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074 USE OF E-PARTICIPATION TOOLS FOR SUPPORT OF POLICY MODELLING AT REGIONAL LEVEL

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Abstract

This paper describes application-specific and technology specifications related to ICT-based approach for the support of policy modelling as proposed in the EU funded FP7 ICT OCOPOMO project. In this particular approach strategic planning is supported by a combination of narrative scenarios, agent-based modelling, and e-Participation tools (all integrated via an ICT e-Governance platform). The policy model for a given domain is created iteratively using cooperation of several stakeholder groups (decision makers, analysts, companies, civic society, and the general public). In this paper we will provide principles and key concepts of collaborative policy modelling, but the main focus is on the discussion of high-level architecture of ICT tools and software components, envisioned platform functionality and preliminary view of detailed architecture and technological details for implementation and integration of software components. An overall approach is presented also from the view of a particular pilot application, built around development of a strategy of renewable energy use. The process of development of a new strategy is described using standard BPMN. The process models correspond to AS-IS and TO-BE (i.e. after incorporation of scenario generation and policy modelling) situations.

Keywords: policy modelling, agent-based models, e-participation tools, ICT support.

1 INTRODUCTION

Information and communication technologies (ICT) are intensively used in the area of e-Government (at different levels) in order to support innovation within the paradigm of knowledge-driven economy. The main focus is on employing ICT for modernisation of governments, namely by increasing the efficiency and quality of provided services. Consequently, the issues of interoperability between various types of fully or partially automated electronic services became a central topic in the research agenda (Archmann & Nielsen 2008). The service-centric notion of advanced e-Government solutions enables effective co-operation and information exchange between involved parties, governmental bodies, citizens and businesses, during the policy initiation, development, implementation, monitoring and evaluation. For the service consumers (in this case policy stakeholders) it is, however, often very difficult to understand the policy itself, participate in the policy development, influence the whole process, and modify it in a desired way, respectively. Therefore, involvement of a wider public in the process of policy creation and evolution is important and can be of special value, specifically in the context of economic and financial crisis. Our inability to predict dramatic changes in the economy and society, also because of ignoring those few individuals, who had warned the governments before these threats and negative trends, has been already demonstrated on several occasions.

Hence future trends in e-Government research and applications should extend the paradigm of service provision towards a broader active participation of general public and various groups of interest in a collaborative policy creation, with challenges like suitable ICT support in foresights, capability of managing complexity in strategic planning and policy making in complex socio-economic environments, open and transparent collaboration in the process, efficient collaboration of different stakeholder groups relevant to the given policy area (supported by proper e-Participation tools and technologies), developing, visualising and simulating appropriate policy models that can help in a qualitatively better management of socio-economic processes, development and provision of comprehensive IT solutions to support the policy modelling and simulation as a basis for competent collaboration among policy analysts, policy operators, wider interest groups and the general public.

The outline of the challenges indicates the main directions and prerequisites for further enhancements of scientific research and development in the area of e-Governance. The policy modelling, supported by statistical methods and agent-based social simulation (Nowak et al. 1990), can provide an environment for visualisation, monitoring, verification, and approval of goals for advanced e-Government applications. Furthermore, the connection between scientific models and informal observation of human behaviour can be supported by advanced e-Participation techniques enabling adaptation of policy models in a social interaction.

The design of a software platform and methodology providing an environment for modelling policies in a collaborative manner is in the focus of the European R&D project OCOPOMO (Open COllaboration for POlicy MOdelling). OCOPOMO is co-funded by the European Commission under the 7th Framework Programme. It is co-ordinated by the University of Koblenz-Landau, the project consortium consists of ten partners from five European countries (Germany, Italy, Poland, Slovakia, UK). The three-year project, which started in January 2010, will be tested on pilot applications in Italy and Slovakia.

The high-level architecture of ICT tools and software components, as it was designed for collaborative policy modelling in OCOPOMO, will be presented in the paper. The main research objective is an investigation and demonstration of possibilities of integrating tools and technologies for agent-based policy modelling, narrative scenario development, and e-Participation collaboration into a single e-Governance platform. The remaining part of the paper is structured as follows: Section 2 describes related research topics and work to collaborative policy modelling and supporting tools. Section 3 provides overall description of the project, high-level architecture of the ICT platform and envisioned functionality of the implemented and integrated tools. Section 4 presents an example of Slovak pilot application with process description for creation and adaption of new policy, as well as preliminary version of detailed architecture for ICT OCOPOMO platform.

2 RELATED RESEARCH TOPICS AND PROJECTS

The collaborative policy modelling applied in the field of e-Government can be seen as an interdisciplinary concept, supported by several mutually interrelated topics. It includes different policy modelling approaches, scenario-based development of foresights, and collaborative environments for e-Participation and e-Governance applications.

The policy modelling is particularly applied on general modelling and analysis of economy at the macro level. The classic approach (Klein 1947), based on Keynesian system of macro-theoretical relationships, uses econometric (statistical) techniques applied on empirical macro-data to estimate parameters for these relationships. The models produced by this approach are still frequently used, even the econometric estimation techniques become more sophisticated and the content of models was expanded over the past 60 years. A more recent approach, consisting of a set of dynamic stochastic general equilibrium (DSGE) models (Strid & Walentin 2009), is based on micro theoretical relationships (Woodford 2009). The analysis and modelling is performed in a respect to the behaviour of so-called 'representative agents' – independent actors that are taking decisions to maximise their utilities over an infinite time horizon.

These two approaches to policy modelling differ in the source of data, as well as in the direction of handling and processing the data. The former econometric modelling uses top-down approach. Settings of statistical techniques employed in the model calculation are pre-defined by an expert and thus are driven by a particular theory. Accuracy and appropriateness of such a model is significantly dependent on the correctness of input data and is highly sensitive to possible deviations. The agent-based modelling approach employs bottom-up approach. The data on micro level are gathered from observations of individual agents and are calibrated against 'stylised' macro-relationships, such as the cross-correlation over the business cycle between hours of work and leisure. It unifies the agents' behaviour on the macro level into a single scheme of rational acting.

From an evidence-based perspective, it is not easy to reconcile either the econometric or general equilibrium approaches to the policy modelling applied in e-Governance. The society understood as a complex system is composed of agents existing at different levels of social reality, and their interactions both within and between levels. Individual actors represent the micro level, social groups and organisations the mezzo-level, nations and societies the macro level. Interactions that often are described as links in a network may be of both economic and social nature. They include, for example, supply-demand-relations between producers, flows of capitals, administrative dependency, social influence or social interdependence. Each of these interaction types can be, in principle, described by a set of rules that may emerge from an average behaviour of agents. However, assuming non-linearity caused by cross-level acting of independent agents, simple rules of social influence among individuals may lead to the emergence of complex patterns of public opinion (Nowak et al. 1990). In a policy modelling system applied for e-Governance, it is especially important to capture these complex patterns on a more global level and recognise the tendencies that may lead to strategic planning. In a non-linear cross-level social system, the decision of an individual agent to adopt a particular strategy usually depends on the decisions of other agents. Each agent adopting a strategy increases the chances of adoption of this strategy by other agents what leads to clustered strategy switching that resembles avalanches.

The accuracy and adequacy of a policy model evolving in a complex social interaction is determined by a distribution of relevant information among agents. The decisions of particular actors, i.e. stakeholders involved in the modelling a policy for a given topic, need to be driven by an understandable explanation of possible alternatives, constraints and future trends that can affect the topic of interest. The technique of narrative scenarios is an advanced and commonly taken method for representing a definition and exploration of futures in a domain (Carroll 1995). The scenario-building procedure aims at generating different perspectives of the future to gain more insight into possible opportunities and threats. This technique allows better and more effective exploration of alternative trajectories of a certain domain beyond short-term forecasting (Janssen et al. 2007). Typology and classification of scenario types proposed in (Gausemeier et al. 1995) distinguishes the criteria of

application area, time horizon, starting point, goal, degree of tractability, and assignment of occurrence probabilities to future situations. Particular types include scenarios for decision-making or orientation, internal or external scenario projects, scenarios on situation or process, explorative or anticipative scenarios, descriptive or prescriptive scenarios, forecasts or foresights, extreme or trend scenarios, long-term, mid-term, and short-term prognosis.

Agent-based approach to the policy modelling is highly dependent on a possibility of open and free information exchange between participating actors. Individual goals, interests and preferences are confronted with actual status of the policy model, expressed in a set of relevant narrative scenarios. Active participation of an actor in the process of policy modelling should include a means for customisation and modification of both scenarios and models, which can then became a subject of further discussion or can serve for verification of various (sometimes even contradictory) ideas. This process can lead to a self-organisation and a balanced, consensus-based policy model may be produced as a result of the collaborative activities (Moss et al. 2000).

The interaction between policy modelling actors requires a proper suite of collaborative tools enabling presentation of stakeholders' ideas, discussions and negotiations between actors, voting on open issues and decision making. Consequently, the policy modelling solution should include e-Participation applications that mediate the input from stakeholders for development of the policy in a given domain. In this sense, e-Participation provides means for 'constant involvement of citizens in their own governance' (Moreno-Jiménez & Polasek 2005), whereas the whole policy modelling solution follows the principles of e-Governance to facilitate effective decision making and improvement of public policies (Nowak & Vallacher 1998).

Several projects related to governance and (collaborative) policy modelling are being implemented within the FP7 ICT Programme. We can mention, for example, projects such as COCKPIT (http://www.cockpit-project.eu), PADGETS (http://www.padgets.eu), IMPACT (http://www.policy-impact.eu), FuturICT (http://www.futurict.ethz.ch/FuturIcT), etc. A support action project CROSSROAD (http://crossroad-eu.net) aims at building a roadmap for ICT research in the field of governance and policy modelling. It will be supported by the results derived from other FP7 projects in the area of e-Government and policy making, where OCOPOMO also belongs to.

From the OCOPOMO perspective, the available technologies and tools for above-mentioned approaches of collaborative policy modelling can be divided into the following groups, namely:

- *Agent-based policy modelling tools*, built on the platform of multi-agent systems (MAS). Nowadays, probably the most popular open-source software platforms for developing MAS are JADE (http://jade.tilab.com) and Repast (http://repast.sourceforge.net). A survey and evaluation of available agent-based simulation tools can be found in (Tobias & Hofmann 2004).
- *Content management systems* (CMS) capable to facilitate collaborative digital content creation. CMS can be used for maintenance of shared policy models, narrative scenarios and supporting documents. Traditional CMS such as Apache Lenya, Drupal, Jackrabbit, Plone, etc. may be further enhanced by semantic technologies and knowledge management features and the semantic metadata descriptions can then be used for advanced search or mediation of collaboratively created content.
- *Collaboration platforms* (groupware), supporting communication between involved participants, collaborative work upon shared information artefacts and co-ordination of actors' activities. Among wide variety of currently available groupware systems we can mention examples of open source solutions such as Hipergate, Open-Xchange, KP-Lab, Lucane, eGroupWare, OpenGroupware.org, etc.
- *E-Participation platforms*, typically based on Web 2.0 features, include an ICT support for social networks such as discussion fora, wikis, blogs, chats, podcasts, etc. These means, when applied in e-Government or e-Governance applications, involve actors in the opinion-making process up to the point of making a decision (Schneider et al. 2008). Extensive survey of existing e-Participation projects and solutions was elaborated within the MOMENTUM project (http://www.ep-momentum.eu). The frameworks such as LEX-IS, VoicE, or LexiPation can be mentioned as relevant examples.

The OCOPOMO project aims at integration of relevant specialised ICT tools and platforms into a single e-Governance toolkit that will enable a collaborative policy modelling for decision support of governmental representatives.

3 GENERAL OVERVIEW OF THE OCOPOMO PROJECT

The OCOPOMO approach focuses on long-term strategic planning for governmental policy operators and decision makers. The project vision is to provide ICT-based support for integration of scenario generation, formal policy modelling, and open collaboration at different levels (local, regional, national or global level of policy formation). Verification and testing of the policy is supported by involving all relevant stakeholders. The OCOPOMO project involves several activities: to implement an ICT solution for the target users, decision makers and all (even potential) stakeholders, to provide a collaborative environment for an integrated process of policy modelling to produce formal scenarios by means of simulation experiments and scenario-based futures development. The specific objectives of the project are:

- Creation of two policy analyses at regional level, in the scope of pilot applications in Italy and Slovakia.
- Development of a general model of macroeconomic relations constrained by the data produced at national and European level.
- Conceptual and functional integration of narrative scenario analysis with formal policy modelling. The resulting policy analyses should possess the precision and clarity of formal models as well as the rich contextual and imaginative content of verbal narratives.
- Integration of the model of macroeconomic complexity with the regional policy models. The aim is to ensure that the regional models, which potentially can generate a range of surprising results, can be analysed both formally from macro-model output and informally by actors using scenario exercises or e-Participation tools.
- Development of ICT solutions that will support the engagement and participation of stakeholders.

3.1 Basic conceptual scheme of the project

The policy modelling approach adopted in OCOPOMO is a combination of agent-based bottom-up and econometric top-down approaches. The prerequisite for such an approach is a balanced range and structure of target users, stakeholders involved in the policy creation and modification. An initial definition of a policy framework is under responsibility of the policy analysts and policy operators, i.e. those responsible for preparing and developing strategic decisions to be made in (in this case regional) parliaments and/or by respective governmental bodies. The policy draft is elaborated by a group of policy/economy experts into a macroeconomic model, which can serve as a reference for global evidence and validation of individual (regional, domain-based) policies. In parallel, the policy proposal is confronted with preferences of various interest groups and to some extent also with opinions of wider general public. The OCOPOMO solution will allow these “external” user groups to actively comment upon and modify the policy proposal (on the level of policy models, narrative scenarios, or any kind of supporting materials), advocate their viewpoints and share ideas.

The conceptual scheme of the collaborative policy modelling adopted in the OCOPOMO project is depicted in Figure 1. It presents interactions and communication flows between target user groups of policy analysts, policy operators, groups of experts, external interest groups and citizens. The iterative process of policy modelling in the scope of OCOPOMO is focussed on two pilot application cases, within which stakeholder groups will participate to collaboratively develop scenarios for a strategic area of interest. The order of interactions between the particular stakeholders is marked by numbers.

At the beginning, the policy analysts, policy operators and interest groups collaborate in the process of scenario development (1). The policy analysts may accompany the scenario with various supporting materials and explanations needed for better understanding of the proposed policy as well as for creation of respective policy model. The interest groups, which include representatives of specific non-governmental organisations, chambers of commerce, companies, and the general public, may

influence the policy creation already in the phase of initial design. Using e-Participation tools, they can provide comments and propose modifications in the scenario. The results of this first process step are a number of alternative scenarios for each policy domain (i.e. for each pilot application case).

The generated narrative scenarios are then used as a basis for two types of policy models. Experts in the area of policy modelling produce a common macroeconomic agent-based simulation model (2). It includes general and complex issues of economy theory, European or national directives and global trends (e.g. trends in private investment, consumption, changes in rates of inflation, etc.) in the modelled domain. The individual agent-based policy models will be developed specifically to reflect the concerns, objectives and perspectives of particular local stakeholders, which will be represented as agents in the model (3). Consequently, the macroeconomic model will be integrated into each of the individual pilot models to simulate the wider economic environment in which the regional policies are to be implemented.

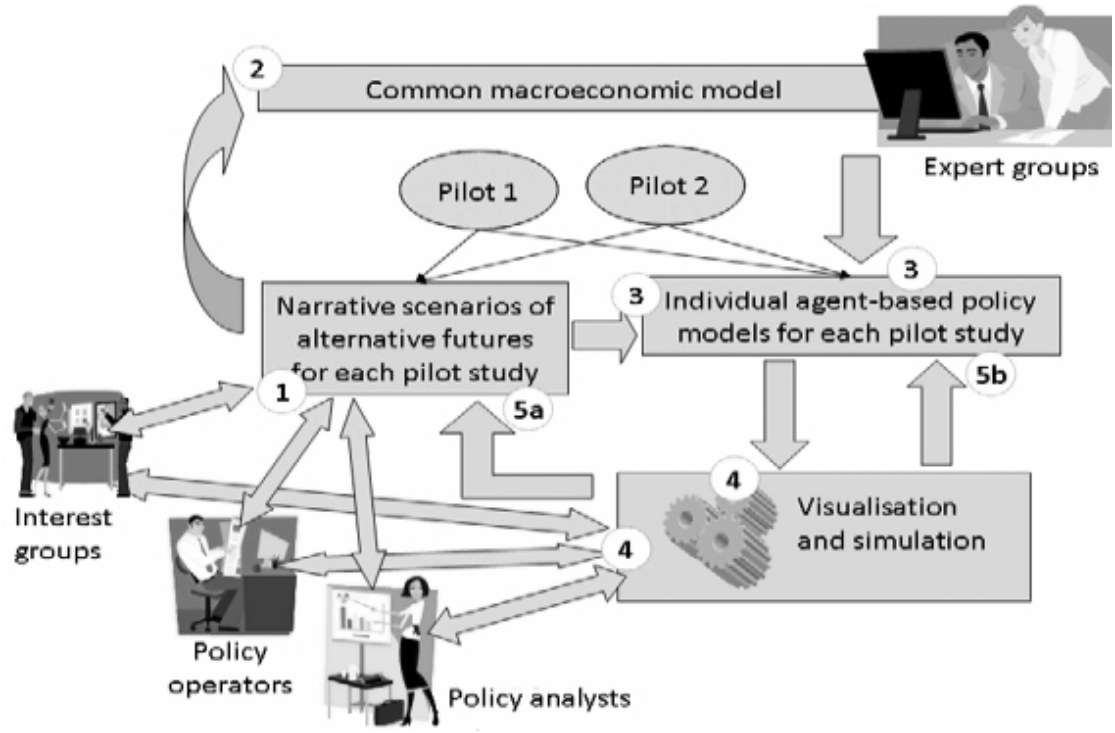

Figure 1. OCOPOMO concept of open collaboration in scenario-based policy modelling.

The designed policy models, aligned to the supporting narrative scenarios, are then visualised and simulated in the OCOPOMO platform (4). The stakeholders may actively and collaboratively modify the parameters of agent-based models, validate and evaluate the policies based on the scenarios developed in first step. A collection of revisions and modifications for the alternative scenarios, the parameters identified as those being crucial in the policy domain, and the individual policy models are provided as a result of this step. The procedure continues iteratively by processing the generated requests for modifications. Depending on what type of revisions and at what moment is requested, the process continues with the changes in alternative scenarios developed for each policy domain (5a), or by modifications in individual policy models (5b).

Two iterations are planned within the project. However, in practice, the process is likely to be ongoing and incremental with many partial revisions. Finally, after a consensual approval of most of the involved shareholders, the resulting narrative scenarios and policy models shall help policy operators to make their decisions on the basis of better quality of policy analysis results available.

3.2 High-level architecture of the OCOPOMO platform

One of the innovations of OCOPOMO is in enabling stakeholder collaboration by means of using a suite of ICT tools supporting collaborative development of narrative scenarios and policy models. It includes various means of communication and seamless information exchange, searching and manipulation with digital content (including the policy models and text-based scenarios), storage and management of shared digital content. These technologies will be integrated into an *ICT toolbox*. A high-level architecture of inner components and respective interfaces of the proposed ICT toolbox is presented in Figure 2.

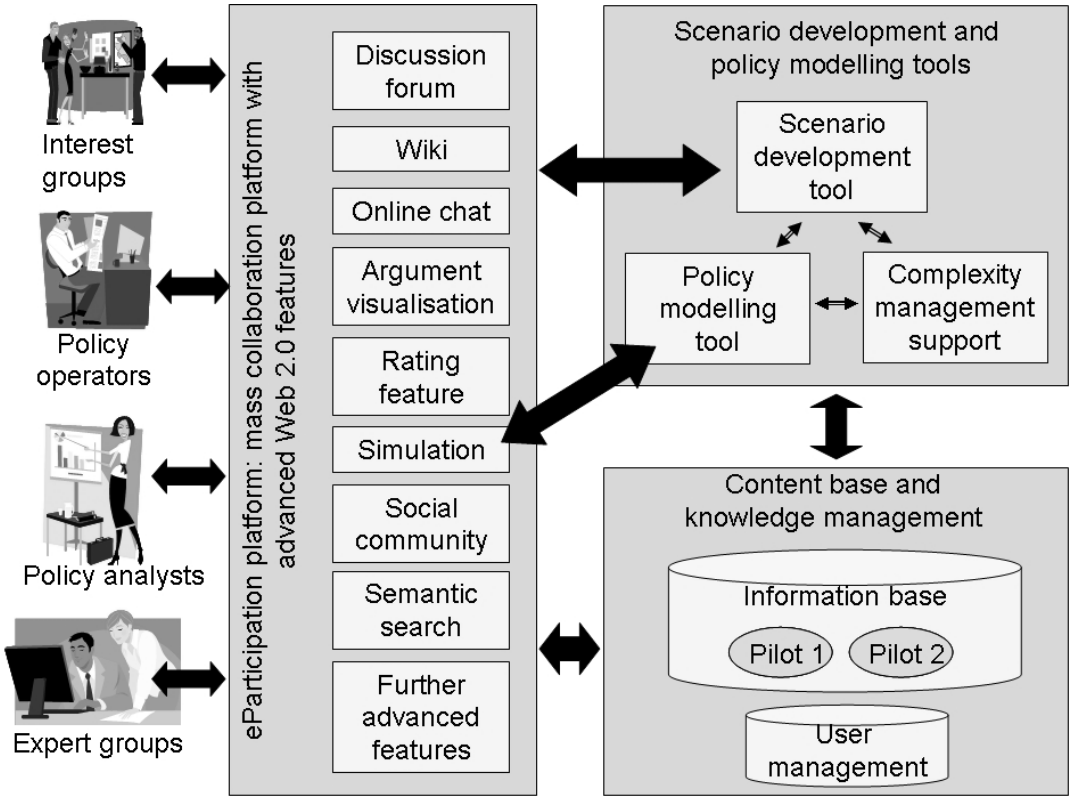

Figure 2. ICT toolbox supporting open collaboration in OCOPOMO.

The open collaboration in narrative scenario development is supported by the e-Participation platform that encapsulates advanced participation and collaboration features in line with the Web 2.0 vision. Included tools provide means for structuring the scenario development, supported by discussion, assessment and rating features of the key parameters to be identified in a verbal policy description. The module of e-Participation platform comprises of a collaborative space of the shareholders' community, enabling storage of and access to personalised digital data, such as alternative policy models, customised scenarios, supporting documents etc. Tools for policy modelling, visualisation and simulation will be integrated and functionally interconnected with the scenario development tools in order to support different stakeholder groups contributing to individual steps of the procedural design shown in Figure 1. The scenarios, policy models, and other materials published in the shared collaborative space are semantically annotated by elements of a common knowledge model. Using such a semantic enhancement, heterogeneous information resources can be mediated and organised on a basis of unified vocabulary (i.e. a set of basic terms with agreed meaning). Furthermore, the stakeholders will be able to search and access the published information in meaningful semantic relationships.

4 PILOT APPLICATIONS AND PRELIMARY ARCHITECTURE

4.1 Basic description of the pilot applications

The OCOPOMO platform will be applied and tested on two pilot cases, where the stakeholder groups will participate to collaboratively develop scenarios for a strategic area of high interest. The policy areas of the pilot applications are as follows:

- *Pilot Campania*: Campania Region (http://www.regione.campania.it), Italy. The main goal of the pilot is to develop ICT- and methodological support in policy decisions in respect to an optimal allocation of EU Structural funds in the region and thus to improve economic growth, socio-economic balance in economy and society of the region. The objective is to manage the distribution of EU resources for local development policies with specific regard to such issues as environmental sustainability, cultural and tourism appeal, competitiveness of the region's productive economy, energy, accessibility and transport, information society, urban development and quality of life.
- *Pilot KSR*: Kosice Self-governing Region (KSR, http://www.vucke.sk), Slovakia. The key policy topic is the development of a sustainable long-term strategy for exploitation of renewable energy resources. The interest of KSR is to better understand and identify potential impacts of policies in use of renewable energy resources, namely the impacts on employment, the financial implications of the investments, the environmental impacts and a wide range of associated issues. The aim is to see how efficient the existing measures are, how many jobs the strategy creates, etc.

Both pilot application cases were defined on regional level, with an assumption to incorporate the macro-level policy of European and national dimensions as well as to reflect and integrate the micro-level policies of particular municipalities in the region.

The development of the OCOPOMO platform started with the specification of user requirements for both pilot applications. It includes the identification of existing and potential stakeholders in the domain and the detailed analysis of the current status of policy creation process. The sub-processes that could (should) be provided for collaborative work need to be identified and assigned to respective groups of stakeholders.

4.2 KSR pilot application analysis – collaboration-based extensions of the current process

To demonstrate the adopted approach, we will describe these steps using the KSR pilot case. In the first step, the stakeholders were identified for each of target user groups. Interest groups consist of various types of external and internal stakeholders such as energy producers, potential investors, NGOs and public associations that are active in the field of energy savings, general public, members of regional parliament, working groups in the parliament, as well as public servants from the Department of Regional Development and Land Planning in KSR (DRDLP) and SIEA (Slovak Innovation and Energy Agency, http://www.sea.gov.sk). The OCOPOMO partners responsible for scenario generation and policy modelling, who are in a position of facilitators and service providers, play an important role in this process as (internal) stakeholders. After identifying the target user groups, contacts to representatives need to be gathered and proper communication channels established. Citizens, NGOs and various interest groups can be contacted, for example, via local media channels, press agencies, web forums or web-based social networks.

In the second step of the procedure, an initial narrative scenario describing KSR's plans and intentions in the area of renewable energy will be formulated and published in the OCOPOMO platform for wider discussion and collaborative manipulation. A first draft of the scenario will be prepared by policy analysts according to the current status of the domain, existing process of policy creation, and KSR's vision of future development in the area of renewable energy resources.

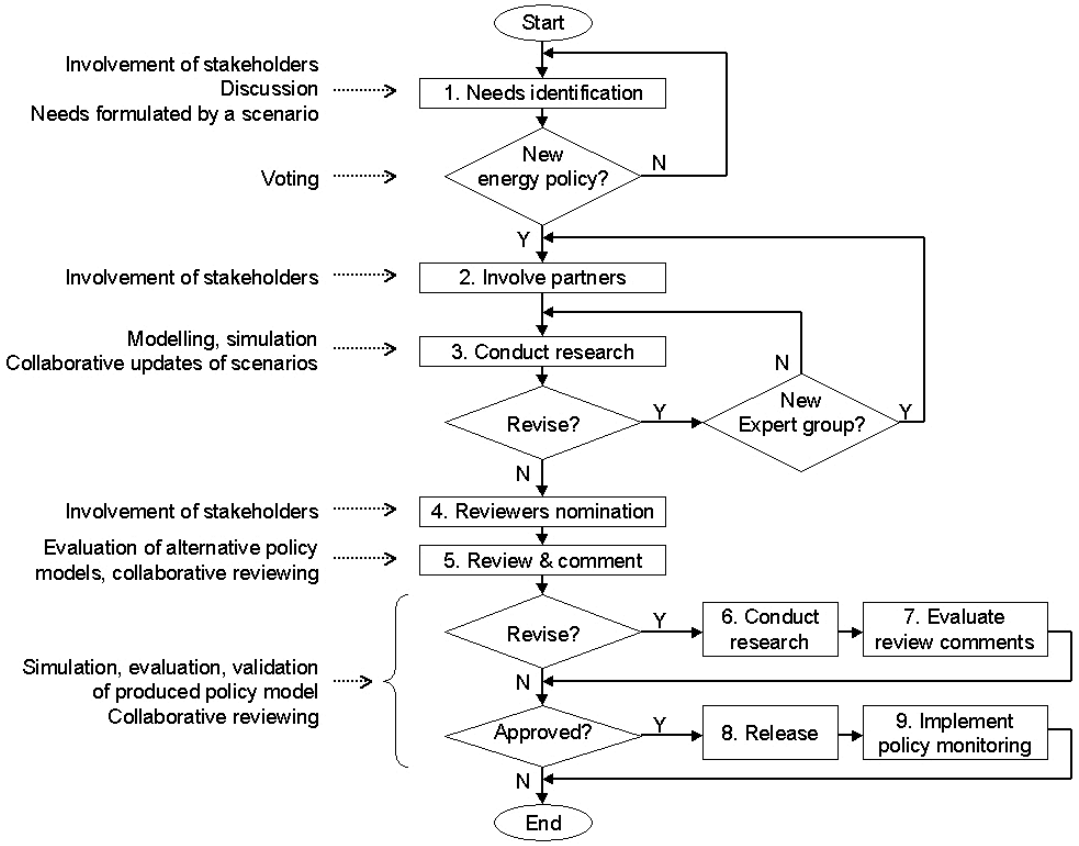

Figure 3. Process of policy creation in the KSR pilot use-case.

The process of policy creation, as it is nowadays applied in KSR, is depicted on the right-hand side of Figure 3. This simple flow chart representation of the process describes steps of the policy creation within KSR. Briefly, after identification of needs for a new policy, its creation is started. Then an expert group is set up (step 2: Involve partners), followed by the research related to a new policy. The result is a policy draft, which is then reviewed, revised and approved, together with necessary feedback and evaluations. The described process can be extended and upgraded by means of the OCOPOMO platform, as it is presented on the left-hand side of Figure 3. The consortium of stakeholders can be flexibly modified and can include all relevant user groups. E-Participation tools supporting on-line discussions, presentation of alternative personal ideas, information sharing, voting and polling on problematic issues may be very productive in phases 1, 2, 4 and 5 of the process. OCOPOMO capabilities of collaborative development of narrative scenarios and related policy models, integration of macro-level and micro-level views, simulation and validation of alternative models are essential for analysis, research and evaluation in phases 3, 5, 6 and 7.

Next step of our AS-IS analysis for KSR pilot application was to describe the process in more precise way. For this reason we have used BPMN (Business Process Management Initiative) standard (http://www.bpmn.org/). An example of a process fragment formalised in the BPMN standard is depicted in Figure 4. The process comes from the DRDLP stakeholder to the Expert group in the moment of Conduct research, which is actually looped sub-process. The "Conduct research" activity is a sub-process of creating the policy draft proposal. It is supported by the OCOPOMO tools for policy modelling and agent-based simulation as well as for collaborative formulation of narrative scenarios, which should result in producing a draft directive for the newly created policy. After the creation of the Draft Directive document, i.e. a textual description of the new policy draft proposal, this document goes to the Executive board. It creates a report about the draft quality and sends it to President of KSR (who is the responsible person) and process follows to another blocks. Optionally, if the draft proposal does not reach the required quality or level of details, the sub-process of conducting the research can be re-initiated by the Execution Board body.

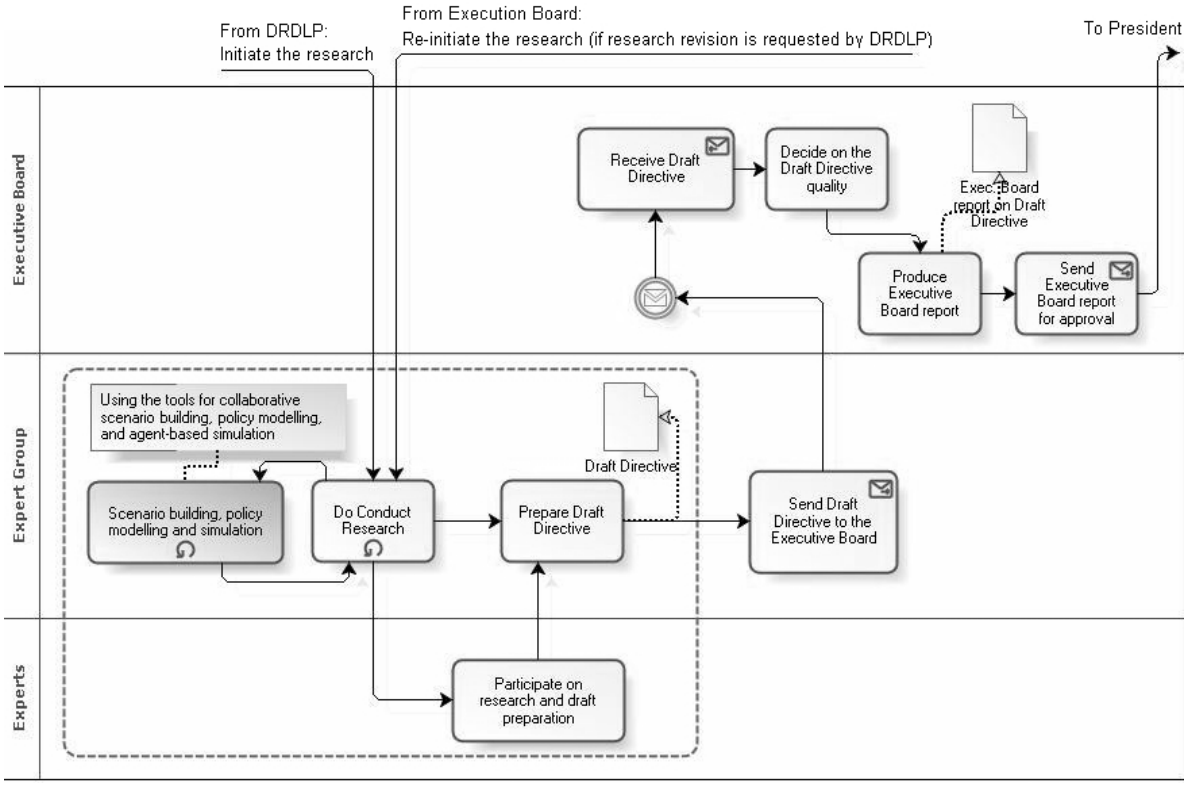

Figure 4. Example of the BPMN model for KSR policy creation process.

The main objective of the BPMN model creation is to find places in the process where ICT toolbox will be used, and to design and implement support in those specified places. The tasks and sub-processes that will be provided by the OCOPOMO ICT toolbox are marked with a coloured background. In Figure 4, the sub-process of "Scenario building, policy modelling and simulation" was identified as a supporting activity in the collaborative investigation of alternatives and settings in the newly defined policy and thus it will be supported by the respective tools and technologies of the OCOPOMO platform.

4.3 Preliminary architecture of OCOPOMO platform

In this section we will provide first preliminary version of architecture for the OCOPOMO solution. The architecture design is based on the high-level schema of functional components and their interfaces, presented above in Figure 2. For designing the structure of inner system modules, we have adopted the methodology of Rozanski and Woods (2005), which requires an identification of viewpoints, perspectives, and stakeholders (users, external systems) of the platform. In the context of the information viewpoint, four main component groups were identified for the OCOPOMO platform:

- *Tools*: client applications within portal or as external services (in Figure 2, it roughly corresponds to the e-Participation platform and the tools for Scenario development and policy modelling),
- *Core*: business logic components for support of functionality and management of whole platform (this group has no direct equivalent in Figure 2),
- *Data*: repository for different resources and metadata used within project (i.e. the Content base and knowledge management in Figure 2), and
- *External Services and Resources*: abstract view of external services and resources related to pilot applications (in Figure 2, it is depicted as an interaction with stakeholders).

These components, as depicted in Figure 5, are supposed to communicate via standardised API interface provided and maintained by the system core. Modular architecture enables implementing and providing some of system components as web services.

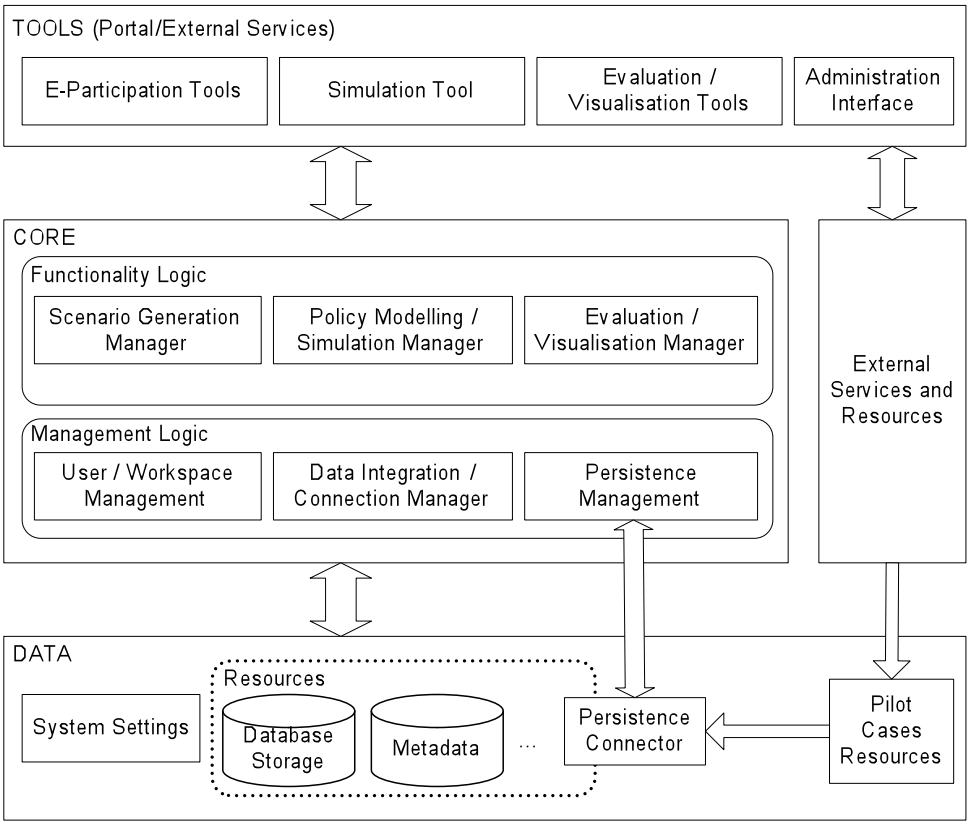

Figure 5. Architecture of the OCOPOMO platform.

The OCOPOMO Core component group consists of two parts. First, there are managers for business logic of functionality provided by the solution to users, where all main issues of the process are managed. It means that Scenario Generation, Policy modelling and Simulation, and Evaluation and Visualisation has its own manager for logic behind. All these should also communicate together and with tools from the Tools layer. Management logic group of components is important for data integration, persistence, and communication between components, as well as for management of users, workspace and security issues. The Core part of the architecture is connected to the Tools layer, where all particular tools (i.e. a simulation tool like Repast, visualisation tools, e-Participation software with wiki, blog, forums) are provided to user directly or through integrated portal. If there is a need for some external service, the Tools layer is able to communicate with these elements (which are, in Figure 5, located under External Services and Resources group). One part of the Tools layer is also an administration interface. On the other hand side, the Core layer is connected to Data layer, where system-related data (such as users, roles, permissions, etc.) are stored. Also the resources related to tools and exchanged information are stored within database, metadata repository, or other types of persistent storage. Persistence connector will be used for abstracting of potentially heterogeneous information resources. Pilot-specific data will be stored using the connector as well; however, the data originally generated by the External resources part will be mediated and used solely as an input to the Resources part. Basic data repositories are assumed to be the ontologies, relational databases, file systems, and indexing space to store the content and properties of the resources used within a business process and to provide them to the functional modules.

5 CONCLUSION

The presented idea of collaborative policy modelling, proposed and applied in the FP7 ICT OCOPOMO project, aims at enabling active and sustainable participation of a wide range of interest groups on a long-term policy formation. It uses a combination of explanatory narrative scenarios, simulations in agent-based policy models, and e-Participation techniques, which may enhance existing

e-Governance solutions towards higher transparency and wider public acceptance. Two pilot applications in Italy and Slovakia, targeting a development of regional strategies for the domains of EU structural funds and renewable energy resources, are proposed as a "proof of concept". Currently (May 2010), the project is in the phase of gathering user requirements, evaluating available ICT tools and technology frameworks, designing the architecture and modules of the OCOPOMO platform. In parallel, narrative scenarios and related policy models for pilot applications on both macro- and micro levels are developed in a co-operation of user partners (i.e. KSR and Campania) and policy modelling experts. The platform architecture and components will be precisely designed in the end of 2010. More information on the OCOPOMO project can be found at http://www.ocopomo.org.

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