Chapter 5
The FUPOL Policy Lifecycle

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ABSTRACT

The purpose of this chapter is to outline an advanced policy lifecycle, the FUPOL model with its ability to link technical features in the area of policy modeling. The FUPOL Policy Lifecycle is based on 6 stages, which are further divided into 8 main tasks. These main tasks are split up into 19 subtasks to provide a very detailed policy lifecycle structure. The detailed breakdown allows one to link each task to various technical features, such as opinion maps, policy indicator dashboard, knowledge database, and simulation and visualization tools. The chapter further argues that the methodology applied is future proof and has the potential of accommodating new technologies in the future.

INTRODUCTION

Public policy is the domain of local and national governments. They address a public issue by laws, regulations, decisions or actions. Many topics are usually treated by public policy such as economy, social welfare, crime, tourism, traffic, education, etc.

Governments take decisions for their citizens primarily based on their policy concept and the current economic and social development. All these decisions originate in many analysis and discussions with all relevant stakeholders, such as companies, NGO´s, governmental organisations, citizens, unions, organizations representing commerce and industry etc. Most of the decisions are empirical and are based on previous experiences in the specific policy domain.

In a rapidly changing world a very cautious and deliberate policy making is required and routinely decisions might be dangerous, because circumstances and framework conditions alter quickly. Likewise available data as well as the technologies to support policy design and implementation are evolving quickly.

This gives to the policy decisions the opportunity to associate the knowledge of the experiences and the political and ideological background with the availability of data and information that go beyond the boundaries of the internal traditional gov-

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ernment knowledge and include external sources on the internet, like Social Networks or Internet of Things. This leads to better fact based decisions, although these are likely to be still influenced by political and ideological considerations. Policy decisions are always risky but facts based decisions overcome or mitigate those risks

Therefore it is very important to approach the policy lifecycle in a systematic way, which means describing all steps in high detail. Such a detailed description is also required to provide a complete picture, which technologies can support the policy design and implementation

The objective of this chapter is to work out a new enhanced and detailed policy lifecycle which has the ability to link technical features in the area of policy modeling. The methodology applied must be future-proof and have the potential of accommodating new upcoming technologies

BACKGROUND

Policy

Before discussing the policy lifecycle it has to be specified what is a policy in this specific context. In the context of public policy a policy is understood as a course of action, authorized by the government, to achieve predefined specific goals. Such a course of action may take many forms. It could, for example, be expressed in the form of a strategy, a program, a law or a statement made by an executive authority. (Hewlett, Ramesh and Perl, 2009)

Policies are not created in a vacuum. Many people affected by these policies have an interest in determining the content of that policy. Policies can also be seen as processes. They change as they are implemented and rarely conform to plan. Policies can have intended and unintended outcomes.

Furthermore it is well known that public policy is a very complex task comprising many decisions influenced by citizens, politicians and companies on a national and on an international basis.

Policy Lifecycle Models

Hewlett, Ramesh and Perl (2009) point out that the most popular means of simplifying public policy making for analytical purposes has been to think of it as a process, that is, as a set of interrelated stages through which policy issues and deliberations flow in a more or less sequential fashion from "inputs" (problems) to "outputs" (policies).

The first one who tried to facilitate the policymaking process and to reduce it to different stages was Harold Lasswell. (Hewlett, Ramesh and Perl, 2009) The concept of policy lifecycle was developed by him in the USA in the 1950s. He was one of the pioneers of modern political science and he described public policy science as being multidisciplinary, problem-solving and explicitly normative. Based on these characteristics, he developed the concept of policy cycles, which he broke down into seven fundamental stages in decision-making (Hupe and Hill, 2006), such as intelligence, promotion, prescription, invocation, application, termination and appraisal.

After Lasswells definition of the seven-stages-model many variants of a process model, especially regarding the number of stages have been developed.

Jones (1984), Anderson (1996) and Brewer (1983) also defined policy modeling processes, which are not equal, but the specification of the required procedures for decision making and implementation of policies are analogical, using five to seven stages.

At present there is a consensus to use problem solving policy cycles, which are divided into five stages. Howlett et.al. (2009, p.12) suggest: a)

agenda setting for problem identification, b) policy formulation for the proposal of different solutions, c) decision making for choice of solution, d) policy implementation for putting solutions into effect and e) policy evaluation for monitoring the results.

Ann Macintosh (2003) proclaims five stages, such as agenda setting, analysis, policy creation, implementation and monitoring.

The main advantage of the policy lifecycle is that this model breaks down the complex public policy process into a few stages.

The process of Policy Modeling (PM) is a complex challenge, which includes various tasks with a predefined order to ensure the creation of an effective policy. To face this challenge the structure of the accruing tasks were investigated by several existing process definitions. The processes enable the definition of process-tasks and supporting tools for an efficient task-solving. In particular the supporting tools are nowadays brought by the Information and Communication Technologies (ICT), with the rising role of internet, social web and further ICT-based technologies. The definition of PM-processes was often defined in existing works by setting goals for their categorization.

The conventional PM processes are the most established definitions and primary used and implemented at public authorities. They have been researched since decades. Modern ICT technology like Internet, social networks, simulation and graphical visualisation, structured and unstructured information analytics etc. did not exist initially when PM processes have been established. Therefore unfortunately public authorities do not often consider usually the ICT-tools and their opportunities. Novel approaches for e-Participation and e-Governance are not usually reconciled with the conventional PM-processes. The greatest advantage of such conventional PM-process definitions is their accurate documentation. No other category of PM-process definition provides such a well described definition of each process step. Most of the conventional defined PM-process, i.e. in (Jones, 1984), Hupe, 2006), are not equal, but they describe the required steps in a similar way according to (Howlett, 2009) and (Hupe, 2006). They are using a three to seven stage model and cover the same issues.

ICT Support and Policy Lifecycle Models

A more recent approach to define the PM-process is to consider the use of ICT-tools in the entire process. In particular the involvement of citizens and their opinions can be supported in a more comfortable way because they allow a quick interaction between citizens and governments. These process models adapt the conventional PM-process to include some ICT-tools.

The well-known definition of Macintosh (2003) and the associated published model is proposed by the OECD (Macintosh, 2003) to reinforce e-Democracy. Both processes define a five-stage PM-process: (1) Agenda Setting, (2) Analysis, (3) Policy Creation, (4) Policy Implementation, and (5) Policy Monitoring.

Next to these established process definitions, there are very similar definitions with a deviation in the number of stages. They address the same issues, similar to the parallel existing process definition for the conventional PM-processes. The process definition of Mashinini (2008) consists of four phases. His model combines the first two stages of Agenda Setting and Analysis in one stage.

Another policy lifecycle process definition was proposed by the World Bank (2010). It describes a more structured process with an assessing and co-ordination responsibility within the governments.

European Projects

A number of European research projects have also specifically addressed policy lifecycle models and related ICT support, namely

- Open Collaboration for Policy Modeling (OCOPOMO),

- Policy Gadgets Mashing Underlying Group Knowledge in Web 2.0 Media (PADGETS),
- Integrated Method for Policy Making Using Argument Modeling and Computer Assisted Text Analysis (IMPACT),
- Citizens Collaboration and Co-Creation in Public Service Deliverable (Cockpit)

Open Collaboration for Policy Modeling (OCOPOMO)

OCOPOMO is an agent-based policy model which shows two significant differences compared to previous policy modeling approaches.

The first is that the models are strictly evidence-based and built around the descriptions, expectations and beliefs of stakeholders in the policy process. The models are not driven by prior theories except to the extent that the theories have been developed in close connection with evidence and well validated independently of the models developed for the policy analysis. (Moss et al. 2011, p. 10)

The second important difference is that the nature of the models and their development implies a different relationship between the modellers and the clients – in this case the stakeholders – in the policy development, design and implementation process. The modeling process involves stakeholder participation so that the stakeholders and modellers are in effect partners. (Moss et al., 2011, p. 10)

In OCOPOMO the policy model is divided into phases, which will be merged in an integrated and iterative process. (Bicking et al., 2010). Phase 1 is the "Identification and Analysis of Potential Policy Areas" supported with stakeholder workshops and traditional research. This specific step is devoted to the design of problematic scenarios for relevant policy areas. After selection of the policy domains the scenarios have to be outlined by the use of scenario generation tools applicable for various policy domains. In Phase 2 "Agreement on one Policy Area" the policy domain to be modeled and simulated will normally be selected by using an opinion polling system on the common workspace. Phase 3 is devoted to "Detailing Objectives and Formulation of Scenarios" by using the common workspace and the use of a scenario generation tool, resulting in a narrative to outline the policy model. Phase 4 is reserved for "Extracting Particular Parameters" based on the narrative. Phase 5 is dedicated for "Detailing of Actors, Structures, Conditions, Environmental Factors and Behavior to Each Other" and results in the definition of the simulation the agents. (Bicking et al., 2010, p. 58)

Policy Gadgets Mashing Underlying Group Knowledge in Web 2.0 Media (PADGETS)

PADGETS was a project in the domain of eGovernance and Policy Modeling. The objective was to design a prototype to facilitate policy decisions by the use of social media tools and a decision support system (Padgets-Project, 2013).

In deliverable 2.1 the main novelties of the PADGETS platform are described as

- "A relaxation of current constraints in terms of size, frequency and quality of participation", which means easy access to participation for stakeholders and continuously interaction between policy makers and stakeholders (Ferro et al., 2011, p. 29);
- "An integrated management of multiple SMP & SNP channels", by using the web dashboard (Ferro et al., 2011, p. 29); and
- "Creation of an open decision support systems bringing together simulation models and SMP and SNP" (Ferro et al., 2011, p. 29).

The policy life cycle is supported by "padget campaigns", which are launched during the different stages.

Padget Campaigns are considered as a consultation tool. Policy decisions might differ from the results of the campaign. (Ferro et al, 2011).

Integrated Method for Policy Making Using Argument Modeling and Computer Assisted Text Analysis (IMPACT)

IMPACT was a specialized research project with a specific focus on the automatic processing of arguments, as for instance pros and cons. (IMPACT-Project, 2013) "IMPACT argumentation tools are designed to make it easier to collect policy proposals and arguments about the pros and cons of policy proposals, identify stakeholder interests and values, reconstruct arguments from natural language texts collected from weblogs and discussion forums distributed throughout the Internet, visualize networks of arguments, evaluate arguments, reveal implicit premises, and ask relevant critical questions. (Fraunhofer et al. 2010, p.3)

IMPACT was initiated to compensate the shortcomings of state of the art consultation tools. A major deficit of traditional consultation tools is the constraint of their argumentation support systems. The IMPACT argumentation has been specifically developed to foster stakeholder consultation about legislative Green Papers. A Green Paper is a preliminary government report presenting policy proposal which has to be discussed in Parliament to obtain consent. In general Green Papers are published so as to obtain and collect opinions and alternative proposals about the suggestion from all relevant stakeholders, such as citizens, companies, NGO´s, government officials.

Citizens Collaboration and Co-Creation in Public Service Deliverable (Cockpit)

Cockpit is a project in the area of eGovernance and Policy Modeling. The major objective was to design a prototype to facilitate the decision making process by use of social media and a specific decision support tool. The initial idea was to enhance the public participation in the new design of public services and to encourage the stakeholders to express their needs regarding the public services delivery. (Cockpit-Project, 2013)

The governance model was supported by a set of tools relevant for the decision making process, such as

- "The Citizens' Opinion Mining Tool,
- The Public Service Engineering Tool,
- The Public Service Simulation and Visualisation Tool,
- The Policy and Law Retrieval Tool,
- The Deliberative Citizens' Engagement Platform" (Koutras et al., 2010, p. 12).

The prototype was tested in three pilot cities and can be implemented for citizen empowerment in various policy domains.

MAIN FOCUS: ADVANCED POLICY MODELS

Issues, Controversies, Problems

The Challenge of Detail in the ICT Driven Process Definitions

Current technologies offer a broad range of features such as social media, automated advanced text and speech analytics, simulation, visualization or mobile.

None of the ICT-driven process definitions outlined in the section "ICT Support and Policy Lifecycle Models" describe the steps of the workflow

- To sufficiently explain the use of certain tools and their benefit;

- To design ICT tools based on existing technology; and
- To evaluate the use of new technologies to support them.

Challenges of Integration and Full Policy Lifecycle Support

The current ICT solutions supporting e-Participation and policy modeling are focused on solving a specific problem. Consequently ICT tools developed support a certain step of the policy design and implementation only. Moreover they are only partly integrated on the conceptual and the technical level. The conceptual level refers to the policy lifecycle, the technical level refers to data integration and user interface. Sometimes there are also limitations on the scope of stakeholder and citizen involvement.

The FP7 research projects mentioned clearly illustrate the above.

In OCOPOMO a number of tools namely "Common Virtual Work Space", "Common Virtual Participation", "Area Scenario Generation Tool", "Gap Tool" and scenario tools are provided to support the policy design process. The limitation of these tools is that the number of stakeholders that can be reached and processed in OCOPOMO is limited and does not include citizen participation. There is no ICT support for the policy implementation phase and subsequent evaluation.

PADGETS is intended as a consultation tool with social media. While the social media support is extensive across the whole policy lifecycle it does not offer the integration of other tools for example visualization and policy impact simulation.

The IMPACT project is focused on the automatic processing of arguments in a political debate, which is helpful once a specific policy topic has been identified. However the tools do not support the identification of a policy issue which is not yet on the public agenda as well as the policy implementation phase and subsequent evaluation.

The Cockpit project is focused only on the domain of new design of public services, which is a specific problem of policy design and implementation. Consequently the use of most of the tools is limited to this specific domain.

SOLUTION: THE FUPOL POLICY LIFECYCLE

Introduction

In order to address the linkage between policy process and ICT, a new model has been developed in the FUPOL project (FUPOL-Project, 2013). It uses the existing models as a base, but enriches them with a comprehensive, integrated and detailed breakdown of tasks as well as with a linkage to ICT technologies and benefits.

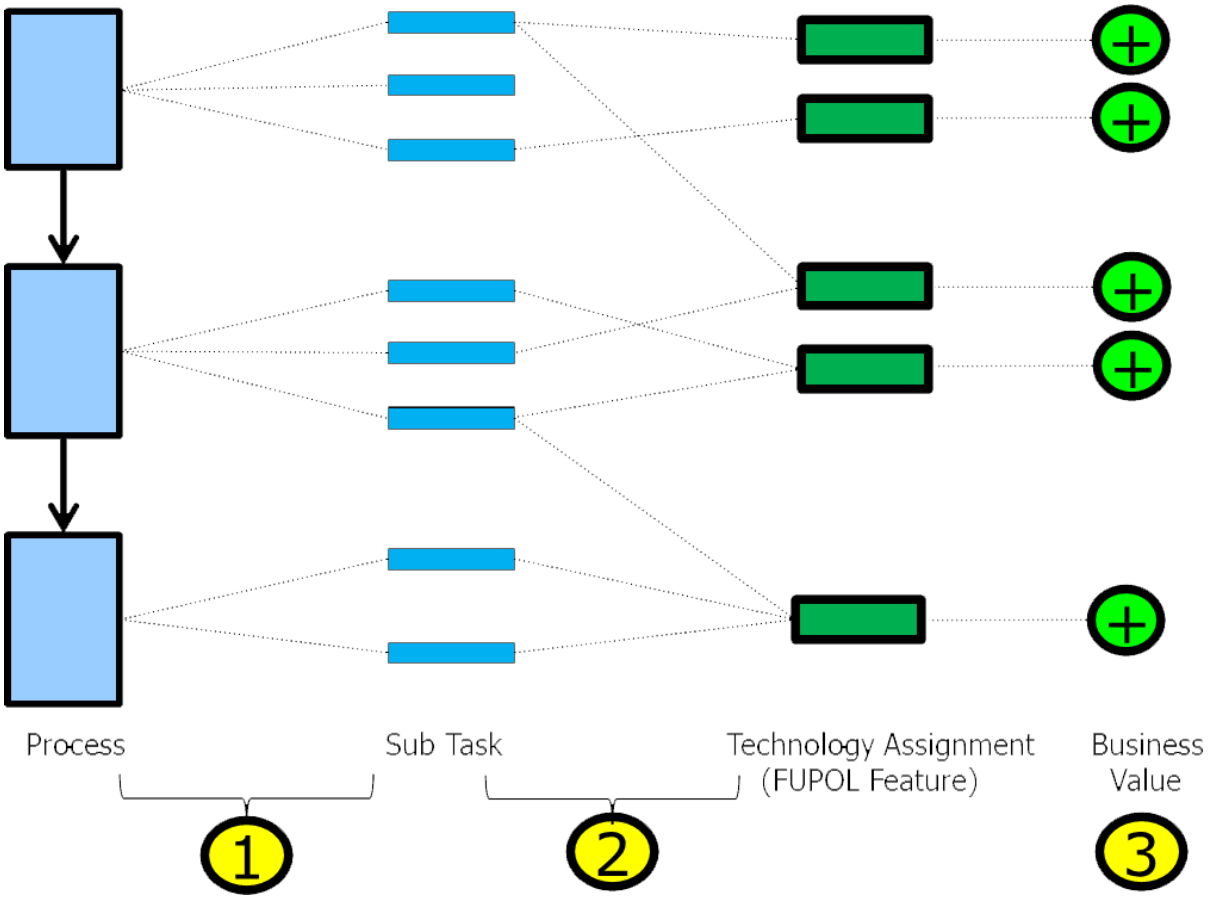
The novel FUPOL Policy Lifecycle is characterized by its six lifecycle stages, main-tasks and subtasks which are combined with technical features.

The picture shows the alignment of the several layers.

1. Each step in the policy lifecycle process has several subtasks.
2. For each step in the policy design process *one or more* technologies (FUPOL features) Support a specific step in the process.
3. Each feature has a business value for a certain stakeholder group.

The FUPOL policy life-cycle supports all levels of participation, such as

Figure 1. FUPOL Policy Lifecycle layers



- Information, which is a one way communication where the government or the policy distributes information to the stakeholders;
- Consultation, which is a two way communications and allows feedback from the citizens and other stakeholders based on issues previously defined by the government;
- Active participation, which is a partnership cooperation between the government and all relevant stakeholders (citizens, companies). The stakeholders are involved in the decision making process, respectively in the design of the policy document, in the implementation and evaluation of the policy measures; and
- Passive participation, to find out the citizens opinions about specific topics by crawling of media, social media, blogs etc.

In the following chapter we describe in detail the whole FUPOL policy process which can be divided into the following generic stages:

- Agenda setting, which allows the identification and the validation of a policy problem.
- Analysis, which is determined to identify the challenges and opportunities as well as the solution approaches linked to the identified policy problem.

- Policy Formulation & Policy Creation, which aims at drafting proposals for ratification based on policy options.
- Decision Making, which is the domain of the policy maker.
- Policy Implementation, which guarantees the implementation of the selected policy measures.
- Policy Monitoring & Evaluation, which includes forecast simulation, monitoring of key-indicators and impact evaluation.

The Figure 2 shows the overall process and the link between each stage of the Policy Lifecycle and its subdivision into single elements in relation to the main tasks and subtasks. Each of these elements of the overall process is described in the following chapters. The description of each element is supported by specific FUPOL software features. These software features are described in the chapter "Software modules supporting the FUPOL features and their Assignment to Subtasks" that follow after.

1. Agenda Setting

In the policy lifecycle stage called "agenda setting" the issues which should be addressed by the national or local government are discussed. It has to be found out either there is a need to define a policy measure for a specific topic or to amend an existing one. This is the first stage in the FUPOL Policy Lifecycle and indeed a very delicate one as it lays the cornerstone for the follow-up stages.

Ann Macintosh (2003) defines Agenda Setting

… establishing the need for a policy or a change in policy and defining what the problem to be addressed is. This may arise as the result of a change of government; a sudden change in the environment; a growing development; a new problem or a continuing problem. (Macintosh, 2003, p. 35)

Of course, the agenda setting stage is highly influenced by the media. They play an important role in the shaping of the political life and reality. It has to be considered that the constituents have access to all sort of medias like newspapers, radio, television, Internet etc. They are not only informed about the relevant topics which should be treated but also about their necessity and ranking. From the amount of information and the placement in the news the consumers of the mass media are briefed regarding the importance of the different political topics.

This insight is absolutely relevant for FUPOL, as the agenda setting process is supported by social media tools. The citizen and other relevant stakeholders are constantly addressed by campaigns to post their opinions with regard to specific topics. Especially the wording of the campaign text has a specific influence on the stakeholder´s response, in terms of quality and quantity.

1.1 Policy Problem Identification

Policy issues can be divided into two categories:

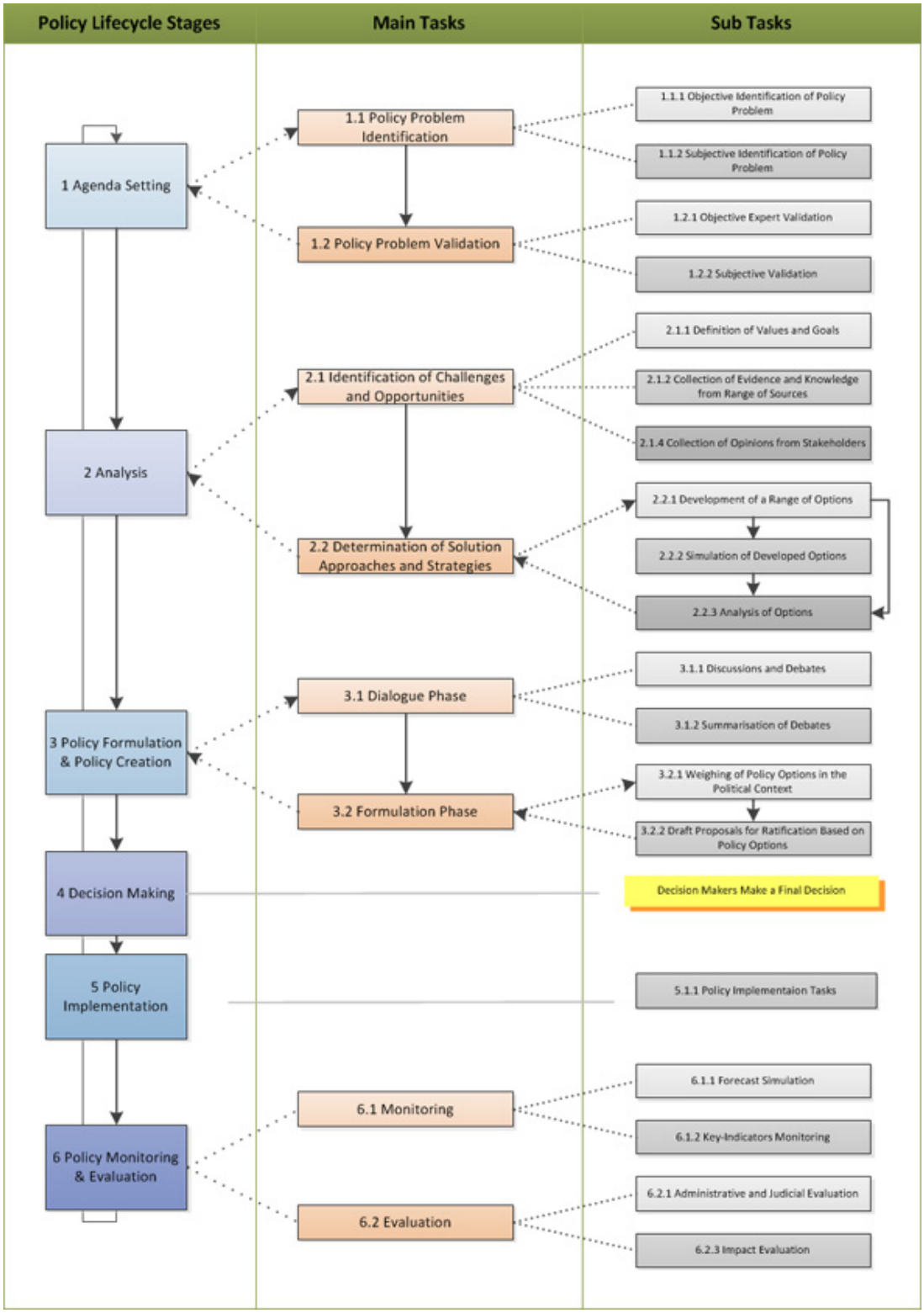
- Those which are already on the public policy agenda; and
- Those that are not.

If an issue is already on the public-policy agenda, it has a sufficiently high profile. A formal process to elaborate further on it is likely to be in place. If an issue is not on the public-policy agenda electronic tools can be used to identify it quickly.

Typically a policy issue will come up, appear and remain on the public policy agenda when it meets one or more of the following criteria.

The FUPOL Policy Lifecycle

Figure 2. Overview FUPOL Policy Lifecycle



- Involvement of a large number of people.
- Impact creation on the wellbeing of the citizens as a whole which has to be regulated (e.g. heavy traffic jams during rush hours which calls for alternative means of transport).
- Long-lasting existence and public discussion, which means this issue is of high relevance to the people.

But the selection of policy issues which will be considered by the government is highly influenced by international and domestic actors and the government itself. But this does not mean that the problem will be solved by passing through the whole policy lifecycle.

According to Ann Macintosh in the agenda setting the need for a policy or a change in policy has to be established. In addition the problem concerned has to be defined. This problem may arise as a result in changes in development or in the government. (Ann Macintosh, 2004). The active participation of citizen, civil servants and the chambers of commerce and industry association allows them to determine possible agenda items.

1.1.1 Objective Identification of Policy Problem

This refers to the identification of issues through analysis of statistical data. Issues are identified through deviation of indicators from predefined thresholds. Many studies and works around agenda setting concluded that cultural, political and other factors were less significant in the clarification of the public policy than economic factors.

The idea of the political business cycle was created and it assumes, that "the economy has its own internal dynamics, which on occasion are altered by political interference. In many countries the timing of this interference could be predicted by looking at key political events such as elections and budgets, which tend to occur with some degree of regularity in democratic states". (Howlett, 2009, p. 95)

In addition it has to be regarded that the political regime, the partisan ideology and the ideology of the political leaders outlines the frame of the economic policy.

Example: As described previously the objective problem identification is based on the analysis of the statistical data and or the deviation of indicators from predefined thresholds. The objective description of the policy problem is supported by the policy indicator dashboard and the visualization of statistical data. The most relevant indicators in urban economy which have to be monitored with respect of the development in this specific policy domain are described below. Definitions refer to the World Bank rules and guidelines.

- Gross Domestic Product, this is the market value of all officially recognized final goods and services produced within a city in a given period of time (The World Bank, 2013).
- GDP per capita, which is GDP divided by midyear population.
- GDP annual growth rate, that expresses the growth per year.
- National savings, which is the sum of private and public savings.
- Average personal income, which is the total personal income minus personal current taxes or the average household income.
- Percentage of households with less than half average income (or households below poverty line).
- Economic activity rate, what is the percentage of the population, both employed and unemployed resulting in the manpower supply of the labour market regardless of their current labour status.

- Proportion of skilled labour – this is a segment of the work force with a high skill level that creates significant economic value through the work performed.
- Proportion of unskilled labour, which is a segment of the work force associated with a low skill level or a limited economic level for the work performed.
- Purchasing power.
- Employment rate and employment growth rate.
- Informal employment rate.
- Unemployment rate.
- Average level of skills and education.
- Proportion of tertiary graduates.
- Public investment per capita.
- Private investment per capita.
- Energy consumption per capita.

The objective construction of a policy problem is supported in FUPOL by the visualization of statistical data.

1.1.2 Subjective Identification of Policy Problem

The subjective construction of a policy problem refers to the identification of topics from social media. In general world views, principal beliefs and causal ideas are relevant in the agenda setting process.

Example: The citizen or other stakeholders like government authorities or companies will discuss and identify their problems via social networks. Regarding the economic policy they most probably might complain about the following.

- High local taxes,
- Insufficient personal or household income,
- High unemployment rates,
- Bad business infrastructure,
- Missing business incentives to increase the employment rate.

The subjective construction of the policy problem is supported in FUPOL by software modules and functions for the social network aggregation and single window display, the Hot Topic Sensing Tool & Topic Summarization, Opinion Maps, visual social data analysis and of course, polling with questionnaires.

1.2 Policy Problem Validation

In this stage it is checked, whether the problem identified is a real problem and should be taken further to an analysis stage.

1.2.1 Objective Expert Validation

The problems identified in the step subjective identification of Policy Problem (1.1.2) are checked again by experts, whether they are a real problem or not. The recommended methods are desk research and statistical data analysis.

Example: In case of complaints via postings in the social media domain experts are involved to validate either these postings are a real problem for the citizens, the companies and other stakeholders. This subtask is supported by the FUPOL Knowledge Database and the visualization of statistical data.

1.2.2 Subjective Validation

The problems identified in the step objective identification of policy problem are checked again by social media analysis and news analysis whether they are a real problem for the citizens and stakeholders.

Example: If the before mentioned indicators vary from the previously defined threshold values, the stakeholders will be further questioned via social media. It has to be found out if the deviation from predefined thresholds are a real problem for them or not. Let´s assume, in our example the current annual unemployment rate is 15%, which

is above the threshold of e.g. 10%, especially for the younger generation up to 24 years. The government has to find out the acuteness and priority of the problem, in case it is one. In addition it is recommended to detect the alternatives such as provision of education and training and by whom they are supported.

The subjective validation is supported in FUPOL by the features for Hot Topic Sensing & Topic Summarization, social network aggregation and single window display, visual social data analysis and polling with questionnaires.

2. Analysis

2.1 Identification of Challenges and Opportunities

This phase refers to the identification of challenges and opportunities associated with an agenda item. In addition the goals and the development of criteria and indicators on how to measure the impact are required. During the analysis-phase knowledge and evidence has to be collected from a broad variety of sources. Consequently comprehensive desk research and statistical analysis is required.

2.1.1 Definition of Values and Goals

The FUPOL Policy Life Cycle proposes the definition of values and goals and the development of criteria and indicators on how to measure the impact in the policy topic in this phase.

Political actors set goals to meet the assumed needs of stakeholders. Consequently one of the steps in the policy analysis is the determination of goals. A goal answers the question "What is the policy supposed to do?" Note that a goal is an end, not a means to an end. Goals are abstract and general, whereas objectives are specific and concrete. A goal of a policy could be the strengthening of the families. The objective to reach the goal might be to enable mothers and fathers to take six weeks of unpaid leave to care for a new born and return to the job with no change in assignment or demotion.

The goals and objectives have to fulfil the S.M.A.R.T criteria (SMART, 2013) and specifies that they should be Specific, Measurable, Attainable, Relevant and Time-bound. In order to ensure that the targets are not forgotten, the goals and objectives should be evaluated and re-evaluated by reviewers. In order to facilitate policy goals their influencing factors must be determined from the very beginning.

Example: In the specific case with a low and declining employment rate the city will envisage a decrease of the unemployment rate from 15% to 12% within one year. This phase is supported in FUPOL by the features implementing the Knowledge Database and Visualization.

2.1.2 Collection of Evidence and Knowledge from a Range of Sources

This includes primarily collection of

- Research-based knowledge;
- Project implementation knowledge; and
- Statistics.

Research-based knowledge or scientific knowledge is perceived as highly credible and therefore used to underline certain positions in the policy process. However it has some shortcomings.

- It may take too long for the pace of the policy design.
- The scope and coverage may be too small.

Project and policy implementation knowledge is knowledge generated during the implementa-

tion of policy implementation projects and programmes, which is a very valuable source, because of its practical orientation.

Statistics and statistical information plays an important role in the policy modeling process, because of its objective character. It is also a very important input for simulations and forecasts.

Example: Evidence has to be collected from many resources such as case studies how the employment rate can be decreased under similar boundary conditions. This subtask is supported in FUPOL by the Knowledge Database and visualization and visualization of statistical data.

2.1.3 Collection of Opinions from Stakeholders

Already at this stage opinions can be collected actively from stakeholders as a preparation of the next phase.

Example: Opinions from the citizens and other stakeholders how the employment-situation could be improved have to be gathered by the use of social network aggregation and single window display, Opinion Maps and visual data analysis.

2.2 Determination of Solution Approaches and Strategies

2.2.1 Development of a Range of Options

In this phase a range of options including cost/benefit analysis have to be developed to support the decision making process. Cost/benefit analysis are well known as a systematic process for calculating and comparing benefits and cost of a project or of a government policy. Hence standard economic theories claim that economic efficiency, measured by the difference between benefits and costs, should be the criterion for making policy choices. This is highly criticized by governments and policy makers. Indeed, cost/benefit analysis can be very useful for comparing the favourable and unfavourable effects of policies. But cost/benefit analysis are not sufficient for the design of public policy, while they can provide an excellent basis and framework for subsequent analysis, which itself is required for the elaboration of options. In this phase much desk research, statistical analysis as well as social media and news analysis are required.

It has to be stated that the developing of options also include the identification of technical and political constraints (Howlett et.al., 2009, p. 112) actions. This seems very clear, but is not considered in policy proposals and might jeopardise the course of actions. Limitations have to be considered and feasibilities and un-feasibilities detected.

Example: In this stage civil servants, government staff and experts elaborate a range of options on how, for example, the unemployment rate could be decreased. Stakeholders are allowed to determine the range of options to improve the economic policy challenge. Unfortunately the range of options in the urban context is limited, because the economic policies are determined by national and international factors, such as taxes, GDP growth rate, infrastructure and business incentives.

In the case of economic policy there are many stakeholders to be involved, like companies, residents, representatives of business organisations and labour organizations, eventually environmental interest groups as well. The developing of options can be supported by the use in FUPOL of the features supporting the knowledge database and visualization, Visual Fuzzy Cognitive Maps and the Community Feedback Platform.

2.2.2 Simulation of Developed Options

This step is not mandatory and means that the impact of the policy is simulated. Typically policy issues are complex that is why Fuzzy Cognitive Maps are proposed to capture all aspects of an issue with related indicators.

Example: An economy is a very complex system in which the impact of interventions cannot easily be determined. The first main objective of the economic simulation is to determine the impact of local policy decisions on the economic parameters of the city. This means different alternatives can be simulated and the impact can be matched. It is suggested to compare the difference, if no policy change is implemented. This is shown as the initial, or so-called baseline forecast. The second objective is to forecast and anticipate future economic developments.

A simulation tool has the advantage that the impact of a policy can be tested in a de-facto laboratory environment and evaluated to decide whether a certain change is desirable or not. The simulated result or impact of the policy decisions can be visualized too. The output of the simulation can be discussed on social media to make it transparent to the public.

2.2.3 Analysis of Options

This includes various characteristics of the options such as impact, costs, efforts, risks etc. involved.

Example: After impact simulation of economic policy changes, the selected options have to be analysed precisely regarding their impact, risks, efforts and costs.

In addition to the impact in this phase the predicted costs have to be elaborated too. They might incur for the provision of additional infrastructure and land, tax cuts to attract these companies, etc. The risks might be an increase of air pollution caused by rising industrial production or an increase in passenger or freight traffic. These impact, effort, cost and risk analysis have to be elaborated for all selected options. Stakeholders are asked for their inputs too.

The option analysis phase will be supported in FUPOL by the knowledge data base and visualization.

3. Policy Formulation and Policy Creation

3.1 Dialogue Phase

This phase aims at establishing a dialogue for reaching a consensus based on the analysis of the options and finally chose among the various policy alternatives.

3.1.1 Discussions and Debates

This stage refers to discussions and deliberations through various channels such as

- Social media,
- Press,
- Television,
- Expert groups meetings,
- Meetings with interest groups,
- Public hearings,
- Town hall meetings, etc.

Example: In case the number of start-ups has to be stimulated, it would be advisable to arrange meetings with the different interest groups, such as residents, representatives of business organisations and labour organization. The social media should be used for further enhance the stakeholder participation. This stage is supported in FUPOL by social network aggregation and single window display, Opinion Maps, visual social data analysis, Community Feedback Platform and Outgoing Multichannel Social Media Single Window Messaging.

3.1.2 Summarisation of Debates

Results are summarized and published on electronic and non-electronic channels, such as press, conferences, etc., so they are available to the public.

Example: The results of the debates regarding the selected options based on the analysis will be

provided to the general public. The results will be extracted by FUPOL via hot topic sensing and published via Outgoing Multichannel Social Media Single Window Messaging.

3.2 Formulation Phase

This phase should ensure the creation of a good policy document based on formal consultations, risk analysis and pilot studies. This is primarily the responsibility of domain experts, who could be external consultants and government officials. Active participation is limited in this phase.

3.2.1 Weighing of Policy Options in the Political Context

This refers to the evaluation and fine-tuning of the intended policy in the current legal, organizational and political context. For example a policy could achieve the intended impact, but it would not find a majority in the decision making bodies or it violates other laws or fundamental rights or exceeds organizational capacities. To reduce the risk of miscarried policy proposals the identification of constraints in the subtask developing of options subtask should be treated very carefully.

3.2.2 Draft Proposals for Ratification Based on Policy Options

One or more alternative fine-tuned policy proposals are drafted for ratification in the decision making bodies.

Example: This means in our example regarding economic development that a complete policy paper for the provision of business incentives and allocation of land for industrial settlement will be designed. Public participation is not foreseen in this stage.

4. Decision Making

The decision making stage of the Policy Lifecycle is nearly the same as that of the agenda setting, the analysis and the policy formulation and creation stage. It is completely affected by the domestic actors, their institutional setting and their ideas, the global or international influence and by the constraints under which decision makers operate. A focus on these variables can help to predict the type of outcome likely to arise from the particular style of decision adopted in the policy process in question (Howlett et.al., 2009, p.158).

Based on the fine tuned policy proposals and the resulting policy document elaborated in the policy formulation phase a decision is made by the relevant decision making body. This could be for example an assembly of representatives, a politician or a decision maker in the civil service. The policy document takes into account all the information from statistics, documents, social media and simulations. The decision making process itself is a political and not a technical one and public participation is not foreseen in this phase. At this stage the overall benefit of the FUPOL approach and its tools will be reaped. The decision will be better documented and will have a better acceptance level by the stakeholders.

5. Policy Implementation

After the authorization of a policy it has to be put into effect by the administrators or executives. The implementation inspires little interest among the general public, unless it fails. That's why the implementation process should be accompanied by citizen participation to guarantee a transparent, cooperative and successful one. The best policy paper is worthless without a well executed implementation.

The policy implementation is the process whereby a written policy is turned into actions which have a positive or negative influence on peoples´ lives. The policy inputs include all actions to be taken for the implementation of a policy. For example, the inputs for an economic policy could encompass the provision of specific schools, apprentice trainings, universities etc. After implementation, especially after policy enforcement, the policy outputs, which are goods and services

produced by a policy, could be evidenced by the number of educated and trained people. This has to be evaluated in the evaluation phase. Policy outcomes represents the knowledge and skills required by the trained and educated people which could result, accompanied by the increased provision of working places, in a prospering economic development.

5.1. Policy Implementation Tasks

The implementation tasks comprise all activities required to implement the policy. These tasks include the creation or provision of organisations and the establishment of regulatory and legal frameworks to support the actions. Hence implementation has many facets and therefore cannot be described extensively. It includes tasks such as budgetary measures, public relation actions, organisation changes and staff recruiting. Budgetary measures in general are required for the funding of the policy strategy. Organisational changes might be required to carry out all the envisaged activities and additional staff might be required too to overtake the responsibilities.

An important aspect is the selection of the policy enforcement instrument. Policies can be implemented in a number of ways, with means by various policy tools or policy instruments. A policy statement indicates what should be received including the content of the policy, the organisation and the persons responsible for carrying out the activities. The tool or instrument is the method by which the desired effect is pursued.

The most important policy instruments are specified below.

- Regulations, such as taxes and fees, subsidies, tariffs and fines.
- Communication by the policy actors during speeches, conferences, debates and advisory committees.
- Funding via programs, grants, subsidies, transfers and market-based incentives.
- Public Ownership in form of corporations and mixed ownership.

People who are responsible for the policy enforcement have to be authorized. In general these are civil servants and administrate officials who establish and manage the change process.

Example: For fostering the economic development and the wellbeing of citizens many activities have to be launched. The most important ones are specified below.

- Budget allocations are required to grant subsidies and other incentives, to provide development of infrastructure and to guarantee suitable skill development.
- Organisational measures, such as the foundation of an office including recruiting of staff to support and finance start-ups.
- Public relations activities are essential to attract new businesses and to change the mind-set of companies and employees.
- Legal actions comprising legislation and elaboration of specific guidelines, will be required for implementation.

Economic development can be implemented by various policy tools, such as laws, regulations, action plans, etc. On the city level this is typically done by

- Local tax rate (taxes on the regional/city level),
- Laws on business incentives / direct subsidies,
- Laws related to land use policy (allocation of land).

This task will be supported in FUPOL by the features for Outgoing Multichannel Social Media Single Window Messaging, Community Feedback Platform, visualization of statistical data, Opinion Maps and social network aggregation and single window display.

6. Policy Monitoring and Evaluation

Policy makers, companies and the public want to know which policies work and which policies don't. Consequently the aim of the evaluation is to determine whether an implemented policy is doing what it is supposed to.

The terms 'monitoring' and 'evaluation' are often used together. This is why monitoring and evaluation are an embedded concept and essential in every policy process. It is seen as a dialog between the stakeholders and the development progress of the policy measure.

Monitoring the policy - and the values and goals defined in the analysis phase - enables a determination of positive or negative effects for the target group. Monitoring is a long-term process, because many programs have long-term effects that will not be known in the short term. Evaluation can be divided into formative and summative evaluation (CIVICUS).

Formative evaluation examines the operations of the program, usually for the purpose of improving the program and assessing its implementation with operational key indicators, such as number of people participating, etc. Summative evaluation checks whether the policy achieved its intended goals as defined in the analysis phase or not. Changes should be suggested in the policy monitoring and evaluation phase and the process can loop back into stage 1 (agenda setting) as the policy may be modified on the basis of experience with implementation.

6.1 Monitoring

Monitoring is usually understood to be an on-going activity that takes place during policy implementation. Monitoring is checking progress against plans. The aim is to trace and adjust the process as it is unfolding. Information gathered in relation to these aspects during the monitoring process provides the basis for the evaluative analysis.

6.1.1 Forecast Simulation

The simulation can be used to forecast future impact at any time using actual figures and as such contribute to the monitoring of the implemented policy.

Example: The permanent simulation of the impact can be used to forecast future impacts at any time using actual figures and contributes to the evaluation of the implemented policy. This might be the impact of attracting new companies on the employment rate that can be simulated continuously. In FUPOL the simulation can be supported by visualization too.

6.1.2 Key-Indicators Monitoring

Monitoring means to use quantifiable indicators to measure the policy implementation progress. It should help stakeholders to verify that targets are being met and policy makers to know whether the policy is working. It certainly involves the development of methods for effective data-collection and management.

Example: The key indicators specified in the analysis phase can be monitored continuously too. The monitoring of key indicators is supported by visualization.

6.2 Evaluation

Evaluation, on the other hand, is generally conducted at the end of an implementation period. Evaluations should help to draw conclusions about main aspects of the intervention (ESCAP Virtual Conference, 2003).

- Effectiveness, which expresses the degree to which the policy measure attains the previously defined objectives and goals.
- Efficiency outlines the extent to which the effort, costs and time is well used to reach the envisaged outcome. The total cost has to be lower than the benefits.

- Flexibility expresses the extent to which the policies can be adjusted to changing circumstances.
- Equity of policy measures means that they are fair to the people concerned.
- Institutional constraints which means that policies have to be in line with the existing legislation.
- Community acceptance expresses the extent to which the community accepts the policy.

The aim is usually to help decision-makers assess the overall difference a policy made compared with the previous situation.

6.2.1 Administrative and Judicial Evaluation

Administrative evaluation is generally practiced within governmental bodies to evaluate the policies and the effectiveness of the government services. Administrative evaluation should guarantee that the envisaged goals can be reached. Judicial or legal evaluation is concerned with the process on how government programmes are implemented. It is not concerned with budgets, etc.

Example: The evaluation focus on how the economic policy is implemented.

6.2.2 Impact Evaluation

The impact evaluation estimates the changes which result from the implemented policy. The impact evaluation even compares the outcome of the policy and what would have happened in case of the absence of the policy.

SOFTWARE MODULES SUPPORTING THE FUPOL FEATURES AND THEIR ASSIGNMENT TO SUBTASKS

The various FUPOL features and technologies can be used in several subtasks of the policy process and are described below.

- Data Integration and Storage.
- Unified Integrated User Interface
- Policy Indicator Dashboard.
- Social network aggregation and single window display.
- Hot Topic Sensing & Topic Summarization.
- Community Feedback Platform.
- Visualization of statistical data.
- Visual social data analysis.
- Knowledge database and visualization.
- Outgoing Multichannel Social Media Single Window Messaging.
- Opinion Maps.
- Simulation and impact visualization.
- Visual Fuzzy Cognitive Maps.

These set of these FUPOL software features represent a tool kit that support the integration and implementation of the overall Policy Lifecycle. Although the objective of FUPOL is to enable the integration of the full Policy Lifecycle it must be noted the FUPOL software features can be used separately to implement only portions of the Policy Lifecycle if this is required by specific policy needs (see Table 1).

Data Integration and Storage

One of the most important features of the FUPOL Core Platform is that it provides access to a comprehensive set of data. This includes statistical data from various sources (Eurostat, regional/local data,...), semantic data - mainly from social media, geographical data, knowledge data, operational data, such as user accounts, user activity data, clients, journals, etc.

Unified Integrated User Interface

User interface integration in FUPOIL means that two applications are integrated so that a user can carry out an operation that involves two different applications – without having to take into account that somebody is actually running two applications.

Table 1. FUPOL Policy Lifecycle subtasks and assigned technologies

Policy Life Cycle	Policy Indicator Dashboard	Social Network Aggregation and Single Window Display	Hot Topic Sensing & Topic Summarization	Opinion Maps	Knowledge Database and Visualization	Visual Social Data Analysis	Visual Fuzzy Cognitive Maps	Visualization of Statistical Data	Community Feedback Platform	Outgoing Multichannel Social Media Single Window Messaging	Simulation and Impact Visualization
Agenda Setting (1)											
Policy Problem Identification (1.1)											
Objective Identification of Policy Problem (1.1.1)	X							X			
Subjective Identification of Policy Problem (1.1.2)		X	X	X		X					
Policy Problem Validation (1.2)											
Objective Expert Validation (1.2.1)					X			X			
Subjective Validation (1.2.2)		X	X			X					
Analysis (2)											
Identification of Challenges and Opportunities (2.1)											
Definition of Values and Goals (2.1.1)					X						
Collection of Evidence and Knowledge from a Range of Sources (2.1.2)					X			X			
Collection of Opinions from Stakeholders (2.1.3)		X		X		X					
Determination of Solution Approaches and Strategies (2.2)											
Development of a Range of Options (2.2.1)					X		X		X		
Simulation of Developed Options(2.2.2)											X
Analysis of Options(2.2.3)					X						
Policy Formulation and Policy Creation (3)											
Dialogue Phase (3.1)											
Discussions and Debates (3.1.1)		X		X		X			X	X	
Summarization of Debates(3.1.2)			X							X	

continued on following page

Table 1. Continued

Policy Life Cycle	Policy Indicator Dashboard	Social Network Aggregation and Single Window Display	Hot Topic Sensing & Topic Summarization	Opinion Maps	Knowledge Database and Visualization	Visual Social Data Analysis	Visual Fuzzy Cognitive Maps	Visualization of Statistical Data	Community Feedback Platform	Outgoing Multichannel Social Media Single Window Messaging	Simulation and Impact Visualization
Formulation Phase (3.2)											
Weighing of Policy Options in the Political Context(3.2.1)											
Draft Proposals for Ratification Based on Policy Options (3.2.2)											
Decision Making (4)											
Policy Implementation (5)											
Policy Implementation Tasks (5.1)		X	X	X					X	X	
Policy Monitoring and Evaluation (6)											
Monitoring (6.1)											
Forecast Simulation (6.1.1)											X
Key-Indicators Monitoring (6.1.2)	X							X			
Evaluation (6.2)											
Administrative and Judicial Evaluation (6.2.1)											
Impact Evaluation (6.2.2)								X			

Policy Indicator Dashboard

The policy indicator dashboard visualizes various indicators and flags if they are below / above thresholds or certain conditions are fulfilled. The dashboard is intended as a tool for decision makers and advisors to set context and perspective when evaluating the current state of policy domains in the city.

Hot Topic Sensing and Topic Summarization

Hot Topic Sensing (HTS) is a web and social network analytics tool that analyses data from social networks, newspapers, forums, blogs, etc. and identify relevant topics. The purpose of the HTS is to help with the identification of community needs through Machine Learning and NLP (Natural Language Processing) algorithms. Postings from various social media are analysed and "Hot" topics are extracted.

Topic Summarization means that a summary of postings is created, which reflects the opinions of the postings in brief.

Community Feedback Platform

The Community Feedback Platform is inspired by Crowd Sourcing platforms and is designed to enhance cognitive processes in a similar vein as traditional Idea Management Systems (IMS). The purpose of the system is to facilitate the idea analysis and selection processes.

- Create a campaign focused in a desired topic.
- Start ideation process: communities write ideas comment and vote on them.
- Select promising ideas and ranking from different point of views.
- The best promising ideas can be implemented.

Though similar to a classical IMS, the FUPOL Community Feedback Platform is augmented with novel features that extend its functionality beyond what is normally associated with an IMS.

- A view on the collected space of citizens expression from different sources of information, such as blogs, social media and forums.
- Provision of the capability to enrich the space by different means such as commenting/voting as a facilitator.
- Analytics toolkit, such as computing: trends, topics, sentiments.

Visualization of Statistical Data

In the described process of policy modeling, the aspect of problem identification plays a key-role for the whole policy design process. The need for getting valid information about certain topics and policy indicators is essential for setting the agenda for a new possible policy. Visualizing these valid and proved data provides a more useful instrument to gather information by comparing, associating, correlating and identifying various data, data-attributes or indicators.

Visual Social Data Analysis

Besides valid and objective data, the investigation of subjective values is important for identifying problems and gathering information about the "social impact". The method of choice to analyse based on ICT-tools the social impact is Social Network Analysis (SNA). SNA enables the analysis of social networks and the identification of opinion leaders by measuring and mapping the relationships and flows between people, groups, organizations and other connected information or knowledge entities. The nodes in the network are the people and groups while the links show relationships or flows between the nodes. Their

interactive visual representation provides a quick comprehension of the relation of topics to influence actors or topics of general interest. Further it provides an explorative approach for navigating through such networks and gathering more knowledge about the related topics. Especially the identification of opinion leaders is important. An opinion leader is an active media user, who interprets the meaning of media messages or content for lower-end media users. Typically the opinion leader is held in high esteem by those who accept his or her opinions.

In all stages of the policy lifecycle process it is important to know the structure of the social network related to a policy issue and identify opinion leaders, follow them and eventually also contact them directly (peer influencing strategy).

FUPOL Knowledge Database and Visualization

In various steps of the FUPOL process model, the acquisition of information and the generation of knowledge play an essential role. The web provides increasing and rising knowledge repositories that enables for example to validate hypothesis for experts, or explores options. The FUPOL Knowledge Database stores multimedia documents and links them to campaigns and political topics, providing context related information to the user".

It enables a user to search for knowledge in different external (web) data and internal (FUPOL) sources and combines visualizations in visual cockpit metaphor for various policy tasks. A user is able to view on web-knowledge to validate for example an identified policy problem and gather related implicit information.

Outgoing Multichannel Social Media Single Window Messaging

This is the capability of posting messages to various channels (social media targets) at the same time without the need to manually post to each site separately. FUPOL supports active social media usage by providing posting messages to various channels (social media targets) at the same time without the need to manually use those sites directly.

Opinion Maps

Many political debates in a city have a reference to some specific spots. People have opinions on upcoming construction projects, on the place for a new bus station or they just want to tell you that there's some broken traffic light there.

FUPOL provides the Opinion Map as a tool for geo-referenced interaction. Opinion Maps are interactive electronic maps that can be integrated into almost any internal or external web site.

So for example the municipality can use the city's existing blog for starting a political debate related to some construction project. The opinion map can be integrated seamlessly into their blog and e-Citizens are now able to express their opinions by interacting with that map.

Simulation and Impact Visualization

The simulation enables a virtual evaluation of policies. Therefore the statistical history of indicators is used to generate forecast based on mathematical models, in dependency of identified influencing indicators which can be addressed with a policy.

A simulation tool has the advantage that the impact of a policy can be tested in a de-facto laboratory environment and evaluated to decide whether a certain change is desirable or not.

Fuzzy Cognitive Map

A fuzzy cognitive map (FCM) represents a system as a network showing the directed causal relations between its elements through arrows. It graphically represents the beliefs and perceptions that a person holds about a specific question or system and is created during interviews. A factor or node in the

network stands for a key-factor of the system. The directed links show the causal relations between factors. The relations between the elements can be used to compute the "strength of impact" of these elements. FCM can be applied in group sessions or in interviews with single persons, depending on the requirements. In such session issues which are highly uncertain or to which conflicting views exist can be easily detected.

The "visual" element of FCM provides a comprehensive view on the underlying topic and relations. Therefore graph-based visualization with weighting algorithms for the FCM outcomes are used. The comprehensive view on the relations provides more transparency.

From the visualization point of view the FCM describes in its major presentation a graph, i.e. it can be shown as node-graph visualization. Therefore the used data for the definition of the FCM is close to existing graph-based definition formats. For the final integration into FUPOL the focus lays on the visualization just as graph with labels for additional explanations on the node and edges. To allow interactivity, a linking between the FCM and the considered model in the background and the simulation as analysis tool is provided. The new FCM will be visualized by the end users and they will be allowed to check the effects of changing the value-force assigned to the different concepts represented in the FCM.

FUTURE RESEARCH DIRECTIONS

An important milestone to meet future requirements in the domain of policy modeling is the FP7 crossover project, finalized at the beginning of 2013. The major objectives of this European Coordination and Support Action project was bridging the gaps between politicians, experts and the public at large for the sake of an improved and transparent policy making process. (Osimo, 2013)

The most important outputs of the crossover-project are an international research roadmap and a knowledge database. The international research roadmap for governance and policy modeling provides a detailed illustration of available and upcoming tools for the promotion of policy modeling. In addition a comprehensive set of worldwide use cases including solutions is offered. The knowledge database contains tools, methods and knowledge respecting the governance and policy modeling research domains.

In the policy modeling workflow specifically future research should focus on the lack of appropriate ICT support for the decision making itself. Research should focus on ICT-solutions which are able to at least propose optimized decisions to policy makers.

CONCLUSION

The chapter is focused on the policy lifecycle process itself and a methodology how to link the process to various supporting technologies. The policy lifecycle is analysed and described in a systematic way including all steps in high detail.

In order to work out current shortcomings conventional policy modeling models, process models which investigate ICT in the process model as well as European research projects (FP7) have been analysed.

The results reveal that the main shortcomings are

1. Existing Policy Lifecycle models are not detailed enough to allow a proper and future-proof assignment of technologies.
2. Current ICT solutions supporting e-Participation and policy modeling are focused on solving a specific problem. They are only partly integrated both on the conceptual and the technical level.

In order to overcome the above mentioned shortcomings a highly detailed process including six main processes, tasks and subtasks is worked

out. Subsequently the subtasks of the process are linked to available technologies. The methodology is deemed future-proof and flexible, since it allows to easily assign future emerging technologies to the policy lifecycle. However it is the decision of the policy maker and supporting experts to evaluate if, for a specific policy model, all steps are necessary. FUPOL enables not only the implementation of the full policy modell process but also a subset of the process depending on needs and the specific policy to be addressed.

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KEY TERMS AND DEFINITIONS

eGovernance: Means that governance is driven by ICT whilst delivering government or public services and products.

eParticipation: The support and enhancement of public participation in the government decision making process by ICT, especially by social media.

FUPOL (Future Policy Modeling): An FP7 project providing an integrated approach to e-Governance, e-participation and policy modeling.

Hot Topic: A cluster with similar postings.

ICT Tools for Policy Design and Implementation: Are all features required and available to increase the quality and acceptance of policy measure by the public, such as social media tools, opinion maps, hot topic sensing, visualization and simulation tools.

Policy Lifecycle: The life cycle of a policy, beginning from its identification and analysation, its detailed formulation, the decision making process, its implementation and the monitoring and evaluation of the policy impact.

Policy Modeling: The representation of the real life policy in a model and to predict the impact of policy measures in a de facto laboratory environment.