OVERVIEW OF THE SUBJECT MATTER

The increasing role of Information and Communication Technologies (ICT) has changed the way that people interact with each other and with their environment. It also initiated changes in policy design and the way citizens and politicians engage with legislation, administration, and government.

As a consequence of this ongoing change, the European Commission has initiated a research stream on ICT solutions for governance and policy modeling. This book, *Handbook of Research on Advanced ICT Integration for Governance and Policy Modeling*, originates from the largest project of this research stream, the Future Policy Modeling (FUPOL) project. FUPOL itself aims at developing a new governance model to support the policy design and the whole policy life cycle by the use of innovative ICT tools. A novel, detailed policy lifecycle model linked each step to new ICT technologies and explains its benefits for governments, citizens, and other stakeholders. FUPOL has also outlined how different available technologies can be integrated in such a model that fit into ICT infrastructures of governments. This cutting edge governance model is applicable worldwide, irrespective of the region or social and political context.

It has been realized that the methods and the ICT tools to support the policy lifecycle and the political decision making process have drastically changed with the emergence of social media, advanced simulation techniques, open government data, big data, opinion mining, advanced text analytics and visualization, amongst others.

Subsequently, the status of information and communication technologies play an increasing and leading role with worldwide impacts on economic, social, and political structures and development of nations. The importance of social media tools to foster stakeholder participation in the policy decision-making process by opinion collection is growing. Cities, municipalities, or government institutions ask for citizens’ opinions to identify the need for a new policy or a change in policy. In a next step, comments are requested regarding challenges, risks, and opportunities connected to new policy measures. The whole e-participation process is assisted by social media tools and visualization techniques that offer the essential information at a glance.

Simulations and statistical predictive measurements combined with visualization methods allow a prediction of future impacts. The application of machine learning methods for mining information from the Web and other open resources leads to the analysis of historical or recent data. Based on these, information solutions can be identified, which leads to transparent decision making.

The book addresses a broad range of ICT tools and implementation guidelines for governance and policy modeling. It aims to provide a comprehensive and comprehensible view on different approaches, methods, and models of ICT integration, e-Participation, and social involvement in political processes. One main aspect is the analysis of citizens’ opinions and their influence on political decisions.
It is essential to understand how models from traditional policy modeling can be combined with ICT-based techniques. This book illustrates the adoption of different ICT methods on established traditional policy modeling methodologies and the linking of technical features with the different tasks of the policy lifecycle. All relevant technologies, for instance the Policy Indicator Dashboard, the Opinion Maps, and the Fuzzy Cognitive Maps, are brought into the context of the policy modeling process. Simulation and machine-learning methods, for example, are used to predict possible illustrated scenarios or extract information from various and heterogeneous resources (e.g. text or multimedia). Information visualization techniques will illustrate the value of pictures to convey information and amplify human cognition. Other technologies like fuzzy cognitive maps or semantics will lead to a comprehensive picture of today’s technological possibilities and the related advances for policy modeling.

One of the main objectives of this book is to explain how the new technologies can be applied in traditional policy design and decision making. It further introduces and illustrates precisely how these technologies are applied in real world scenarios. The technologies are investigated as well as various application scenarios across the world.

ADDRESSED TARGET AUDIENCE

This book addresses a wide range of audience with its interdisciplinary character of politics, social, and computer sciences.

Academic readers from technical disciplines will benefit from the presented ICT concepts, techniques, and system-specific attributes, as well as from best practices for electronic government solutions. Methodological approaches and description of use cases will be of benefit for academia from social and political disciplines.

Practitioners from businesses, such as consultants and service managers, are provided with solution approaches for the selection and implementation of the ICT tools and guidelines.

*Handbook of Research on Advanced ICT Integration for Governance and Policy Modeling* is also a valuable resource for civil servants and political decision makers.

ORGANIZATION OF THE BOOK

The book is grouped into 5 major sections and divided into 22 individual chapters.

Section 1 starts with an overview of the fundamental aspects of eGovernment and Open Government. This section outlines aspects and terms in e-Government and e-Governance and introduces some general requirements for providing an open government environment. Section 1 comprises five chapters.

For this purpose, Chapter 1 gives an encompassing overview of the structure and terms of e-Government. It also outlines the e-Government terms in a clear fashion. Furthermore, it introduces a practical picture of what e-Participation and related terms are. Chapter 2 has a focus on Open Government Data (OGD), which is explained based on the experience in Austria. It includes the informal approach of OGD consensus finding, the OGD specifications, the organizational setting, and harmonization approaches in the DACH countries (Germany, Austria, and Switzerland) and pan-European region.
Chapter 3 explains various standards from the W3C’s Semantic Web activity and the role they play in the context of Open Data, as for instance RDF as a standard data format for publishing and consuming structured information on the Web, the Linked Data principles for interlinking RDF data, and RDFS and OWL. The chapter offers current deployments and potential, risks, and challenges.

Chapter 4 gives an overview of the existing policy modeling processes and explains their major focus. It further introduces how ICT can be integrated in practical processes and public authorities. Based on these descriptions, the general requirements on a new ICT-oriented policy modeling process that allows the inclusion of ICT into a valid and useful process for public authorities is described.

Chapter 5 outlines 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 six stages, which are further divided into main tasks and subtasks to provide a very detailed policy lifecycle structure. The detailed breakdown permits the linking of each task to various technical features, such as opinion maps, policy indicator dashboard, knowledge data base, and simulation and visualization tools. This methodology has the potential to accommodate new technologies in the future.

Section 2 is focused on simulation methods and software for policy modeling. Causal models and fuzzy cognitive maps to foster the policy life cycle by the support of visualization are the focal point. In addition, the role of simulation and social factors in the designing of policy decision-making support tools are emphasized. Section 2 is divided into four chapters.

Chapter 6 provides an illustration of the benefits of causal modeling with respect to other commercialized approaches. The aim is to develop simulation models that could fulfill the transparency and acceptability requirements to foster e-participation taking into consideration the demands and skills of the multiple and heterogeneous users of urban policy models.

Chapter 7 is based on the fact that policy decision making is implemented in a framework that has to respect technical and social aspects. It deals with socio-technical systems design peculiarities, emphasizing the role of simulation and social factors in the designing of policy decision-making support systems.

Chapter 8 presents an overview of research attempts where fuzzy cognitive maps have been employed as a simulation tool in order to support policy decision makers in their assessment of the impact of policies and help them adopt the most suitable policy to implement.

Chapter 9 describes a novel adaptive approach to supporting and assisting the user during different tasks. For certain tasks and interactions of the user, different technical features that support and assist the user can be enabled or disabled. In consequence, experts will get less restrictive features and tools that make solving tasks more effective, whereas novices will mostly get a restricted feature set where they are more strictly guided.

Section 3 outlines technologies for the Active Involvement of citizen in the policy process, as for instance stakeholders feedback platforms, information visualization, hot topic sensing and topic summarization, real-time multimedia policy analysis, and approaches for the integration of various technologies for policy modeling. Section 3 comprises five chapters.

Chapter 10 is focused on e-Participation with stakeholder feedback platforms. Social media platforms allow a crowd of individuals to answer questions but do not support a “one-to-many” dialogue, where the communication manager, acting on behalf of the public authorities, can interact with the crowd. In this chapter, a software platform is outlined that aims to address this gap and describe the system envisioned in the FUPOL project.
Chapter 11 introduces information visualization as a solution for enabling the human information access to heterogeneous data that are necessary during the policy modeling process. Therefore, the steps of policy design are identified. A foundational overview of information visualization is given, investigating, besides visualization techniques, the entire spectrum of data to visualization. In this context, data and interaction methods are introduced. The chapter concludes with a conceptual example of visualizing social data in the domain of policy modeling.

Chapter 12 presents a set of data analytics tools that can help public authorities to extract and summarize textual content from Internet forums and social media feeds. There are many potential applications of these tools, such as the visualization of the main political discussion in the city, early detection of disagreement with the local politics, or city services connected to social media.

Chapter 13 presents common real-time multimedia content analysis methodologies and core technologies to analyze multimedia content from a practitioner’s viewpoint, highlighting their primary impact, best practices, current limitations, and future trends in this domain. In addition, the impact of multimedia content analysis within a governance-oriented applied context based on two use cases is presented.

The purpose of Chapter 14 is to outline various aspects of the technical design and architecture of an ICT system that is capable of handling the requirements that are typical for the policy-modeling domain. An overview of the relevant technologies for each step of the FUPOL policy modeling lifecycle, the standards that they build upon, and how to integrate them into a coherent system is provided. As FUPOL is currently the only existing system that is capable of covering the full policy-modeling process, the practical application of these architectural and technical concepts with examples taken from the FUPOL system is illustrated.

Section 4 introduces best practice cases and research projects in Zagreb, Skopje, Brazil, China, Singapore, and in low-income neighborhoods. This section is divided into seven chapters.

Chapter 15 explains the implementing of the FUPOL policy model and FUPOL platform in the current policies of the city of Zagreb. Two pilot initiatives, based on the whole policy lifecycle, have been selected. The chapter covers the background of these pilots, the challenges faced by the city of Zagreb, the results, and the solutions, too.

Chapter 16 presents an optimization model intended to support the policy design regarding the scheduling of different recreational activities at the Vodno Mountain, which should not interfere with each other. It is aimed to explore barriers and facilitators, while preserving the natural environment, minimizing noise pollution and criminal activity, and avoiding conflicts as much as possible. Optimization functions are defined as an input to a simulation model, which will be developed in the future. In addition, citizens are included in the process of policy decision making by creating social media surveys and gathering online public opinion.

Chapter 17 outlines a comprehensive new governance model to support the policy design and implementation lifecycle in the domain of urban planning to foster bicycle inter-modality in the city of Skopje. The innovations are driven by the demand of citizens and political decision makers. The scientific approach is based on complexity science. The proposed optimization model is aimed to explore barriers and facilitators to using bicycles as a transport means in Skopje, considering bicycle riding for transport on private bicycles and different share schemes.

Chapter 18 analyzes the effectiveness of citizens’ engagement in the e-Democracy initiative through the case study of the discussion of the Internet Civilian Landmark in Brazil. It analyzes two types of participation—comments and suggestions to the draft bill—and measures the effectiveness of user-participation.
Chapter 19 seeks to research the information society construction in China during the 12th 5-year plan period (2011-2015), especially the efforts to involve citizens in participating in the decision-making process. The chapter summarizes the strengths and weaknesses in the practice of public participation and e-Participation.

Chapter 20 provides an overview of Singapore’s IT strategy development and the relation between government and key stakeholders to define and establish new policies, governance, and the framework implemented through the added value provided by IT and visual solutions ad-hoc utilized.

Chapter 21 presents the conceptual framework for e-Participation in low- and middle-income neighborhoods, reviewing first the main features of traditional participation and later the strengths and weaknesses of e-Participation. This framework is applied to a slum-upgrading project in Mtwapa, Kenya. The underlying platform is proposed to be implemented in low-income countries to facilitate effective and inexpensive ICT-enabled citizen participation.

Section 5 addresses future directions regarding Policy Making 2.0.

Chapter 22 is based on current research conducted by the authors as part of the “CROSSOVER Project – Bridging Communities for Next Generation Policy Making,” an FP7-funded support action of the European Commission. In particular, the chapter identifies the opportunities and benefits resulting from applications of ICT tools for collaborative governance and policy modeling, and provides an outline of what technologies are and will be available to meet the needs of policymakers.

CONCLUSION

_Handbook of Research on Advanced ICT Integration for Governance and Policy Modeling_ provides comprehensive information about state-of-the-art approaches, methods, models, and IT-systems for policy design and implementation.

The reader of this book will understand how the technologies are linked with each other and support the policy-modeling process.

Apart from the theoretical background, this book provides an insight into practical solutions and application scenarios across the world.

This will enable readers to apply the introduced approaches for advanced solutions in policy modeling.

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