Towards a Method for Collaborative Policy Making

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Summary. This paper is concerned with the development of a method for collaborative policy making. The aim of this method is to improve the quality of *policy-making processes*. The creation of policies is a collaborative process. The quality of this collaboration has a profound impact on the quality of the resulting policies and the acceptance by its stakeholders. We therefore aim to integrate techniques from the field of collaboration engineering into our policy making method in order to improve the quality of the process and its outcomes.

We present the results of two case studies conducted on the use of collaboration engineering in the context of policy making processes. A key element in this result involves the initial design of a method for policy making in terms of elementary constructs from collaboration engineering.

1 Introduction

The current complexity in organizational decision-making has led to a multitude of approaches. Among them is the concept of *policy*. A policy [1] is a guide that establishes parameters for making decisions; it provides guidelines to channel a manager's thinking in a specific direction. The concept of policy is not limited to the world of business and government alone. In the field of IT, several forms of policies exist as well. For example, [2] discusses the notion of IT policies to govern and direct an organization's IT portfolio, while [3, 4] have used the term *architecture principle* to refer to the same notion. Another form of policy playing an increasingly important role in the field of IT are business rules as a mechanism to formalize business policies [5].

Policies are created in a *policy-making process*, which involves an iterative and collaborative process requiring an interaction amongst three broad streams of activities: problem definition, solution proposals and a consensus based selection of the line of action to take. The core participants of a policy-making process must be involved in complex and key decision making processes themselves, if they are to be effective in representing organizational

interests. Explicit policies are a key indicator for successful organizational decision-making.

The complexity of policy-making processes in organizations may be described as having to cope with large problems. Examples include: information technology, innovation, procurement, security, software testing, etc. These problems may be affected by (i) unclear and contradictory targets set for the policy goals; (ii) policy actors being involved in one or more aspects of the process, with potentially different values/interests, perceptions of the situation, and policy preferences. Policy makers and others involved in the policy-making process need information to understand the dynamics of a particular problem and develop options for action. A policy is not made in a vacuum. It is affected by social and economic conditions, prevailing political values and the public mood at any given time, as well as the local cultural norms, among other variables.

A policy-making process is a collaborative design process whose attention is devoted to the structure of the policy, to the context and constraints (concerns) of the policy and its creation process, and the actual decisions and events that occur [6]. We aim to examine, and address, those concerns that have a collaborative nature. Such concerns include the involvement of a variety of actors resulting in a situation where multiple backgrounds, incompatible interests, and diverging areas of interest all have to be brought together to produce an acceptable policy result. Due to the collaborative nature of a policy-making process, its quality is greatly determined by a well-managed collaborative process. We look towards the field of *collaboration engineering* to be able to deal with such concerns. Collaboration engineering is concerned with the design of recurring collaborative processes using collaboration techniques and technology [7].

The main purpose of our paper is to establish a method for the realization of "good policies" in a collaborative process and how this process can be improved by the support of collaboration engineering. This will take the form of a generic design of a policy making process in terms of constructs from collaboration engineering, which has been arrived at using the *action research* approach. As a next step we will further elaborate this initial method using techniques from situational method engineering [8, 9], allowing us to introduce more parametrization of the method for specific situations.

The remainder of this paper is structured as follows. Section 2 briefly explains the concepts of policy, policy making processes and collaboration engineering. Section 3 provides a discussion of two case studies we have performed. Based on these case studies, section 4 discusses the design of our current policy making method. Finally, Section 5 provides the conclusion as well as a discussion on further research.

2 Policy making processes and collaboration engineering

The concept of *policy* has been defined by several researchers. Rose [10], defines a policy as "a long series of more-or-less related activities" and their consequences for those concerned rather than as a discrete decision. Rose's definition embodies the useful notion that policy is a course or pattern of activity and not simply a decision to do something. Friedrich [11], regards policy as "a proposed course of action of a person, group, or government within a given environment providing obstacles and opportunities which the policy was proposed to utilize and overcome in an effort to reach a goal or realize an objective or a purpose." To the notion of policy as a course of action, Friedrich adds the requirement that policy is directed toward the accomplishment of some purpose or goal. Although the purpose or goal of government actions may not always be easy to discern, the idea that policy involves purposive behavior seems a necessary part of a policy definition. Policy, however, should designate what is actually done rather than what is proposed in the way of action on some matter. Anderson [12], defines policy as "a purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern". Anderson's concept of policy focuses attention on what is actually done as against what is proposed or intended, and it differentiates a *policy* from a *decision*, which is a "*choice among competing alternatives*". Eulau and Prewitt [13], define a policy as a "standing decision characterized by behavioral consistency and repetitiveness on the part of both those who make it and those who abide by it". Whether in the public or private sector, policies also can be thought of as the instruments through which societies regulate themselves and attempt to channel human behavior in acceptable directions [14].

Taking into account the various perspectives of policy, and to put our research into context, we offer the following definition to help integrate them: *a policy is a purposive course of action followed by a set of actor(s) to guide and determine present and future decisions, with an aim of realizing goals.*

According to [6], the process of *policy-making* includes the manner in which problems get conceptualized and are brought to a governing body in order to be resolved. The governing body then formulates alternatives and select policy solutions; and those solutions get implemented, evaluated, and revised. Policy stages are thought of as a typology that completely describes policy decisions and actions that occur around a policy. The policy-making process "connotes temporarily, an unfolding of actions, events, and decisions that may culminate in an authoritative decision, which, at least temporarily, binds all within the jurisdiction of the governing body". In explaining policy-making process, Sabatier says that the emphasis is much more on the unfolding than it is on the authoritative decision. In examining the unfolding, attention is devoted to structure, to the context and constraints of the process, and to actual decisions and events that occur. Dunn [15] defines policy-making process as "the administrative, organizational and political activities and attitudes that

shape the transformation of policy inputs into outputs and impacts". Even with the structured definitions of policy processes given, there is, it should be stressed, no one single process by which policy is made. Variations in the subject of policy will produce variations in the manner of policy-making. For instance, taxation, railroad regulation, aid to private schools, and professional licensing, are each characterized by distinguishable policy processes [12].

Sometimes the phrase *policy cycle* is used to make clear that the process is cyclical or continuous rather than a one-time set of actions. Instead of a top-down listing of each stage, it could be presented as a series of stages linked in a circle because no policy decision or solution is ever final. Changing conditions, new information, formal evaluations, and shifting opinions often stimulate reconsideration and revision of established policies. In the real world these stages can and do overlap or are sometimes skipped. In other words, policies might be formulated before they are high on the political agenda; otherwise it would be impossible to differentiate policy formulation from legitimation.

Essentially, collaboration engineering revolves around the use of *information and communication technologies* to enable the collaboration between people. Although organizations have tried to collaborate in their organizational processes to achieve maximum value from their efforts, achieving effective team collaboration still remains a challenge. Collaboration is the degree to which people in an organization can combine their mental efforts so as to achieve common goals [16]. Because of this challenge, organizations have resorted to using groupware technologies in order for collaboration to work for them. However, technology alone seldom is the answer. What is needed is the design of effective collaboration processes. This can be achieved by following the collaboration engineering approach which is defined [7] as "the design of re-usable collaboration processes and technologies meant to engender predictable success among practitioners of recurring mission-critical collaborative tasks". In other words, collaboration engineering addresses recurring collaboration processes that can be transferred to groups that can be self-sustaining in these processes, using collaboration techniques and technology [17].

In collaboration engineering research, collaboration engineers need to follow standard, repeatable procedures to achieve predictable success with group processes. These procedures should enable people to move from one activity to another during collaboration, and they accomplish the activity by moving through some combination of patterns of collaboration [7]. Collaboration engineering researchers identified five general patterns of collaboration to enable a group to complete a particular group activity [7]: i) *Diverge* – to move from a state of having fewer concepts to a state of having more concepts. The goal of divergence is for a group to create concepts that have not yet been considered; ii) *Converge* – to move from a state of having many concepts to a state of having a focus on, and understanding of, fewer concepts worthy of further attention. The goal of convergence is for a group to reduce their cognitive load by reducing the number of concepts they must address; iii) *Organize* – to move from less to more understanding of the relationships among the concepts. The

goal of organization is to reduce the effort of a follow-on activity; iv) *Evaluate* – to move from less to more understanding of the benefit of concepts toward attaining a goal relative to one or more criteria. The goal of evaluation is to focus a discussion or inform a group's choice based on a judgment of the worth of a set of concepts with respect to a set of task-relevant criteria; v) *Build Consensus* – to move from having less to having more agreement among stakeholders on courses of action. The goal of consensus building is to let a group of mission-critical stakeholders arrive at mutually acceptable commitments.

The patterns of collaboration do not explicitly detail how a group could conduct a recurring collaboration process, especially with teams who do not have professional facilitators at their disposal. This can be achieved by the key collaboration engineering concept: *the thinkLet*. A thinklet is defined by [7] as "*the smallest unit of intellectual capital required to create a single repeatable, predictable pattern of collaboration among people working toward a goal*". ThinkLets can be used as conceptual building blocks in the design of collaboration processes. Some examples of thinkLets are provided in Table 1. More examples of thinkLets can e.g. be found in [18].

ThinkLet Name	**Collaboration Pattern**	**Purpose**
DirectedBrainstorm	Generate	To generate, in parallel, a broad, diverse set of highly creative ideas in response to prompts from a moderator and the ideas contributed by team mates.
BucketSummary	Reduce and clarify	To remove redundancy and ambiguity from broad generated items.
BucketWalk	Evaluate	To review the contents of each bucket (category) to make sure that all items are appropriately placed and understood.
MoodRing	Build Consensus	To continuously track the level of consensus within the group with regard to the issue currently under discussion.

Table 1. Examples of thinkLets with their respective Collaboration Pattern

3 Case study and evaluation

In this section, we present how our research was conducted and evaluated. We will do so in terms of a description of the research approach and cases involved. We also present a description of the generic method for collaborative policy-making, and relate this to the results of the case studies in the sections that follow.

3.1 Research approach

To develop and evaluate our method for collaborative policy-making, we followed the *action research* methodology process proposed by [19] where four

activities that can be carried out over several iterations (in our case two) are involved. The 'Plan' activity is concerned with the exploration of the research site and the preparation of the intervention. The 'Act' activity involves actual interventions made by the researcher. The 'Observe' activity is where the collection of data, enabling evaluation, is done during and after the actual intervention. Finally, the 'Reflect' activity involves analysis of collected data and infers conclusions regarding the intervention that may feed into the 'Plan' activity of a new iteration.

We used action research because it permits highly interpretive assumptions to be made about observations; also the researcher intervenes in the problem setting, and it is performed collaboratively yet enhances the competencies of the respective actors [20]. In addition, we selected action research because it is an applied research method that can be tested in the field. Better still, it addresses the "how to" research questions. Our research aimed at developing and testing a method for collaborative policy-making, that is, a method of how to realize a quality policy in a collaborative effort. More so, the continuous design and evaluation of a method for collaborative policy-making may not be easy to study in a constructed setting. Lastly, action research allowed us to evaluate and improve our problem-solving techniques or theories during a series of interventions.

Based on the action research process described above, we executed the four activities as follows: In the 'Planning' activity, we conducted interviews with four organizations that have policy-making functions and also performed a literature review to understand organizational policy-making. The data collected formed the initial requirements for the generic method.

The 'Act' activity involved actual execution of the method in the field both in an industrial setting and an inexperienced environment. We applied the method for collaborative policy-making with two policy types in two case organizations:

Case Organization 1 – it was used to observe the performance of the method in an industrial setting. A team of five experienced Information and Technology (IT) workers and involved in making policies for the Information Technology Department of the Ministry of Finance, Planning and Economic Development (MOFPED), Uganda used the method to develop an Information Technology (IT) policy for the department.

Case Organization 2 – it was used as an inexperienced environment. A team of sixteen people comprised of two experienced IT workers involved in IT policy-making and fourteen Master's Students (2nd year, Computer Science) at Radboud University Nijmegen (RUN), the Netherlands, used the method to develop a policy in the form of architectural principles for the student portal information system for RUN. The two experienced participants mainly assisted the students with the appropriate content.

To evaluate the performance and perception of the method for collaborative policy-making by the participants, we collected and analyzed explorative

data during the 'Observe' activity. Three kinds of instruments, that is, observations, interviews and questionnaires comprising of qualitative and quantitative questions, were used for data collection. The tools enabled us to collect and analyze data regarding effectiveness, efficiency and policy stakeholders' satisfaction with the method to improve the policy process and its outcomes; perceived policy elements identification; and the degree of applicability of the method.

Finally, in the 'Reflect' activity, our observations were analyzed with the aim of improving the method.

3.2 Method design for Collaborative Policy-making

This section presents the design of the initial method for collaborative policy-making. The method was designed following the collaboration engineering approach described in Section 2. Even though this approach comprises several design steps, the ones relevant to our research study included decomposing the method into collaborative activities, the classification of these activities into patterns of collaboration, selection of appropriate thinkLets to guide facilitation of the group during the execution of each activity as well as making the design method more predictable and repeatable. In the subsections below we give a description of the criteria we followed to evaluate the performance of the method, and a presentation of the final design of the method, respectively.

3.3 Evaluation criteria

The design of the method for collaborative policy-making was derived from two iterations based on a selected design criteria. The criteria selection was derived from the goal of our research. Our research aimed at establishing a method for the realization of good policies in a collaborative policy-making process and how this process can be improved by the support of collaboration engineering. The following four criteria were considered by us:

Effectiveness – the method for collaborative policy-making should enable stakeholders to achieve their goal.

Efficiency – the method for collaborative policy-making should take stakeholders less time for attainment of the policy than without the use of a collaborative approach.

Degree of applicability – the extent to which the method can be applied to varying policy types.

Perceived policy elements identification – the method should enable stakeholders to have a common understanding of the policy elements (and their definitions).

4 Design Method

The method for collaborative policy-making was not designed from scratch. We based our design on method requirements derived from the explorative field study with four case organizations that have policy-making functions and also in concurrence with the policy process discussed by [21]. A typical policy-making process includes six stages [21]. However, our method design only involves the development/formation phase of the policy-making process. The method (development/formation phase) has two main parts: part 1 – pre-development/meeting phase, and part 2 – development phase.

The method underwent two iterations prior to deriving the final method design. The two iterations of the earlier versions of the method were applied in the two cases described above. The final method design is shown in Figure 1 in which we present the steps required to develop/form a policy document, and the patterns of collaboration with related thinkLets used to guide the group to execute each step.

The method is divided into two main phases, as mentioned earlier on. It starts with the participants familiarizing themselves with each other and agreeing on the pre-development elements gathered in several earlier pre-meetings. The participants familiarize themselves on these elements for the actual development of the policy. The elements comprise the problem to be solved; the relevant information to be used to develop the policy; a legal framework to support the policy to be developed; the ownership of the policy; leadership positioning; who are the stakeholders (internal and external); and technical resources for facilitation.

In the activity that follows, guided by the DirectedBrainstorm thinkLet, the participants are invited to brainstorm the mission objectives that they think would be relevant for the intended policy. The result from this activity is a brainstormed list of Policy Mission Objectives waiting for cleaning up.

In the next activity, and using the FastFocus thinkLet, all the participants are asked to organize the brainstormed public list displayed by extracting only the Mission Objectives that they feel are Key to the policy. They do this by grouping ideas and eliminating any redundancies. During this discussion, participants are allowed to also crosscheck to see if there is any important issue/Mission Objective that has not yet been posted on the public list. If this arises, a quick DirectedBrainstorm thinkLet followed by FastFocus thinkLet are performed. The result from this activity is a cleaned list of Key Policy Mission Objectives.

Based on the resulting Key Policy Mission Objectives, the participants are asked to identify and agree on common policy elements definitions that suit the Key Mission Objectives. This activity is guided by the DirectedBrainstorm thinkLet and followed by the FastFocus thinkLet. The result from this activity is a brainstormed list for policy elements.

Using the FastFocus thinkLet, the participants organize the resulting brainstormed list as described in activity 2 above. They then reframe the ex-

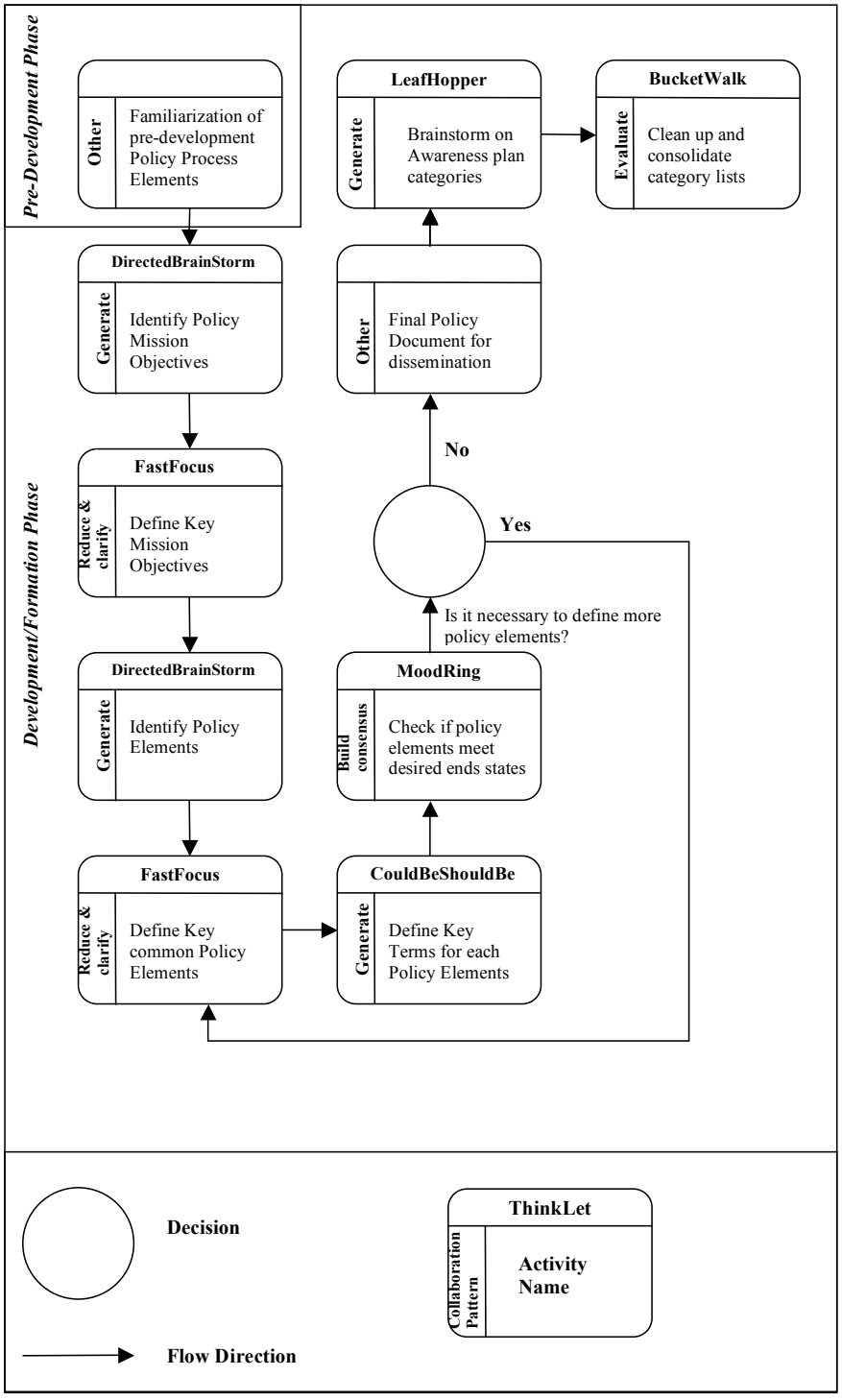

Fig. 1. Method for Collaborative Policy-Making

tracted Key elements in a few words, while categorizing them into sections if needed, depending on the policy structure/format chosen by the participants. During this time, participants crosscheck to see if there is any important issue/policy element that has not yet been posted on the cleaned public list. If the need arises, again a quick DirectedBrainstorm followed by FastFocus is performed. The result of this activity is a cleaned list of Key Policy Elements.

The activity that follows involves defining the Key terms for each of the policy elements defined. Using the CouldBeShouldBe thinkLet, participants are asked to brainstorm terms that they 'could' consider as appropriate for each of the policy elements. Based on the resulting brainstormed list of terms per each policy element, participants are then asked to propose a term that they 'should' take as Key to each policy element. This exercise is continued until all the Key terms for each policy element are defined.

The activities above result into a Policy document. In this activity, and using the MoodRing thinkLet, participants are required to check if the policy document meets the desired objectives for which it was intended for. They do this by voting on a YES/NO basis, where a YES is voted if the elements definitions and terms meet the desired end states and a NO if it does not meet the desired end states, and therefore certain areas need to be re-addressed. A verbal discussion to address any issues raised is conducted until all the participants have reached some sort of consensus on the final policy document.

Finally, the participants need to plan how they will communicate the policy document to its intended users/owners. In this activity, they are required to draw up a policy awareness plan. Two ways are pre-determined that can be used, i.e. communication and education. Following the LeafHopper thinkLet, participants brainstorm about ways in which each of these can be addressed. The result of this activity is brainstormed lists of each awareness category. The resulting brainstormed lists for each awareness category are evaluated to determine if there is any issue that doesn't belong to them respectively, at the same time removing any redundancies. This is achieved by using the BucketWalk thinkLet.

The evaluation of the method design for collaborative policy-making was implemented following a manual procedure. We used the Microsoft Word (MSWord) tool, an LCD projector, removable disks and voting sheets (paper-based) to implement the method. Results from the cases are presented in the section below.

4.1 Results

We now present the results from the two cases in which the method for collaborative policy-making was applied. We collected and analyzed data regarding effectiveness, efficiency, and participants' satisfaction with the method to improve the policy process and its outcomes; perceived policy elements identification; the degree of applicability of the method.

Efficiency

We define efficiency of the method for collaborative policy-making as the degree to which policy-making stakeholders can reduce the amount of time required to attain a policy. To measure this, we considered the execution duration of each stage of the method; also how well the participants understood the method to execute the process tasks; and on the whole also considered the time it took the participants to come up with the final policy document and the awareness plan.

Based on our observations, we concluded that the method execution time was efficient. It took about an hour and fifteen minutes for execution in each of the workshops. This duration is comparable to the traditional way of policy formation, taking place under time pressure stemming from the fact that organizing participation in a policy procedure is hard and time consuming [6]. Even though the majority of the participants felt that the process execution was efficient, not all were happy with this time length; some required that more time should have been assigned to particular activities such as policy elements identification.

Policy formation effectiveness

Policy formation effectiveness is defined as the extent to which the method for collaborative policy-making enables policy stakeholders to achieve their goal. We measured the effectiveness of the method by how well the participants managed to come up with a policy at the end of execution.

From our observations, it was noted that the participants effectively managed to form policies with respective awareness plans. This was demonstrated during the consensus stage. In this stage, participants were required to check if the policy document met the desired objectives for which it was intended for. They did this by voting on a YES/NO basis, where a YES was voted if the elements definitions and terms met the desired end states and a NO if it did not meet the desired end states. Based on the feedback from the voting sheets (see Table 2), it was observed that the participants achieved fairly satisfactory results, that is, they managed to form a policy based on the desired end states. For those that voted a NO, a verbal discussion was held to re-address their issues. This increased consensus among the participants.

Having arrived at a complete policy document during the consensus stage, the participants also perceived it as having a common understanding of the policy elements identification.

Degree of applicability

We define this construct as the extent to which the method for collaborative policy-making can be applied to varying policy types. To measure this, we applied the method to two cases with different policy types. These included

	Yes	No
Case 1	4 (80%)	1 (20%)
Case 2	12 (75%)	4 (25%)

Table 2. Voting consensus results

formation of an Information Technology policy, and Architectural Principles for an Information System. It was observed that the method was flexible in terms of its applicability in formation of two different types of policies.

Policy stakeholders' satisfaction

To measure this construct, we used the 7-point Likert scale general meeting survey questionnaire where participants can strongly disagree to strongly agree. The instrument validation and theoretical underpinnings can be seen in [22]. Results in Table 3 indicate that the participants were reasonably satisfied with the method outcomes, and the method by which the policies were formed.

	1	2
Satisfaction with method		
Score	4.800	3.838
Standard deviation	1.376	0.995
Satisfaction with outcome		
Score	5.160	4.363
Standard deviation	1.310	1.094

Table 3. Satisfaction with method and outcome

The participants indicated that the results were useful to them as they gave better understanding of what issues they find important/key to the policy. They also observed this method as an all encompassing, interactive, efficient and better method of forming policies.

5 Conclusions and further research

This paper focussed on the development of an initial method for the creation of policies, using *collaboration engineering* to improve the quality of *policy-making processes*. We presented the results of two case studies conducted, regarding the use of collaboration engineering in the context of a policy making processes. Based on the results, the quality of the initial policy making method, in terms of its effectiveness, efficiency and applicability, proved to a satisfactory. As such, the collaborative method has indeed the potential to support organizations in developing quality policies.

As a next step, we aim to more explicitly rationalize design decisions taken in policy making processes (and associated method). We aim to do so by explicitly relating the goals of the policy making process (its *why*), the requirements on the process following from these goals (its *what*), the situation in which it needs to be executed (its *within*), to the construction of the policy making process/method (its *how*). In doing so, we will draw on past results concerning modeling processes [23, 24, 25, 26] and combine these with results from situational method engineering [8, 9]. A policy making process can essentially be regarded as a collaborative modeling process, where the model being produced is the policy.

Furthermore, we also intend to further elaborate the issue of *perceived policy elements identification*. The applicability and longevity of a policy document is highly dependent on a shared (and committed) understanding by all stakeholders involved, including those who are to execute the policy. We are currently using techniques from conceptual modeling [27, 28, 29] to more clearly exhibit the meaning of policies by grounding the underlying concepts and semantics (see [30] for an application of this idea to *architecture principles*). Our next step will be to integrate this grounding process into policy making processes, in particular the CouldBeShouldBe and FastFocus thinkLets of the process depicted in 1.

References

1. Robbins, S., Bergman, R., Stagg, I.: Management. Prentice Hall Australia Pty Ltd., Prentice–Hall, Sydney, USA (1997).
2. Keen, P.: Information Systems and Organizational Change. Communications of the ACM **28** (1981) 24–33.
3. Davenport, T., Hammer, M., Metsisto, T.: How executives can shape their company's information systems. Harvard Business Review **67** (1989) 130–134. doi:10.1225/89206
4. Tapscott, D., Caston, A.: Paradigm Shift – The New Promise of Information Technology. McGraw–Hill, New York, New York, USA (1993). ASIN 0070628572
5. Ross, R., ed.: Business Rules Manifesto. Business Rules Group (2003) Version 2.0. http://www.businessrulesgroup.org/brmanifesto.htm
6. Sabatier, e.: Theories of the Policy Process. West view Press, Boulder, Co. (1999).
7. Briggs, R., Vreede, G.d., Nunamaker, J.: Collaboration Engineering with Thinklets to Pursue Sustained Success with Group Support Systems. Journal of MIS **19** (2003) 31–63.
8. Rossi, M., Brinkkemper, S.: Complexity Metrics for System Development Methods and Techniques. Information Systems **21** (1996) 209–227.
9. Mirbel, I., Ralyté, J.: Situational Method Engineering: combining assembly–based and roadmap–driven approaches. Requirements Engineering **11** (2006) 58–78.

10. Rose, R.e.: Policy Making in Great Britain. Macmillan, London, Great Britain (1969).
11. Friedrich, C.: Man and His Government. Wiley, New York, New York, USA (1963).
12. Anderson, J.: Public Policy–making. Praeger, New York, New York, USA (1975).
13. Eulau, H., Prewitt, K.: Labyrinths of Democracy. Bobbs–Merrill, Indianapolis, USA (1973).
14. Schneider, A., Ingram, H.: Policy Design for Democracy. University Press of Kansas, Lawrence, Kansas, USA (1997).
15. Dunn, W.: Public Policy Analysis: An Introduction. Eaglewood Cliffs, Prentice–Hall, NewJersey, USA (1981).
16. Nunamaker, J., Briggs, R., Vreede, G.d.: From Information Technology To Value Creation Technology. In Dickson, G., DeSanctis, G., eds.: Information Technology and the Future Enterprise, Piscataway, New Jersey, USA, IEEE Computer Society Press (2001).
17. Vreede, G.d.: Collaboration Engineering: Designing for Self–Directed Team Efforts. In: Proceedings of the Shaping the Future of IT. (2004) Conference, Tucson, AZ, November 3–5.
18. Vreede, G.d., Fruhling, A., Chakrapani, A.: A Repeatable Collaboration Process for Usability Testing. In Dickson, G., DeSanctis, G., eds.: Proceedings of the 38th Annual Hawaii International Conference on System Sciences (HICSS'05), Big Island, Hawaii, USA, Washington DC, USA, IEEE Computer Society (2005). ISBN 07695226881
doi:10.1109/HICSS.2005.46
19. Zuber-Skerritt, O.: Action research for change and development. Gower Publishing, Aldershot (1991).
20. Hult, M., Lennung, S.A.: Towards a definition of action research: A note and bibliography. Journal of Management Studies **17** (1980) 241–250.
21. Ford, M.T., Spellacy, P.: Policy development: In theory and practice. In: Tuesday, July 12, Baltimore, MD, July 9-12, 2005, National Association of College and University Business Officers, 2005 Annual Meeting. (2005).
22. Briggs, R., Reinig, B., Vreede, G.d.: Meeting Satisfaction for Technology Supported Groups: An Empirical Validation of a Goal-Attainment Model, Small Group Research, in Press (2006).
23. Hoppenbrouwers, S., Proper, H.E., Weide, T.v.d.: A Fundamental View on the Process of Conceptual Modeling. In: Conceptual Modeling – ER 2005 – 24 International Conference on Conceptual Modeling. Volume 3716 of Lecture Notes in Computer Science. (2005) 128–143. ISBN 3540293892
doi:10.1007/11568322_9
24. Hoppenbrouwers, S., Proper, H.E., Weide, T.v.d.: Formal Modelling as a Grounded Conversation. In Goldkuhl, G., Lind, M., Haraldson, S., eds.: Proceedings of the 10th International Working Conference on t he Language Action Perspective on Communication Modelling (LAP'05), Kiruna, Sweden, EU, Linköpings Universitet and Hogskolan I Boras, Linköping, Sweden, EU (2005) 139–155.
25. Hoppenbrouwers, S., Proper, H.E., Weide, T.v.d.: Towards explicit strategies for modeling. In Halpin, T., Siau, K., Krogstie, J., eds.: Proceedings of the Workshop on Evaluating Modeling Methods for Systems Analysis and Design

(EMMSAD'05), held in conjunctiun with the 17th Conference on Advanced Information Systems 2005 (CAiSE 2005), Porto, Portugal, EU, FEUP, Porto, Portugal, EU (2005) 485–492. ISBN 9727520774

26. Hoppenbrouwers, S., Lindeman, L., Proper, H.E.: Capturing Modeling Processes – Towards the MoDial Modeling Laboratory. In Meersman, R., Tari, Z., Herrero, P., eds.: On the Move to Meaningful Internet Systems 2006: OTM 2006 Workshops – OTM Confederated International Workshops and Posters, AWESOMe, CAMS, COMINF, IS, KSinBIT, MIOS–CIAO, MONET, OnToContent, ORM, PerSys, OTM Acadamy Doctoral Consortium, RDDS, SWWS, and SebGIS, Proceedings, Part II, Montpellier, France, EU. Volume 4278 of Lecture Notes in Computer Science., Berlin, Germany, EU, Springer (2006) 1242–1252.
27. Halpin, T.: Information Modeling and Relational Databases, From Conceptual Analysis to Logical Design. Morgan Kaufmann, San Mateo, California, USA (2001). ISBN 1558606726
28. Hofstede, A.t., Proper, H.E., Weide, T.v.d.: A Conceptual Language for the Description and Manipulation of Complex Information Models. In Gupta, G., ed.: Seventeenth Annual Computer Science Conference. Volume 16 of Australian Computer Science Communications., Christchurch, New Zealand, University of Canterbury (1994) 157–167. ISBN 047302313
29. Hofstede, A.t., Proper, H.E., Weide, T.v.d.: Formal definition of a conceptual language for the description and manipulation of information models. Information Systems **18** (1993) 489–523.
30. Bommel, P.v., Hoppenbrouwers, S., Proper, H.E., Weide, T.v.d.: Giving meaning to enterprise architectures – architecture principles with ORM and ORC. In Meersman, R., Tari, Z., Herrero, P., eds.: On the Move to Meaningful Internet Systems 2006: OTM Workshops – OTM Confederated International Workshops and Posters, AWeSOMe, CAMS, GADA, MIOS+INTEROP, ORM, PhDS, SeBGIS, SWWS, and WOSE 2006. Lecture Notes in Computer Science, Montpellier, France, EU, Springer, Berlin, Germany, EU (2006).