riet, 2003)
    i) perceived independence, credibility and authoritativeness
    ii) between negotiated nonsense and superfluous knowledge
2) creating robust social contexts with intensive interactions between experts and stakeholders (Patton, 1987; Caswill & Shove, 2002)
3) boundary work: safeguarding the boundaries between science and policy (Jasanoff, 1990; Van Eeten & Ten Heuvelhof, 1998; Gieryn, 2002)
4) timely and accurate connections between research process and policy negotiations (De Bruijn & Ten Heuvelhof, 1999; Wiltshire, 2001).

Safeguarding the quality of the research

Frame reflection is stimulated when the research results are perceived as independent and authoritative. Joint fact-finding is a method for organising research processes, in which the different opinions about the policy problem are taken into account (Busenberg, 1999; McCreary et. al. 2001; Leach et. al. 2002; Nowotny, 2003). Research information can only be perceived as independent and authoritative when the different actors with diverging frames recognize their point of view in the research reports.

The involvement of actors in a research process means (Ehrmann & Stinson, 1999; Edelenbos et al, 2003; Van Buuren & Edelenbos, 2004):

- the joint development of the research questions in order to take into account the problem definitions of the stakeholders;
- the collaborative choice of research methods and techniques in order to reckon with different epistemological value systems;
- consensus about the used theory or causal model in order to take the different opinions about the policy problem, its causes and consequences, serious;
- the joint interpretation of the results and the collaborative formulation of the conclusions in order to reach a shared understanding of the facts which will be used in the policy negotiations.

When we reflect upon our case, we see that ProSes have invested most energy in the last phase: the joint interpretation of the results. The choice for Delft Hydraulics was made before the Working Group was started. The choice for this institute roughly implies also the choice for a mathematical and less historical-empirical approach of the morphologic research. The underlying theory (with the Cell Concept etc.) was also determined by the choice for Delft Hydraulics. Only when the report was written, stakeholders were given a voice in softening the conclusions.

One of the most important problems of joint fact-finding processes can be formulated as balancing between negotiated nonsense and superfluous knowledge (Van de Riet, 2003; Van Eeten, 1999; Van Eeten & Ten Heuvelhof, 1998). Negotiated nonsense means that knowledge has support of the stakeholders but at the same time lack sound scientific ground. Superfluous knowledge means knowledge that is scientifically correct, but don’t take into account the problem definitions and values of (some) stakeholders.

In the case of ProSes we see both problems. An example of negotiated nonsense can be found in the input of the experts of PAET. They propose an alternative dredging strategy. The evidence for the fruitfulness of this strategy is limited. But the possibilities of this idea, the eventual simultaneous improvements of the safety, the accessibility and the ecology of the estuary, were too beautiful that actors don't want to emphasise the relative small scientific base of it.

Superfluous knowledge also exists in the ProSes case. We see that Delft Hydraulics holds on the Cell Concept while different actors don't believe in the validity of it. The research report reflects this controversy: the concept is used, but its added value is toned down.

Creating robust social contexts

Involving stakeholders in the research process is a necessary but not a sufficient condition for reaching frame reflection. A robust social context in which these stakeholders interact with each other is necessary in order to stimulate mutual learning. Within a rich social context, in which a sufficient level of trust and openness consists, reaching shared knowledge is much easier than in a context in which distrust and closeness is dominant.

If we define trust as a more or less stable perception of actors about other actors, that is that they refrain from opportunistic behaviour, this has several advantages for knowledge generation processes (see large literature on trust, Zand, 1972; Ring/Van de Ven, 1992; Parker/Vaidya, 2001; Nooteboom, 2002; Edelenbos/Klijn, 2003):

- the more actors trust each other the more they will be prepared to share information because they expect others to be prudent and careful with that information;
- the more actors trust each other the more they will invest in co-operation because they can handle conflicts with more ease;
- the more actors trust each other the more they will be incline to cooperate to create innovation and new products and policy outcomes because trust reduces the uncertainty connected to strategic actions of other actors.

So in general trust is expected to create more stable processes with more flow of information between the actors and more risk-taking in term of innovations and new solutions to be pursued. But trust is not always easy to establish. Building trust

requires intensive and enduring interactions and therefore time. A sense of mutual dependency is necessary to stimulate actors to co-operate.

In ProSes, we see how distrust a long time dominated the Working Group Morphology. Deep-rooted negative perceptions of each other prevent the Working Group to become a 'rich social context'. Too little was invested in close interactions between the main antagonists. Younger people did not replace people with a long history. The Working Group is at least partly dominated and influenced by the clashes and cleavages that occurred in the long history of research around the Scheldt Estuary. The preliminary choice for Delft Hydraulics was one of the most important mistakes of ProSes.

Boundary work: safeguarding the boundaries of science and policy

Involving stakeholders in the policy process doesn't mean that the research process can be used to realise policy ambitions. There have to be some degree of scientific 'neutrality' but the research results don't deliver the objective truth. A process of negotiation and valuing is necessary to reach policy decisions. Research results are 'only' information within a policy debate.

Scientists often have 'technocratic' ambitions (Fischer, 1990). They want to structure the policy debate with a scientific, rational logic. Scientists have often a very cynical view of the policy world. In the case of ProSes we see how experts try to structure the policy debate when they propose to use a multi-criteria analysis for weighing policy options against each other. The project organisation ProSes doesn't agree with this proposal. The policy deliberations have to be divided from the scientific process: value conflicts cannot be scientifically resolved.

Sometimes, the boundary between science and politics becomes too thick. The Working Group Morphology stresses the uncertainties surrounding the morphological research. From a scientific view, this was a correct strategy. But from a political point of view, it makes much of the research useless for taking policy decisions.

Boundary work between science and policy is needed (Jasanoff, 1990). This means that the connection between the research process and the political process has to be thought-out carefully. Too tight connection between science and policy might result in partisan science. At the other hand too loose connection might lead to research outcomes with no impact in decision-making. Joint fact-finding has to balance on the edge of this dilemma.

Timely connections between research process and policy negotiations

Too often, temporal misfits hinder the use of research results in the policy process. Ideally, researchers deliver their insights when policy-makers deliberate on that specific issue. There are, however, many problems with organising these two processes parallel to each other. The research process often asks much time in order to generate some degree of clarity and of certainty. Policy-makers have tight deadlines and want to have the research results in time.

After all, notwithstanding the imperfections of the joint fact-finding process, to a certain degree ProSes succeed in reaching consensus between the main stakeholders. But, there remains one important problem. That concerns the relation between the interactive negotiation process around the estuary and the formal (political, democratic) decision arenas in The Hague and Brussels. On this (often neglected) success factor of joint fact-finding, we will elaborate in the next two paragraphs.

6. ProSes and the danger of insufficient engagement

Joint fact-finding can be seen as a temporary and less formalized network of stakeholders in search for meaningful information. ProSes is a project organisation that tries to organize and facilitate that joint fact-finding process. The policy and research process that they have organised, serves one important goal: the realisation of an integral and balanced Development Plan that can be approved by the government and the representatives of both countries. Therefore, support from the stakeholders and the organisations involved in the management of the estuary, is necessary. During the process much is invested in gaining this support.

ProSes can realise, within the context of a short-term, intensive policy process, a balanced package of policy measures with enough support of the involved actors and supported by convincing arguments, shared by the main stakeholders. However, a couple of difficulties remain.

The first is the gearing to one another of the representatives of organisations as the environmental organisations, the province of Zeeland and the Port of Antwerp and their grassroots. Within the relative ‘private’ setting of ProSes, actors reach a degree of consensus. But it is not said that their home organisations are satisfied by the results of the policy process. For example, one representative of the environmental

organisation has participated in the Working Group Morphology and has agreed on the main conclusions of the morphological research. However, the environmental organisations are very dissatisfied with the proposed environmental policy proposals. That forms a reason to attack the morphological research for the great uncertainties that surrounds the conclusions and thus the policy proposal for deepening the fairway. There is also a substantial difficulty with the relation between ProSes and the interactive dialogue process that this organisation has organised on the one hand and the ministers, the governments and the Parliaments of both countries who have to approve the Development Plan. Some of the departments (the Dutch ministries of Agriculture and of Transport) are not pleased with the proposed environmental measures, mainly because of financial reasons. They look at the research results and conclude that the effects of a deepening don't have significant effects upon the ecological condition of the estuary. Therefore: in their opinion additional environmental investments are not necessary. This conclusion is (scientifically) correct. The actors involved in the ProSes negotiations, on the contrary, agree on the necessity to restore some habitats because of the relative deplorable condition of the estuary. Their consensus about a further deepening of the fairway depends partially on the support for extra investments in nature and environment.

Thus, the agreement that actors reach about scientific results and policy ambitions within the context of a temporary negotiation process, has to be passed on to the formal political and democratic procedures in order to sustain the consensus between the stakeholders. Until now, nothing is known about the support of both parliaments for the Development Plan. It is not unthinkable that the Dutch Parliament will have some objections. Somewhat exaggerated: an agreement produced in a careful process of nearly two years can be outvoted within half an hour.

7. The democratic and organisational anchorage of joint fact-finding

Out of the less formalized, bottom-up processes new 'governance networks' emerge, which are based on interdependencies between public, private and civil society actors. These networks often exist quite a long time. As a result they develop their own rules of conduct, routines and procedures (Koppenjan/Klijn, 2004). New institutions develop, which can be characterized as 'proto-institutions' (Lawrence et al, 2002). Although many definitions and descriptions of institutions stress their long-term and

stable character, we expressly want to add this with the possibility of short-term institutions in order to stress the dynamic character of institutions and possible clashes between different institutional regimes. In this way *de*-institutionalization - instead of institutionalization - comes in play. In our view, for instance a temporary joint fact-finding process can already often imposes a temporary institutional structure on top of or next to existing organizational and political institutions, which have implications for existing institutions.

Disconnected and loosely coupled

Temporary networks that arise from joint fact-finding initiatives are often remote from traditional approaches to representative control and accountability. The new institutions arising from bottom-up processes offer potentials – i.e. efficiency of the process, legitimacy of the process – but at the same time bring problems along as they are often disconnected or very loosely coupled to formal democratic and/or organizational structures.

Several studies (Edelenbos and Klijn, 2004; Edelenbos, 2005; Klijn & Koppenjan, 2000; Sorenson & Torfing, 2003; Skelcher, forthcoming) make clear that there are problems with linking networks with (classical) representative forms of governance.

A first observation is that there is often a 'missing institutional link' between networks and formal decision-making (Edelenbos, forthcoming). Joint fact-finding processes are often organized as an informal process with different rules and roles than the existing institutional representative system, which runs parallel or prior to the formal institutions of negotiation and decision-making. As such, informal, interactive, bottom-up processes can be seen as an extra phase or stage before the real decision-making process begins. The formal processes often do not adapt themselves to the informal games of joint fact-finding, and vice versa.

This poor institutional embeddedness of joint fact-finding networks often leads to 'cherry-picking' behavior on the part of decision-makers, because they do not feel committed to the variety created by the informal joint fact-finding process. As a result, the rich variation 'evaporates' as soon as the joint fact-finding process has ended and formal policy-making has begun. Joint fact-finding is well equipped to generate a wide range of ideas, plans and suggestions, but is often ill equipped to

retent this variety out of interactive processes and use it for subsequent – often formal – (policy) processes.

A second observation is that during the first stages of the joint fact-finding process existing institutions leave more room for new institutions than during the final stage (decision-making). At the end of the process, when decisions have to be prepared and finally made, the existing institutions are rehabilitated and the temporary institutions of the joint fact-finding process neglected. In the earlier stages those in the joint fact-finding network were allowed to play, with a limited and reticent involvement of the parties prominent in the representative system. In contrast, after the joint fact-finding output went into the existing institutional structure of the representative system, with only a limited attendance and voice of the participants.

Tensions between the boundary and the home practice

A third observation is that joint fact-finding often misses organizational links to their 'home practices' which participants in the network represent. Participants have got authority of their home organization the act on their behalf. Sometimes, we see in practice that participants have problems of getting achievement in the joint fact-finding network back to their home organizations. In practice mandates are often not so solid as they first seem. Moreover, people of the home organizations sometimes feel that their representatives have gone adrift. We see a tension between the home front in which certain interests, values and opinions are made absolute and the representatives, which have gone through a dialogue and negotiation process with other stakeholders in which values and interests are put into perspective. Representatives think that they have realized a fine agreement with others, while people at the home organizations are stuck with the feeling that they have been sold out. This tension oftentimes means that successes in the joint fact-finding networks are at the same time seen as failures in the home organizations. In other words the organizational linkage to the home organizations is very thin and breaks as soon as the home organizations aren't satisfied with the accomplishments of their representatives.

8. Conclusion: possibilities and limitations of knowledge management

The challenges for knowledge management in complex policy processes

We have argued in our paper that knowledge creation is far from easy in complex networks. Knowledge and information isn't value-free. Interests, perspectives, values and norms determine for a great deal what we see as relevant information and colour the information that is provided us. Knowledge is uncertain and ambiguous by nature.

A second problem is that that knowledge creation is not only an individual process but also a collective process. When stakeholders connect their own meaning to information it often leads to convincing strategies in which stakeholders try to inflict their truth on others. Knowledge is often used as ammunition in trying to reach own goals and interests. In this way knowledge doesn't facilitate but rather frustrates the policy-making process. We have to find common ground in order to reach knowledge, which is meaningful for a group of stakeholders. A joint fact-finding process is a way of realizing collective meaningful information. Frame reflection and shared knowledge are crucial conditions for building consensus in a policy process. Research institutes are not neutral fact finders, but their work have to be accomplished by the critical involvement of stakeholders, in order to prevent report wars and cognitive blockades.

Managing joint fact-finding processes is – as we have seen – not unproblematic. In order to reach their own goals, actors choose strategically between the arenas and processes in which they participate (Weggeman & Van Buuren, 2004). Only when they are convinced of their mutual dependence, they will engage themselves to a process of collaborative dialogue.

Reaching shared knowledge and frame reflection among actors with very different worldviews is not easy. Nobody can (and shall!) enforce another actor to change his mind. In the end, knowledge management only can organise a fruitful context in which shared knowledge can be formed. In such a context mutual trust and respect, transparency and openness, and serious attention for a careful process of negotiation are crucial. Only when actors felt they are taken seriously, they are willing to co-operate in a process of deliberation and finding joint solutions.

However, there is an additional problem for joint fact-finding processes. A joint fact-finding process is in practice a temporary informal network, which often lacks organizational and democratic anchorage. Representatives of organizations in the joint

fact-finding process have to maintain contact with their home organizations in order to get knowledge through in their home organization. Sometimes shared knowledge in the joint fact-finding process can't count on support in the home organizations. The same applies for political decision-making. Members of Parliament are often at a distance of the joint fact-finding process, and are less committed to research outcomes. As a result, they have often no trouble of neglecting research, which doesn't serve their goals and intentions.

The above observations may partly be explained from a lack of attention on the part of knowledge managers for the *institutional incorporation* of the joint fact-finding process. Knowledge managers often show little sensitivity to and awareness of existing democratic and organizational institutions. This results in marginal attention for the institutional incorporation of joint fact-finding networks. Moreover, knowledge managers must also take the relation between the boundary practice (i.e. the temporary network) and the home practice (the organizations that participants represent) and the existing democratic decision-making processes into account in order to prevent evaporation of rich results of the joint fact-finding process. In order words: knowledge management implies at the same time democratic and organizational anchorage of shared knowledge. Joint fact-finding as a knowledge management strategy emphasise the importance of a good process architecture (Edelenbos et. al. 2003): of the research process itself, but also of the relation between research and policy processes.

Democratic anchorage of shared knowledge: first draft of a research agenda

Much of the literature about knowledge management is devoted to the pure rational approach of knowledge: through a process of acquisition, dissemination and utilization, knowledge serves as a basis for decision-making (Weggeman, 2000; McAdam & McCreery, 1999). Only recently there is more attention for the more democratic aspects of knowledge. In the literature this is reflected by studies on social learning and social capital, communities of practice etcetera (Huysman & De Wit, 2004; Achterbergh & Vriens, 2001).

However, one of the key problems of the study of modern public management: the relation between (more or less informal) governance processes and the official political and democratic decision-making procedures directs our attention towards the problem of transferring knowledge from one context to another. This theme is partially discussed in the literature on inter-organizational learning and on the theme

of absorptive capacity (Bosch et.al. 1999; Plaskoff, 2003). To get more insight in the way a robust anchorage of joint fact-finding processes within the traditional hierarchy and representative democracy can be reached, it is necessary to 'translate' the mainly on the private sector oriented knowledge management literature for the public sector in combination with careful case-studies. In this paper some first building blocks are presented. Some preliminary conclusions from that can be drawn (see also Klijn/Koppenjan, 2000b):

- Since connections between fact-finding processes and 'traditional' decision making processes are not made by it self these need process designs to connect them. This also means designing an explicit role for elected politicians in drafting and deciding upon such a process design;
- Fact-finding processes are as have been made clear closely connected to value conflicts. The variety of collecting information and the process has to resemble the variety of interests and values by the involved stakeholders;
- The possibilities and limitations of the fact-finding process have to be made clear as much as possible in the beginning. This can either be done by an explicit statement of elected politicians at the beginning of the limitations and constraints or by trying to develop some understanding in the beginning between the actors.

It becomes also clear for the discussion and the case that organizing joint fact-finding in complex policy processes is difficult and requires a lot of managerial activity. A knowledge manager needs to organize carefully the process of information gathering, to reach shared knowledge and to secure the organizational and democratic link of that shared knowledge in order to produce meaningful knowledge in complex networks.

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