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D5.2 Case studies on specific applications of ICT solutions for policy modelling

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Authors:	Gianluca Misuraca (JRC-IPTS - Task Leader, Coordinator of research activities) Sotirios Koussouris, Fenareti Lampathaki, Panagiotis Kokkinakos, Yannis Charalabidis and Dimitrios Askounis (NTUA)* **Team of experts of the National Technical University of Athens (NTUA) subcontractor for the JRC-IPTS to carry out the activity of mapping and identification of Case Studies on ICT solutions for governance and policy modelling*
Contributors:	Francesco Mureddu and David Osimo (T4I2), Andrea Bassi (MI), Stefano Armenia (CATTID), Eva Jaho (ATC), Phil Archer (W3C) and CROSSOVER's Animators (Petra Ahrweiler, Alberto Cottica, Enrico Ferro, Scott Fortmann-Roe, Igor Mayer, David Price, Pietro Terna, Andrew Van de Moere)
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EXECUTIVE SUMMARY

The so-far short but crucial journey of 'Policy Making 2.0' through time followed closely the advancements and offerings of different Information and Communication Technologies (ICTs) as people recognize that these could improve their way of living, not only at a personal level but most importantly at a community and global level, influencing the way decisions are taken and implemented.

From the ancient times, humans have realised the importance of being part of, and playing an active role in, community and this inclination has grown into a need for every human being over the ages. Being part of a community offers a wide spectrum of benefits, such as securing food (in the pre-historic age) to fighting for better working conditions (via the formation of labour unions in the last centuries). However, the constantly growing complexity of our times and the modern way of living resulted in leaving behind this need, a fact that gradually resulted in people losing the trust on their governments and being unable to catch up with the policy making procedures.

Today, ICTs seem capable enough to strengthen the bond between citizens and decision makers, and as people have re-discovered the advantages of being an active part of the society, they are experimenting new ways to connect with each other towards achieving common goals. As such, Policy Making 2.0 is an highly important domain and has been recognised by the European Commission as one of the fundamental research areas that should be tackled by both researchers and policy makers, especially in a future perspective and in view of the foreseen shift of our global science systems and policy making responses.

This report presents the findings of the in-depth analysis of four case studies selected as being representatives of the Policy making 2.0 realm, and it is the result of the collaborative effort of several experts in the domain that have been actively engaged in the different phases of its implementation. The aim of this activity was in first instance to identify and analyse in-depth case studies focusing on real needs of users and policy makers, and highlighting the concrete problems addressed by research and the impact of ICT solutions for Governance and Policy-Modelling on governance processes and policy-making mechanisms.

The analysis included the identification and mapping of over 300 cases and practices from all over the world, the description of a shortlist of 25 promising cases and the in-depth investigation of a representative set of 4 cases which cover a wide spectrum of policy-making steps, domains and methodologies/technologies/tools, through interviews with experts and end users directly engaged in the selected cases, complemented by desk research and analysis of available documentation and data. The key findings of the analysis have been then reviewed by experts and validated through consultation with CROSSOVER's Animators and the community of Policy Making 2.0 through communicating results to relevant web2.0 channels and incorporating relevant feedback into the analysis.

The findings of the deep analysis and the evaluation of lessons learned from concrete applications of ICT solutions for Governance and Policy Modelling allows to shed light to important dimensions that have been identified for possible integration into the CROSSOVER roadmap. This in turns will contribute to enhance and deepen the research challenges forming altogether the emerging domain of Policy Making 2.0.

The results of the analysis and the insights from experts combined with consultation and validation from the community allowed to draw conclusions in terms of recommendations for policy and future research, in view of the establishment of Policy Making 2.0 as a defined set of methodologies and tools.

In this respect, the recommendations set out in this report, which are the direct outcome of the activities of in-depth analysis of case studies and the work of mapping and identification of promising cases, are aligned with the nature of Policy Making 2.0, which calls for more open, collaborative and evidence-based decisions. These needs are still not fully covered, as the analysis conducted reveals that many of these prerequisites are still lacking even after several years of research and deployment.

After presenting the results of a cross-case analysis and reflections on how to integrate findings into the CROSSOVER's Roadmap, the report concludes offering two sets of recommendations addressed both to policy makers and to practitioners/researchers active in the Policy Making 2.0 domain.

The first set of recommendations regards the presentation of policy implications as captured by the analysis and the interviews conducted with experts involved in the cases investigated.

Those are summarised in the so called 'Decalogue of policy Making 2.0' as follows:

P.R.#1. Build your case in Policy Making 2.0 in an agile manner.
P.R.#2. Continuously embed high-quality (open) data into your policy models.
P.R.#3. Tap the power of visualization and social networks to effectively communicate policy outcomes.
P.R.#4. Invest in real-time simulation technologies.
P.R.#5. Create intuitive, yet diverse interfaces depending on the profile of the stakeholders.
P.R.#6. Bring together multi-disciplinary expertise.
P.R.#7. Engage stakeholders from the very beginning.
P.R.#8. Incubate your case into the interested public organization.
P.R.#9. Treat your case as a product/service to ensure sustainability and further development.
P.R.#10. Think out-of-the box for the deployment of your case in other settings and contexts.

The second set of recommendations aims to provide the necessary input in order to complement and further enhance the CROSSOVER Roadmap on Policy making 2.0, based on the reflections of the findings gathered and the in-depth analysis of the four cases compared against the emerging results of the roadmapping exercise.

Those are the summarised by the following:

R.R.#1. Think of the Roadmap’s Elements as Nodes in a Connected Graph
R.R.#2. Build Clusters of Research Challenges and Define Policy Making “Enablers”
R.R.#3. Shift from Gov Labs to Open Apps
R.R.#4. Define the Timing Horizon for Research

These recommendations are the main conclusions of the in-depth analysis of selected case studies and should be used (possibly upon further validation with other cases and by the community of experts, practitioners, researchers and policy makers involved in the Policy Making 2.0 debate) for the enrichment of the final version of the CROSSOVER Roadmap on Policy Making 2.0.

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1. Introduction

1.1 Purpose and Structure of the Report

This document presents the final report of the activities conducted as part of Task 5.2 Case Studies on specific applications of ICT solutions for governance and policy modelling of the CROSSOVER project. It includes a presentation of the integrated methodology followed for this component of the research and a presentation of the four (4) selected cases, including the main findings of the analysis of each case accompanied by highlights and critical opinions, the lessons learned and the practical recommendations (deriving from the integrated analysis) towards their integration into the Final version of the International Research Roadmap on Policy-Making 2.0, ultimate outcome of the CROSSOVER project.

The report integrates the findings of the research work coordinated by the JRC-IPTS and which was performed in part through subcontracting the activities of identification and analysis of the selected case studies to a team of experts of the National Technical University of Athens (NTUA). It also combines input received from various sources in the course of the implementation of the research, including: desk research, consultation with CROSSOVER consortium members and the CROSSOVER animators who reviewed intermediate deliverables, as well as interviews with experts involved in each one of the four proposed cases (including members of the project teams and some end-users).

Intermediate draft versions of the report and key findings have also been made available for public consultation and validation through communication and discussion of the results with the CROSSOVER animators, the CROSSOVER partners and with the community that follows closely the Policy Making 2.0 domain over various Web 2.0 channels. The final analysis of the four cases combined with the critical comments received by the practitioners/end users of the cases and of the CROSSOVER animators have been used to outline the recommendations about Policy Making 2.0 and about the development of the CROSSOVER Research Roadmap.

The document is therefore structured as follows. Section 2 presents the rationale underpinning Task 5.2 within the overall framework of the project and the methodological approach followed. Section 3 outlines the key findings emerging from the investigation through a brief presentation and a critical analysis of the four selected cases analysed in depth. In Section 4 a cross case analysis is presented outlining similarities and differences of the cases and drawing policy recommendations emerging from the research. Section 5 provides some insights in view of integrating the findings of the case studies into the Research Roadmap, presenting some reflections deriving from the analysis and practical recommendations for improving the CROSSOVER's Roadmap on Policy making 2.0. Finally Section 6 draws some brief conclusions summarising the main findings and recommendations. In the Annexes A-D of the report are presented respectively: the detailed review of the four case studies; the interviews with selected experts per each case; the brief analysis of 25 shortlisted cases and the list of Complete Set of Cases Initially Identified.

1.2 Objectives of Task 5.2 within CROSSOVER

The CROSSOVER project indicates in its Description of Work (DoW) that **Task T5.2 'Identification and Analysis of Case Studies on specific applications of ICT solutions for Governance and Policy Modelling'** should be conducted between M8 (May 2012) and M18 (March 2013). These specific case studies are analysed more in-depth relative to a larger set of cases included in the repository of news and cases prepared during the first phase of the project's implementation. In particular, *building on the results of WP1, and more specifically the repository of tools and the news and cases identified, the International Roadmap on ICT tools for Governance and Policy Modelling outlined in WP2 will be further enhanced through four case studies on specific applications of ICT solutions for governance and policy modelling (in WP5)*.

JRC-IPTS is responsible for coordinating the activities related to Task 5.2 and in particular the conduction of research, analysis, drafting and editing of the in-depth cases studies to enhance and deepen the roadmap. The aim of Task 5.2 is to analyse case studies focusing on real needs of users and policy makers and highlighting the concrete problems solved and the impact of ICT solutions for Governance and Policy-Modelling. For this purpose, in addition to specific policy analysis to design the methodology for case study identification and analysis, the JRC-IPTS decided to sub-contract part of the activities to external researchers, in order to guarantee the knowledge base required to conduct the analysis.

The general objective of the sub-contract consisted of conducting research to map and identify promising cases of applications of ICT solutions for governance and policy modelling, select and analyse in depth four good practice cases in collaboration with JRC-IPTS and CROSSOVER's partners. The four in-depth case studies aim at contributing to enhance and deepen the CROSSOVER roadmap being developed by the CROSSOVER's Consortium's partners, and at evaluating the lesson learned and impacts from implementation of ICT solutions for governance and policy modelling at both European and global level.

The result of the combined activities of JRC-IPTS and other CROSSOVER's partners, in collaboration with the team of the sub-contractor was to provide a comprehensive analysis covering the methodological approach followed, a synthesis of findings of the mapping of cases and the detailed analysis of the four in-depth case studies identified, as well as the cross-analysis of the cases on ICT solutions for governance and policy modelling, drawing conclusions in terms of recommendations for policy and future research to be incorporated into the final version of the CROSSOVER Roadmap.

Task 5.2 started on April 2012 (M7) and the JRC-IPTS prepared the draft Technical Specifications for the subcontracting in May 2012. Further to internal review and consultation, following the results of the first Project's Review meeting, the procurement process initiated in June 2012 and concluded in August 2012. Two offers were received and after evaluation, the notification of award to the winning contractor has been submitted on 10th September 2012. The contract initiated on 16th October 2012 and was concluded at the beginning of February 2013. Meanwhile, the JRC-IPTS developed the overall methodological approach and presented it as an Interim Report of D5.2 for discussion during the Project's Review in October 2012.

2. Analysis of Case studies: Rationale and Methodological Approach

2.1 Rationale

The rationale for conducting in depth case studies as part of the CROSSOVER project is to enrich the Research Roadmap, one of the ultimate outcomes of the project, and provide concrete examples on how ICT solutions for governance and policy modelling work in reality, in different contexts and policy domains. For this reason the analysis of case studies started and was conducted once the Roadmap reached an advanced state of development and its architecture had been validated by stakeholders.

Before proceeding with the presentation of the methodological approach and the findings from the analysis if case studies, it is required to briefly set the stage and present the background to the specific research in the area of ICT for governance and policy modelling, outlining the guiding principles and the current state of the art from which the analysis was built on.

First of all, it is now becoming commonly accepted that the world has become increasingly interconnected, complex, and fast evolving, with the effects of policy choices and of individual behaviours becoming much less predictable[1,2]. Society currently faces a set of new challenges that are global in scale and highly dynamic. In fact, uncertainty and complexity are two distinguishing characteristics of our society, as widely recognised in the literature of complexity science, chaos theory and non-linear systems. Highly improbable events[3] and "wicked problems"[4], which are outside the range of predictability based on past behaviour, dominate our lives as the current financial and economic crisis has proven. To formulate adaptive policies for the future of the globally connected world, and for responding to today's crises, requires the simultaneous consideration of many factors, different types of data and how these interact[5].

Within such a context, ICT emerges as an important enabler for handling complexity and for driving state reorganisation, openness and effectiveness in collaboration with citizens, businesses and society. ICT-assisted policy making can describe complex problems and provide evidence for policy design with a staggering amount of interactive simulations and visualizations that add to the legitimacy of the decisions while enabling citizens to understand, participate and even change their behaviour. Modern approaches in policy making, taking into account political, economic, social, technological, environmental and legal repercussions, consider a variety of different disciplines ranging from complex systems, decision support systems, and public administration concepts, to operational research models.

[1] Charalabidis, Y., Lampathaki, F., Askounis, D. (Eds.) Paving the Way for Future Research in ICT for Governance and Policy Modelling. Bookstars. ISBN: 978-960-6815-94-2. Retrieved on August 1st, 2012 from http://crossroad.epu.ntua.gr/files/2010/02/CROSSROAD_Book-vf-allinon.pdf

[2] Misuraca, G., Broster, D., Centeno, C., Punie, Y., Lampathaki, F., Charalabidis, Y., Askounis, D., Osimo, D., Szkuta, D., Bicking, M. (2010) Envisioning Digital Europe 2030: Scenarios for ICT in Future Governance and Policy Modelling. In G. Misuraca, & W. Lusoli W. (Eds.), IPTS JRC Scientific and Technical Reports. EUR 24614

[3] Taleb, N. N. (2008) The Black Swan: The Impact of the Highly Improbable. Penguin.

[4] Rittel, H., Webber, M. (1973) Dilemmas in a General Theory of Planning, Policy Sciences, 4, pp. 155–169, Elsevier Scientific Publishing Inc.

[5] Bishop, S. & Baudains, P. (2010) Global System Dynamics and Policies. Retrieved on August 1st, 2012 from http://www.globalsystemdynamics.eu/index.php?eID=tx_nawsecuredl&u=0&file=fileadmin/gsd/1_Home/1_Welcome/gsd_booklet.pdf&t=1343919371&hash=310372a179e984fb923cbdd4509a4eb2.

However, the current tools available for policy design, implementation and evaluation still seem ill-suited for capturing the society's complex and interconnected nature[6,7]. In addition, although modelling and simulation techniques have the potential to be important elements for handling complexity and evidence-based decision making, current use of available tools is not marked by a record of success that would gain the confidence of stakeholders in policy making[8].

In parallel, social media appear today as a global phenomenon around cooperation, collective intelligence, users generating content, sharing and connecting, with a disruptive impact on all aspects of society, government, and business[9,10,11]. A new age of engagement has emerged, leveraging social media for policy making as they facilitate the requisite level of collaboration both globally and locally to solve complex issues that would otherwise be impossible to address[12,13]. Social media make the process of engaging citizens in policy making easier and less costly than ever before by providing tools to support knowledge-creation and community-building[14]. Citizen engagement is introduced into the policy process by using citizen-sourcing to enlarge and enhance policy-advisory processes, policy making, and policy feedback[15].

Government 2.0 has now become a new source of policy advice, enabling policy makers to bring together divergent ideas that would not come from traditional sources of policy advice[16]. As governments may have neither the resources nor the necessary know-how to deal with the myriad challenges that arise, the 'wisdom of the crowds', by horizontally sharing and analyzing each and every involved citizens' status, opinion, preferences, reviews, ratings, and needs around specific issues in the various social media (respecting their privacy at the same time), brings to the table a global expertise that reduces the information asymmetry between governments and citizens.

Finally, the public sector collects, produces, reproduces and disseminates a wide range of information in many areas of activity, such as social, economic, geographical, weather, tourist, business, patent and educational information, commonly known as Public Sector Information (PSI)[17].

In recent years, open data initiatives providing public sector information in "free-as-in-speech" manner for public, private and non-profit/civic consumption have flourished at an international and pan-

[6] Charalabidis, Y., Lampathaki, F., Misuraca, G., & Osimo, D. (2012). ICT for Governance and Policy Modelling: Research Challenges and Future Prospects in Europe. Computer Society Proceedings of the 45th Hawaii International Conference on System Sciences (HICSS). Hawaii: IEEE.

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European level. Numerous web and mobile applications exploiting open data have emerged leading to the characterization of open data as an effective engine of economic growth, social wellbeing, political accountability and public service improvement[18]. It is now well accepted that such open data also serve as a significant key ingredient in the policy making process for understanding the existing situation and feeding policy models.

However, the open challenge is how to elicit such information from open data initiatives and social media in real-time and based on reliable visual analytics and sentiment analysis techniques. During the overall model construction and use, legitimate open and social data (as two sides of the same coin[19]) assist decision makers to learn how a certain system works and ultimately gain insights (knowledge) and understanding (apply the extracted knowledge from those processes) in order to successfully implement a desired policy. In fact, while it needs to be mentioned that, during the last years, a plethora of bottom-up initiatives[20,21,22,23,24] to promote transparency, collaboration and better policy making has emerged creating a new landscape of communication between society and governmental authorities, evidence of impacts of ICT solutions for governance and policy modeling, describing in details the benefits and the key elements to ensure possible transferability and scalability, are little researched or readily available to the various communities of practice, researchers and policy-makers alike.

2.2 Methodological Approach

2.2.1 Research Design

The methodology to be followed to conduct the activities of Task 5.2 and in particular the identification and in-depth analysis of selected case studies has been carefully designed by the JRC-IPTS and further elaborated in collaboration with the sub-contractor (NTUA) which implements part of the research to identify and analyse the selected case studies, and in consultation with CROSSOVER's partners and animators, in order to comply with the work plan needed to carry out the activities based on the technical specifications set out by the JRC-IPTS.

In order to identify, research and analyse in-depth four Case Studies of promising applications of ICT solutions for governance and policy modeling in the most efficient and effective way, a multi-stage methodology was developed, bearing the following steps, as depicted in Figure 1 here below.

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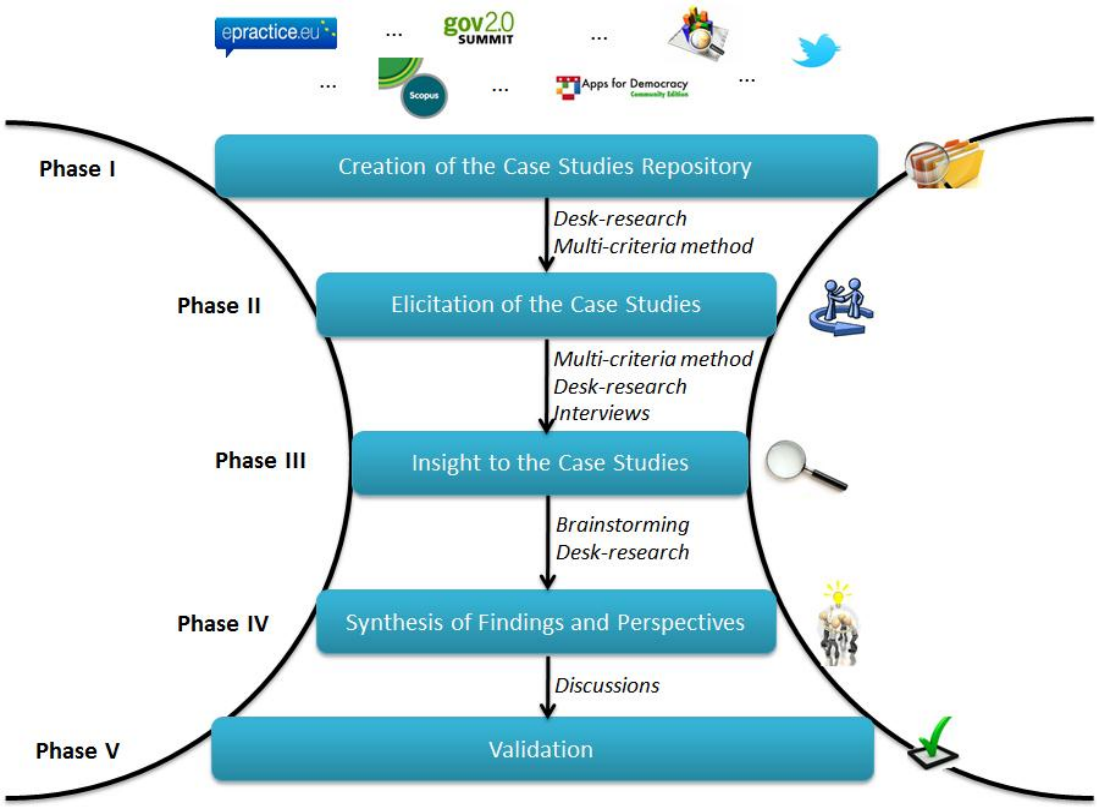


Figure 1: Methodological approach

2.2.2 Implementation of the Methodological Approach

In order to achieve the envisioned results in a transparent, open and documented manner, ensuring the timely and effective delivery of findings, the methodological approach formulated resulted in the following nine steps:

i. Identification of a large number of sources for relevant cases/ initiatives, through an extensive desk research and peer-to-peer brainstorming (e.g. ePractice[25], JoinUp[26], Scopus[27], ISI Web of Knowledge[28] portals)

ii. Formulation and enrichment of an initial extensive, yet not exhaustive, list of candidate cases (more than 300 entries, deriving from almost every continent and applied in various policy domains)

iii. Design and implementation of a suitable Cases' Description Template, in order to capture all the necessary information regarding each case in an effective and efficient manner

[25] http://www.epractice.eu/
[26] http://joinup.ec.europa.eu/
[27] http://www.scopus.com/home.url
[28] http://wokinfo.com/

iv. Definition and application (based on collected information through the aforementioned template) of a set of "1st Round Criteria" in order to filter the initial set of candidate cases and limit their number to 25

v. Description of the 25 selected cases, and, through a second set of selection and prioritization criteria, selection of a limited set of the 10 most relevant cases (An Internal Report 'Descriptive database of cases with at least 20 relevant entries' has been drafted and shared for review with CROSSOVER's partners and animators in October 2012).

vi. Further elaboration on and enrichment of the collected data regarding the top 10 cases identified in consultation with CROSSOVER's partners and animators.

vii. Definition and application of a 3rd set of selection and prioritization criteria, in order to identify the four (4) most suitable and promising cases to be proposed for the needs of the CROSSOVER Roadmap (An Internal Report 'Brief analysis of cases available in the database and shortlist of most promising cases with analysis to support selection' has been drafted and shared for discussion with CROSSOVER's partners and animators in November 2012).

viii. Validation of the four (4) proposed cases in consultation with the whole CROSSOVER consortium, animators and community

ix. Extensive description of and elaboration on the four selected cases (through extensive desk research, interviews with members of each one of the four selected cases, interviews with actual users of the four selected cases etc. in order to derive valuable feedback, policy implications and recommendations targeted towards the CROSSOVER Roadmap. A draft Interim Report 'Case Study Analysis' has been drafted and shared for review with CROSSOVER's partners and animators in December 2012, and a version incorporating comments from reviewers has bee then made available for public consultation and validation in January 2013 through main web2.0 channels .

Each of the steps described above resulted being demanding and therefore individual methodological approaches have been formulated and followed as described in detail in the following sections.

2.2.2.1 Identifying and Analysing 25 Cases studies out of a Pool of 335 Candidates

The research team conducting the study gathered basic data and documentation from a number of resources and examined their relevance to the specific needs and requirements of ICT for Governance and Policy Modelling. This exercise resulted initially in producing a set of 335 Policy making 2.0 cases out of which twenty five (25) practices prevailed as being of high relevance to the scope of the study. For each of these practices, various data have been documented, such as the context of each case, the objectives, the activities performed, the main results and other relevant and useful material that could contribute or be aligned to the different research challenges defined in the CROSSOVER draft Roadmap. During this task, the research team first identified and prioritized potential sources of information ranging from targeted information gathering portals to traditional search engines, academic literature databases and social media in order to gather relevant information and cases. These were matched with the existing datasets of practices collected during previous workpackages (namely WP1 and WP2).

In addition to this, an open invitation for proposal of cases through main social media and web2.0 channels used by the project have been disseminated, aiming at reaching out potential cases and practices that would have not been possible identify through the previous mapping exercises. In parallel to this, a 1st-set of criteria for selecting at the initial set of practices was defined and practices were described using a common template for documenting and comparing the practices. (see Table 1).

GENERAL INFORMATION	
Acronym	Acronym
Title	Full Title
Link	Web Page
Country/Region/City	Country/Region/City of the Case
Contact Point	Name/Address/Email/Tel
CASE DESCRIPTION	
Type of Case	Initiative, Project, etc.
Topic	CO2, Country Income, Entrepreneurship
Sector	Environment, Finance, Labour
Reach	Local/National/Regional/International
Start Date	Date
End Date	Date
Description Abstract	Description of the Case
Status	Ongoing/Terminated
Languages Supported	
Policy Making Cycle Stage	• Agenda Setting; Design; Implementation; Monitor and Evaluation
CROSSOVER Roadmap Research Challenge Group/Research Challenges	• CROSSOVER Roadmap Research Challenge Group
Innovative policy elements of the case	Innovative elements used in the case from policy making perspective
Innovative technological elements	Innovative elements used in the case from the technology perspective
Motivator	Government/Policy Makers/Citizens Initiative/NGO/…
CASE IMPLEMENTATION	
Implementation Approach - Deployment	Description of the implementation of the case
Key Stakeholders and Involvement	Citizens-Vote/Decision Makers- Modelling/….
Supportive Technologies	Social media/Visualisation/Process Modelling/Data modelling/Opinion Mining/Web2.0 Crawling/eParticipation Tools/Deliberation Platforms/…
Funding Source	Own Funding/ Crowd funding/Advertisements/Donations/etc.
Commitment	One-off effort / Embedded in short term-strategy / Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	The main users engaged in the case
Reach (in terms of hits/opinions/etc)	Number of Hits, Number of Opinions, etc.
Availability of Results / Impact	Description of results/impact if available
Maturity	Inception / Traction / Hyper-growth / Mature / Decline
OTHER INFORMATION	
Relative Keywords	Keyword 1, Keyword 2, Keyword 3
Social Media Readiness	Own social network(s) / Publishing policies in social media / Gathering feedback from social media / Seamless publishing and retrieving social data across social media / Unknown
Social Media Interfaces	None / One to Three / Three to Five / More than Five

Table 1: Template for documenting cases

2.2.2.2 Methodology for Selecting the 4 Most Appropriate Cases

Following the identification and description of a preliminary set of 25 promising cases, the JRC-IPTS in collaboration with NTUA and other partners of the CROSSOVER project, identified a shortlist of ten (10) possible cases out of the total number of cases that have been documented previously, who served as the basis for selection of the four (4) case studies to be analysed in depth in the next steps. Towards this direction, the following steps have been implemented:

- Definition of a 2nd-set of criteria for selecting the final candidate cases. Through these criteria the target was to shortlist a small, but representative number of cases that will be aligned with the current landscape in terms of the research themes explored in the CROSSOVER project.

- Application of a multi-criteria method for ranking short-listing the case studies. This exercise has been performed through the application of the aforementioned set of criteria on the initial set of the twenty-five (25) cases that have been identified and resulted to a limited set of ten (10) cases which are considered as most promising and representative of the current landscape, based on the research challenges that have been identified in the CROSSOVER Roadmap.

In order to proceed to the selection of the candidate cases, a multi-criteria methodology[29] was used. The idea was to prioritise the cases on the basis on the specific criteria for judging which cases are more appropriate and mature in order to be used at the next steps of the study. The multi-criteria method selected and applied for prioritising the cases is based on the Analytic Network Process[30] (ANP), a more general form of the well known Analytic Hierarchy Process[31] (AHP) used in multi-criteria decision analysis[32].

ANP is a multi-criteria theory of measurement used to derive relative priority scales of absolute numbers from individual judgments (or from actual measurements normalized to a relative form) that also belong to a fundamental scale of absolute numbers. These judgments represent the relative influence, of one of two elements over the other in a pair wise comparison process on a third element in the system, with respect to an underlying control criterion. The ANP is an essential tool for articulating our understanding of a decision problem.

The first step for implementing the method had to do with the construction of the model. The criteria have been applied to the model by categorising them in three clusters that have to do with the importance of the cases to policy makers and relevant stakeholders, the relevance of the case to the results of the CROSSOVER research project and the sophistication and availability of the cases.

1. CASE IMPORTANCE FOR POLICY MAKERS

1.1. Evidence of utilisation by stakeholders

1.2. Commitment

[29] DETR 2002, Multi-Criteria Analysis: A Manual, Department of Environment, Transport and Regions, London.
[30] Saaty, T.L., The Analytic Network Process: Decision Making with Dependence and. Feedback, RWS Publications, 4922. Ellsworth Ave.
[31] Saaty, T. L., (1980). The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation (New York: McGraw Hill).
[32] ddBelton, V. and Steward, T. (2002), Multiple Criteria Decision Analysis, Kluwer Academic Publishers, Dordrecht, Netherlands.

2. CASE RELEVANCE TO CROSSOVER

2.1. Number of Steps of the Policy Cycle Addressed

2.2. Number of CROSSOVER Research Challenges touched

2.3. Number of CROSSOVER sub-challenges touched per Research Challenge

3. CASE AVAILABILITY AND SOPHISTICATION

3.1. Evidence of the case being active

3.2. Maturity

3.3. Sophistication of Tools Used

The model that has been constructed and was fed into an ANP decision support tool is shown in the next figure, where the relations of the different clusters are depicted.

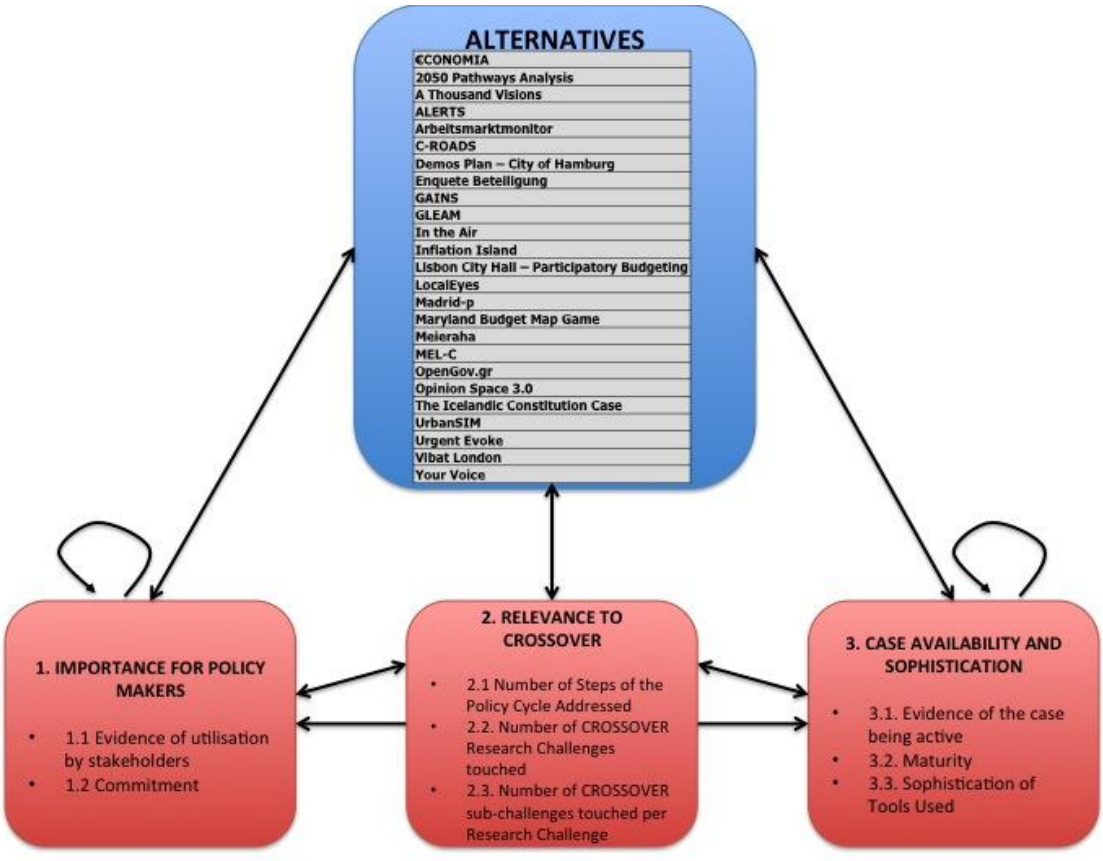


Figure 2: The ANP based Cases prioritization Model

The above-mentioned criteria were applied and evaluated for each case and the output of the multi criteria decision analysis is presented in the following table 2.

No.	Case
1	Opinion Space 3.0
2	2050 Pathways Analysis
3	C-ROADS
4	UrbanSim
5	GAINS
6	GLEAM
7	MEL-C
8	Arbeitsmarktmonitor
9	Vibat London
10	€CONOMIA

No.	Case
11	Urgent Evoke
12	Madrid-p
13	Lisbon City Hall – Participatory Budgeting
14	ALERTS
15	OpenGov.gr
16	Enquete Beteiligung
17	The Icelandic Constitution Case
18	Inflation Island
19	Demos Plan – City of Hamburg
20	A Thousand Visions
21	Meieraha
22	LocalEyes
23	In the Air
24	Your Voice
25	Maryland Budget Map Game

Table 2: Ranking of the 25 shortlisted cases

The derived set of candidate cases was proposed to CROSSOVER's partners and animators for deciding on the appropriateness of the cases and for finalising the shortlist of the 10 shortlisted candidates. This was conducted in order to verify the appropriateness of the cases identified in order to proceed to the detailed analysis of each different case. The 10 candidates have been therefore identified and more information about each case has been gathered, not only through available online resources, but also through direct communication with the responsible persons for each case. In parallel to this a third set of criteria for selecting four (4) 'good practices' has been defined. Such criteria mainly focused on their appropriateness to the themes of the CROSSOVER Roadmap and have been developed so that they can identify the four (4) cases that capture as many aspects as possible of the Policy Making 2.0 domain. Discussion among the CROSSOVER consortium and consultation with animators on the final set of cases to be selected for in-depth analysis took also place before deciding on the four (4) cases to be selected.

The criteria selected for proposing the final four cases are the following:

1. The 4 cases should altogether capture both Research Challenges of the Roadmap
2. The 4 cases should altogether cover as many sub-challenges as possible
3. The 4 cases should altogether cover if possible the Local, Regional and International dimension.
4. Each one of the 4 cases should target a different policy area / application domain (e.g. Environment, Energy, Health, Finance, Labour, Youth, etc.)
5. The cases should have a balance among cases within and outside of the EU.
6. The responsible persons of the cases should be available to be interviewed and provide documentation and insights.

In applying these criteria, the following cases were identified as suitable candidates for in-depth analysis:

- "2050 Pathways analysis", "C-ROADS" and "GAINS" were cases targeting all Environment and Energy Efficiency policies, and almost the same CROSSOVER Research Challenges, while all are based in the EU and have Regional reach. The main proposal from these cases was considered to be "2050 Pathways analysis" for which the UK Department of Energy expressed high interest in participating in the analysis.

- "GLEAM", targeting health and mobility at global level, having an international reach was also identified as a promising and relevant practice, and communication with the implementation team was already established.

- "Opinon Space 3.0" was considered the best candidate outside the EU (targeting Foreign Policy at US and global level) and the case responsible expressed high interest. The second candidate for a case outside the EU was MEL-C (targeting Youth in New Zealand), which was also was contacted.

- "URBANSIM", targeting Urban Planning was another candidate highly ranked with many applications in both the US and the EU, and a communication channel with them has been also established easily.

Based on the above-mentioned criteria and analysis, the final list of cases proposed for analysis resulted in the following (see Table 3 below).

	Application Domain	Policy Cycle				CROSSOVER RC #1						CROSSOVER RC #2								Based	Reach
		Agenda Setting	Design	Implementation	Monitor and Evaluation	Systems of Atomized Models	Collaborative Modelling	Easy Access to Information and Knowledge Creation	Model Validation	Immersive Simulation	Output Analysis and Knowledge Synthesis	Big Data	Opinion Mining and Sentiment Analysis	Visual Analytics	Serious Gaming for Behavioural Change	Open Government Data	Collaborative Governance	Participatory Sensing	Identity Management		
Opinion Space 3.0	Foreign Policy	X	X		X		X	X			X		X	X		X				US	International
2050 Pathways Analysis	Environment		X	X			X			X	X				X	X	X			UK	Local
UrbanSIM	Urban Planning/Transport		X			X				X		X		X						US/EU	International
GLEAM	Health		X				X		X	X	X					X				International	National
Other Candidates																					
C-ROADS[33]	Environment		X	X		X	X	X	X	X				X						EU	National
Arbeitsmarktmonitor	Labor		X		X									X						DE	International

Table 3: Shortlist of 'Top promising cases'

2.2.2.3 Reports of the Four (4) Case Studies

Following the selection of the four most promising cases, the JRC-IPTS in collaboration with NTUA dealt with the analysis of the cases mostly based on the input received through the interviews (see Annex B) conducted with the team engaged in these studies (either as researchers or practitioners that worked for the implementation or as users of the tools). The questions for conducting the interviews were based on the general directions provided by the analysis framework that was defined in the previous part of the study in order to be able to capture important aspects that were not publicly available on the information sources of these cases.

[33] Instead of "2050 Pathways Analysis"

As a result, the analysis of these cases was performed not only through desk-based research but also (and more deeply) through direct exchanges with selected members that have been involved in each case study in order to verify advertised results and to acquire more information (such as impact, usefulness, drawbacks, advantages, business opportunities, etc.).

In more details, during this activity, the following activities were carried out:

- Desk research to analyse relevant data and documentation available and Identification of contact persons per each case. This was based on the work conducted in the previous steps and the in-depth analysis was performed in order to acquire a better understanding for each case in an attempt to prepare the team for the interview.

- Design of an interview template, in collaboration between JRC-IPTS, NTUA and other CROSSOVER's partners, which has been sent to the cases' representatives prior to the interviews. The template has been carefully constructed in order to get all required information about each case, trying to capture the issues of value for the next steps of the analysis. The idea behind the creation of the template was to let people know about the upcoming questions to be better prepared and to guide the discussion to the themes that the investigation needed to touch upon.

- Conduction of qualitative in-depth interviews with representatives of the organisations involved in each selected case. Interviews have been carried out through teleconferencing and have been recorded. Each interview lasted around 90 min on average and was attended by representatives of JRC-IPTS, NTUA and other CROSSOVER partners.

- Identification of additional stakeholders per case for further information retrieval, from the policy perspective to the extent this was possible, as the workload of the high level people identified was a restraining factor for conducting interviews. For the purpose of this step, the study's team has asked the interviewed persons to identify policy makers and decision makers that could be interviewed at a later stage. After this step, an invitation to an interview was send to the identified persons, for conducting a short interview where they could express their views on the specific case.

- Conduction of further interviews with decision makers/policy makers utilising the tool. During this step, the study's team arranged short conference calls with decision makers to extract their thoughts on the usability of each case and to report on how it is being implemented by their organisation.

- Reporting on the interviews and validation of the final output with the interviewed persons.

- Consultation of the acquired feedback with the CROSSOVER Animators for enhancing and improving the final results, based on their expertise. In addition to this, a draft report of the Analysis of Case studies has been made available through main online communities relevant to CROSOVER for public consultation and validation of findings.

3. Outline and concise analysis of the four case studies selected

As described above in section 2 on the methodological approach, the process followed to identifying the four most appropriate and promising cases to be included in the CROSSOVER Roadmap was both targeted and detailed. Thus, it can be assumed that several important messages can be derived from each of the four cases and possibly be generalised or being of inspiration for transferability to similar cases in different contexts or application domains.

The purpose of this section is to offer a focused and "to-the-point" presentation of the key highlights of each of the four cases analysed in-depth, integrated with remarks, propositions and opinions deriving from various experts and/or stakeholders received as additional and valuable feedback during the analysis and/or the review and validation of the findings emerged from consultation with experts and the public.

3.1 2050 Pathways Analysis

3.1.1 General Information

The UK Department of Energy and Climate Change (DECC) built the 2050 Calculator to help the public engage in the debate, and for Government to ensure that its short- and medium-term planning was consistent with achieving the long-term aim of environmental protection through increasing energy efficiency in the country.

The 2050 Pathways Analysis features four practical resources:

1. A web-based tool for the public to experiment with their own ideas for reducing greenhouse gas emissions.
2. An in depth Excel-based tool and reporting system which includes the methodology/the models that are used for the underpinning analysis.
3. A web-based presentation for younger audiences about greenhouse gas emissions.
4. A toolkit for leading an energy debate in schools.

2050 Pathways is a tool to help policy makers, the energy industry and the public better understand the impact of alternative choices in relation to energy production and consumption. For each sector of the economy, four alternative trajectories have been developed, ranging from little or no effort to reduce emissions or save energy (level 1) to extremely ambitious changes that push towards the physical or technical limits of what can be achieved (level 4).

The 2050 Calculator is targeted at citizens, policy makers, senior officials and politicians as well as technical experts through different interfaces.

The following table provides an overview of key information regarding the 2050 Pathways Analysis Case:

URL	http://www.decc.gov.uk/en/content/cms/tackling/2050/2050.aspx
Status	Ongoing
Sector	Environment, Climate Change, Energy Efficinecy
Policy Making Cycle Stage	• Design; *Monitoring and Evaluation*

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Immersive Simulation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Open Government Data
	  ○ Serious Gaming for Behavioural Change
	  ○ Collaborative Governance

3.1.2 Key Highlights

2050 Pathways Analysis has proved to be a very successful initiative in terms of end-user engagement. In the first three months from the official launch of the project there were already about 10.000 unique visitors to the platform. Regarding My2050, there are over 16.000 pathways up to the date, while about 200 stakeholders were involved in the initial (building) phase. After the launch, about 500 stakeholders were engaged. Moreover, a week-long online debate including several experts took place with many comments and active participation from citizens in an open public consultation.

The take-up of the initiative can also be considered successful: the UK "Carbon Plan 2011" a policy strategy document set up by the British government (how will the UK look in 2050) included as one of the main pieces of evidence and visualisation the 2050 Pathways Calculator. In addition, there are education programs, both in and outside of the UK, that engage the 2050 Pathways models and tools in their courses.

Moreover, the 2050 Pathways has been presented to -and has received appreciation from- a variety of audiences, including the EC, NGOs, conferences, open media (including the BBC website) etc.

One of the key components of the 2050 Pathways analysis is the available data. Thus, in parallel with the project team's plan to apply the analysis to more countries (e.g. China, Indonesia, South Africa, Bangladesh), there is a constant effort towards improving and enriching the available data underlying the model and the rendering of results through the visualisation and gaming tools.

3.1.3 Appraisal from end users and review of experts

Feedback deriving from end users and/ or experts related to the CROSSOVER project reported that the 2050 Pathways Analysis is in fact an interesting, useful and innovative initiative. Many workshops and surveys have been carried out, based either on the 2050 Calculator or on the My2050 visualisation tool.

However, it was noted that, unlike the My2050 web-based visualisation, the 2050 Calculator is quite complicated and cannot be easily understood and utilized by the ordinary end user (e.g. ordinary citizen or even policy makers without support). In addition, it was proposed to replace the excel-based tool (that the analysis is based upon) with something more sophisticated. Regarding dissemination, there was a high criticism on not utilizing social media; the 2050 Pathways Analysis team should consider the integration of social channels in their dissemination strategy. Last but not least, it would be interesting to see a comparison of the actual results to those calculated by the 2050 model; in case the propositions made through the 2050 Calculator are adopted and implemented.

3.2 GLEAM

3.2.1 General Information

The global epidemic and mobility model, GLEAM[34], is a discrete stochastic epidemic computational model based on a meta-population approach in which the world is defined in geographical census areas connected in a network of interactions by human travel fluxes corresponding to transportation infrastructures and mobility patterns.

The GLEAM 2.0 simulation engine includes a multi-scale mobility model[35] integrating different layers of transportation networks going from the long range airline connections to the short range daily commuting pattern[36] and it elaborates stochastic infectious disease models to support a wide range of epidemiological studies, covering different types of infections and intervention scenarios in order to respond to the spread of a pandemic crisis in very short times.

Real-world data on population and mobility networks are used and integrate those in structured spatial epidemic models to generate data driven simulations of the worldwide spread of infectious diseases.

The following table provides an overview of the key information regarding the GLEAM Case:

URL	http://www.gleamviz.org
Status	Ongoing
Sector	Health - Epidemiology - Mobility
Policy Making Cycle Stage	• Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Model Validation
	  ○ Immersive Simulation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Visual Analytics
	  ○ Open Governmental Data
	  ○ Big Data

[34] http://www.gleamviz.org/
[35] http://www.gleamviz.org/model/
[36] GLEAM in Detail. Available at: ww.GLEAMviz.org/GLEAM-in-detail/

3.2.2 Key Highlights

The first highlight regarding GLEAM is the amount, complexity and diversity of data the team has managed to collect and organise (e.g. detailed airline transportation model). Data from census agencies, data regarding population at very high resolutions, data from a world map implemented by NASA with the world population divided to 5x5 miles area boxes, the entire database of airlines, about 40 databases from different countries for local mobility, transfer etc. are utilized.

In addition, it has to be mentioned that GLEAM has moved beyond research in the H1N1 epidemic case; when the simulation derived from the application of GLEAM was used ex-post and resulted in a particularly accurate analysis.

GLEAM is nowadays utilized both in research initiatives (e.g. EPIWORK IP project[37], EPIFOR project[38]) and in formal policy making agencies (e.g. US Defense Agency). Moreover, GLEAM can also be met in educational courses; both in a high school and at the university level.

3.2.3 Appraisal from end users and review of experts

During the analysis it has been reported that, due to the GLEAM's highly sophisticated and complex model, the end user has to devote some time in getting familiar with the model and workflow, before being able to utilize it; even when talking about policy makers and not just ordinary citizens. Complementary to this, GLEAM asks for a huge amount of data, thus it is quite difficult (especially when not engaging large and active public agencies) to find and retrieve all the necessary information in order to achieve the desirable result. Therefore, the creation of and open call for contribution to a shared platform aiming to collecting and organising large amounts of relevant data is advisable.

In addition, while the model is indisputably the best solution in diseases spread through transportation (and specifically airlines), it might be too sophisticated when dealing with more restricted areas of application. Last but not least, if not already done so, the GLEAM project team should search for collaborations with public administrations and/ or NGOs, in order to achieve great results in terms of public health and related applications.

[37] EpiWork -Developing the framework for an epidemic forecast infrastructure. Available at: http://www.epiwork.eu

[38] EpiFor - Complexity and predictability of epidemics: toward a computational infrastructure for epidemic forecasts. Available at: http://www.epifor.eu

3.3 Opinion Space 3.0

3.3.1 General Information

Launched by the U.S. Department of State, Opinion Space bridges the worlds of politics and social media in an interactive visualization forum, where users can engage in open dialog on foreign affairs and global policies. It invites users to share their perspectives and ideas in an innovative visual "opinion map" that illustrates which ideas result in the most active discussions and which ideas are judged most insightful by the community of participants. Using an experimental gaming model, Opinion Space incorporates techniques from deliberative polling, collaborative filtering, and multidimensional visualization. The result is a self-organizing system that uses an intuitive graphical "map" that displays patterns, trends, and insights as they emerge and employs the 'wisdom of the crowd' to identify and highlight the most insightful opinions and comments.

In summary, Opinion Space helps policy makers:

- Understand the diversity of their communities
- Solicit feedback and creative suggestions on specific topics
- Rapidly identify the most insightful ideas and suggestions
- Increase satisfaction and engagement with their communities

Opinion Space also helps citizens:

- Visualize their relationships to other people
- Express thoughtful ideas and suggestions about emerging issues
- Engage in friendly competition with other people
- Learn and gain insights from other people

The following table provides an overview of the key information regarding the Opinion Space Case:

URL	http://www.state.gov/opinionspace/ - http://opinion.berkeley.edu
Status	Ongoing
Sector	Foreign affairs, Global policies
Policy Making Cycle Stage	• Agenda Setting • Monitor and Evaluation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Easy Access to Information and Knowledge Creation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Opinion Mining and Sentiment Analysis
	  ○ Visual Analytics
	  ○ Open Governmental Data

3.3.2 Key Highlights

Opinion Space, in the few years of its life (active from 2009), has achieved to be part of the formal procedures of both public (e.g. US State Department[39]) and private (e.g. Fujitsu[40], UniLever[41]) bodies.

As far as end user engagement is concerned, Opinion Space has involved a large number of stakeholders, both from the public at large and from targeted organisations (private companies, public administrations, NGOs, etc.). It has to be noted that in some projects the visitors' participation rate (how many users actually engage themselves with the platform, compared to the number that visited the platform in total) was close to 50% in some cases.

In the State Department instance of Opinion Space 3.0, more than 2000 different ideas were collected (about US foreign policy). In addition, more than 5000 individual responses were gathered on this specific issue. Moreover, the project with a US automobile industry (targeted towards recognising ways of improving their image) resulted to about 1000 ideas generated and about 100.000 comments ratings and evaluating these ideas (e.g. more specifically they talked about green vehicles).

One of the best endorsements regarding Opinion Space was Hillary Clinton's reference to the initiative. Other endorsements include testimonials from high level officers of collaborating companies as presented in the Opinion Space website.

3.3.3 Appraisal from end users and review of experts

Although the concept, way of implementation and visualisation of the Opinion Space case is highly innovative, the project team could consider thinking about improvement in designing the social interaction part of Opinion Space 3.0.

In addition, it has been proposed that the Opinion Space team should argue that the net effect of the two opposite psychological biases of the tool (premier polarization as an input, return in a depolarized representation of individual positions as an output) is a depolarizing one. It thus needs further analysis and consideration especially if interested to be transferred and applied in effective policy making.

Last but not least, although the up-to-date participation in the various projects engaging Opinion Space can be considered satisfactory, the project team should build on further dissemination activities in order to increase even more the participation of the public and reaching out to groups that are not engaged so far. In doing this, specific topics of interest to the public and tailored dissemination campaigns should be promoted.

[39] http://www.state.gov/
[40] http://www.fujitsu.com/global/
[41] http://www.unilever.com/

3.4 UrbanSim

3.4.1 General Information

UrbanSim[42] is a software-based demographic and development modelling tool for integrated planning and analysis of urban development, incorporating the interactions between land use, transportation, environment, economy and public policy with demographic information. It simulates in a 3D environment the choices of individual households, businesses, and parcel landowners and developers, interacting in urban real estate markets and connected by a multi-modal transportation system. The 3D output resulting from the process underpinning the simulation model is presented using indicators, which are variables that convey information on significant aspects of the simulation results.

This approach works with individual agents as done in agent-based modelling, and with very small cells as in the cellular automata[43] approach, or even at building and parcel levels. UrbanSim however differs from these approaches by drawing together choice theory[44], a simulation of real estate markets, and statistical methods in order to achieve accurate estimation of the necessary model parameters (such as land policies, infrastructure choices, etc.) in order to calibrate uncertainty in its system. As an example of its use, one could refer to the project on Modelling Land Use Change in Chittenden County[45], where the model parameters based on statistical analysis of historical data are integrated with market behaviours, land policies, infrastructure choices in order to produce simulations on household, employment and real estate development decisions (where the first two are based on an agent-based approach while the latter on a grid-based approach).

The following table provides an overview of the key information regarding the UrbanSim Case:

URL	http://www.urbasim.org
Status	Ongoing
Sector	Transport
Policy Making Cycle Stage	• Design; *Implementation; Monitoring and Evaluation*

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Systems of Atomized Models
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance
	  ○ Big Data
	  ○ Visual Analytics

[42] http://www.urbasim.org
[43] http://en.wikipedia.org/wiki/Cellular_automaton
[44] http://en.wikipedia.org/wiki/Choice_theory
[45] http://www.uvm.edu/rsenr/countymodel/Workshop08bv3.ppt

3.4.2 Key Highlights

UrbanSim has proved its acceptance by the targeted end users as it has been already applied in many cases (mostly in the US), including Eugene-Springfield - Oregon, Detroit - Michigan, Salt Lake City - Utah, San Francisco – California and Seattle – Washington. In Europe, applications of the UrbanSim system include the cities of Brussels, Paris and Zurich. Nevertheless, UrbanSim, as still being a research initiative, is also very active in the field of research (i.e. SustainCity FP7 project[46]).

In the San Francisco case, the 3D UrbanSim visualization system was created, in order to achieve higher visibility amongst citizens than the plain UrbanSim tool. Each of the meetings conducted in this case engaged from 15 up to 200 participants. The reason for these face to face meetings was to communicate the different scenarios to the public and to receive feedback on the preferences of the citizens.

UrbanSim is now exploring applications in transportation and land use domains, as well as urban design. Environmental issues (e.g. greenhouse gas emissions) were motivation to some projects (such as UrbanSim for Canada[47]); so environmental planning is also a quite relevant issue for the case. Energy consumption and/ or water consumption constitutes issues of interest too. Modelling the impact of climate change (e.g. on weather) is also a topic of interest. Finally, as also mentioned earlier, economic development/ policies are also under consideration.

3.4.3 Appraisal from end users and review of experts

The UrbanSim models urge for large amounts of data; thus, it is a great challenge to locate, collect and transform in a useful form the necessary data (e.g. statistics, demographic etc.). In addition, real estate markets, but also transportation systems, are rather different from place to place. Thus, another challenge is to ascertain that the UrbanSim models are flexible enough in order to fit the various needs.

In addition, given that the UrbanSim aims to further strengthen and enrich its underlying packages and models, they should be careful in dealing with interdependencies amongst different policies (e.g. through complex systems science). In case of such an implementation, the visualisation of the various interdependencies would constitute a very interesting research initiative and application domain.

Moreover, UrbanSim could constitute a catalyst towards collecting, organizing and (probably most important) enriching the globally available open/ public data. Last but not least, the UrbanSim team should explore strengthening the initiative's relation with social media; both as a way of identifying and collecting data and as a way of disseminating the project to citizens and stakeholders, especially when transferring it to different contexts, such as in Europe.

[46] http://www.sustaincity.org/
[47] http://res.ca/UrbanSim/UrbanSimIntro.htm

4. Cross-Analysis of the Case studies

In this section, the four cases that have been investigated in depth (i.e. 2050 Pathways Analysis, GLEAM, Opinion Space 3.0, UrbanSim) are cross-analysed in order to compare findings and distil key recommendations towards policy makers who embark on implementing "Policy Making 2.0" activities.

4.1 Cases Similarities and Differences

2050 Pathways Analysis, GLEAM, Opinion Space 3.0, and UrbanSim were specifically selected as they demonstrate a well-balanced coverage of diverse policy domains, from Environment-Energy efficiency, Health, epidemics and transportation, to Foreign Policy and Urban Planning while altogether capturing as many research challenges under Policy Modelling and Data-powered Collaborative Governance as possible.

Emerging from the need to solve real problems and discuss important policy domains, all cases have been initiated either by governments or as a result of collaboration between researchers and public administrations at different levels, mainly in a top-down approach. In particular, GLEAM and Opinion Space 3.0 were initially introduced as research initiatives that gathered significant attention and subsequent funding from public authorities. In fact, all cases build on a wide range of techniques that result from research and exemplify how research can be effectively applied in real-life settings and public policies.

Multi-disciplinarity in the teams of all cases has brought together different perspectives and ensured appropriate modelling of policy options and interpretation of outcomes. Building a dynamic dialogue with policy makers and all external stakeholders (NGOs, academia, industry) and specific experts, has provided significant insights and feedback to all cases (to different extents as for example in GLEAM, where the participation of citizens is limited). Further, the real support by public officials and experts has been instrumental in the success of all cases.

To address the targeted needs of policy makers and citizens and allow them contribute in a more efficient and productive way to the policy issues at stake, dedicated tools have been developed in each case study. Simple interfaces (like gaming environments in the 2050 Pathways Analysis, or interactive visualizations in GLEAM, Opinion Space 3.0, and UrbanSim) have proved effective in engaging and keeping the interest of people without a specific case-related background (such as in simulation, modelling, etc.) and have been strongly endorsed in practically all cases. Through the visual interfaces, users (either citizens or policy makers) are in a position to create their own models and investigate specific issues that they are interested in. The teams involved in all cases were indeed faced with a trade-off between usability and sophistication, with the constraint of a cut-off point beyond which further simplification would become unacceptable in terms of accuracy. Naturally, in each case, the required learning curve to understand and use a policy model significantly varies (and it depends on the complexity of the policy model(s) running in the background for being used effectively by policy makers).

In all cases, the power of high-quality data at an appropriate level and format to be incorporated into policy models is indisputable. Open data have been exploited to a certain extent in the case of 2050 Pathways Analysis and GLEAM. In Opinion Space 3.0, the necessary data are in effect provided by the users and policy makers. UrbanSim and GLEAM also take stock of proprietary data that had acquisition cost and limitations in their distribution.

Despite recognizing the network effect of social media and Web2.0 technologies, the four cases confirm that their use for the policy-making domain is often accompanied by some scepticism or too much enthusiasm. Interaction with social media is limited to publishing relevant stories in the user's social media accounts while a more efficient exploitation of social data is envisaged as crucial for future research in most of the cases studied.

Funding has also been a non-negligible factor for keeping the cases alive since various additional functionalities and components have been gradually introduced in the course of each case's life span.

All cases have succeeded in informing policy makers and citizens in a documented manner. However, the use of policy models seems rather diverse, focusing at different abstraction levels and ranging from elaborate stochastic models (in GLEAM and UrbanSim) to more lightweight models (that can be depicted in simple spreadsheets like in 2050 Pathways Analysis). As anticipated, behind each model, there are assumptions, modelling compromises, incomplete/ missing data, etc. so looking at solely the numbers is not sufficient. The role of policy makers and field-experts (acting e.g. as advisors and consultants) indeed remains crucial across the procedure on embedding the models into governance and policy making.

To measure impact, typically, no specific Key Performance Indicator (KPIs) were set from the inception of the cases which can be acknowledged as a recurring problem in policy making in general. However, the numbers of visitors and of interactions have demonstrated their success and impact, which has been reinforced with the help of appropriate stakeholders' engagement strategies. It needs to be noted that in some cases (GLEAM) users resorted to the corresponding platform as a result of a natural phenomenon (i.e. H1N1 pandemic) whereas in others (Opinion Space 3.0 and 2050 Pathways Analysis), it was the outcome of large press coverage that demonstrated the value of the cases.

By studying cases that had strong internalization aspects (i.e. transferring experience from national to international level in 2050 Pathways Analysis, from US to EU in UrbanSim), the difference in socio-cultural dimensions emerges and should not be neglected as it may decide the success of a case in applying it to different geographic settings and socio-technical landscapes.

4.2 Policy Implications: the "Decalogue of Policy Making 2.0"

On the basis of the analysis of the experience of the four cases studied and reflected in the interaction with their stakeholders, a set of policy implications were derived. Such implications have been formulated into concrete recommendations (defined as the **"Decalogue of Policy Making 2.0"**) that should be taken into account by policy makers and stakeholders when initiating similar endeavours.

This set of recommendations is addressed not only to policy makers, but also to modellers, practitioners, researchers and policy making 2.0 case development teams, which should all work together in a collaborative manner towards delivering effective applications and methodologies to advance the use of ICT solutions for better governance and policy making.

With this audience in mind, the report presents the complete set of recommendations characterized as the "Decalogue of Policy Making 2.0" as it aims at infusing a very practical and applicable approach to all stakeholders that needs to be involved in such process. It is crucial for all of them to understand and acknowledge all recommendations for a complete case, even if some of them refer to specific actors and not to the overall set of stakeholders. Such a mutual understanding will allow fruitful collaborations in the future and more result-oriented activities, where all parties will be able to comprehend the requirements and the work carried out by each involved actor.

As such, the recommendations that are presented below are also classified:

- Based on the stakeholder groups they refer to, which are:
    - Policy Makers
    - Modellers
    - Researchers
- Based on their scope regarding the overall case development that can be divided in the following steps/phases
    - Business Model and Strategy definition of the case
    - Implementation and Technology Aspects
    - Engagement of Stakeholders

The set of policy recommendations is depicted in Figure 4 below.

As described above, the figure presents the recommendations oriented towards multiple stakeholders (ranging from Policy Makers, to Modellers and Researchers) and classified based upon their scope according to the Business model and strategy issues that should be addressed, the Implementation and Technology aspects that should underlying it, and finally the ways that the Engagement of the various stakeholders should be achieved.

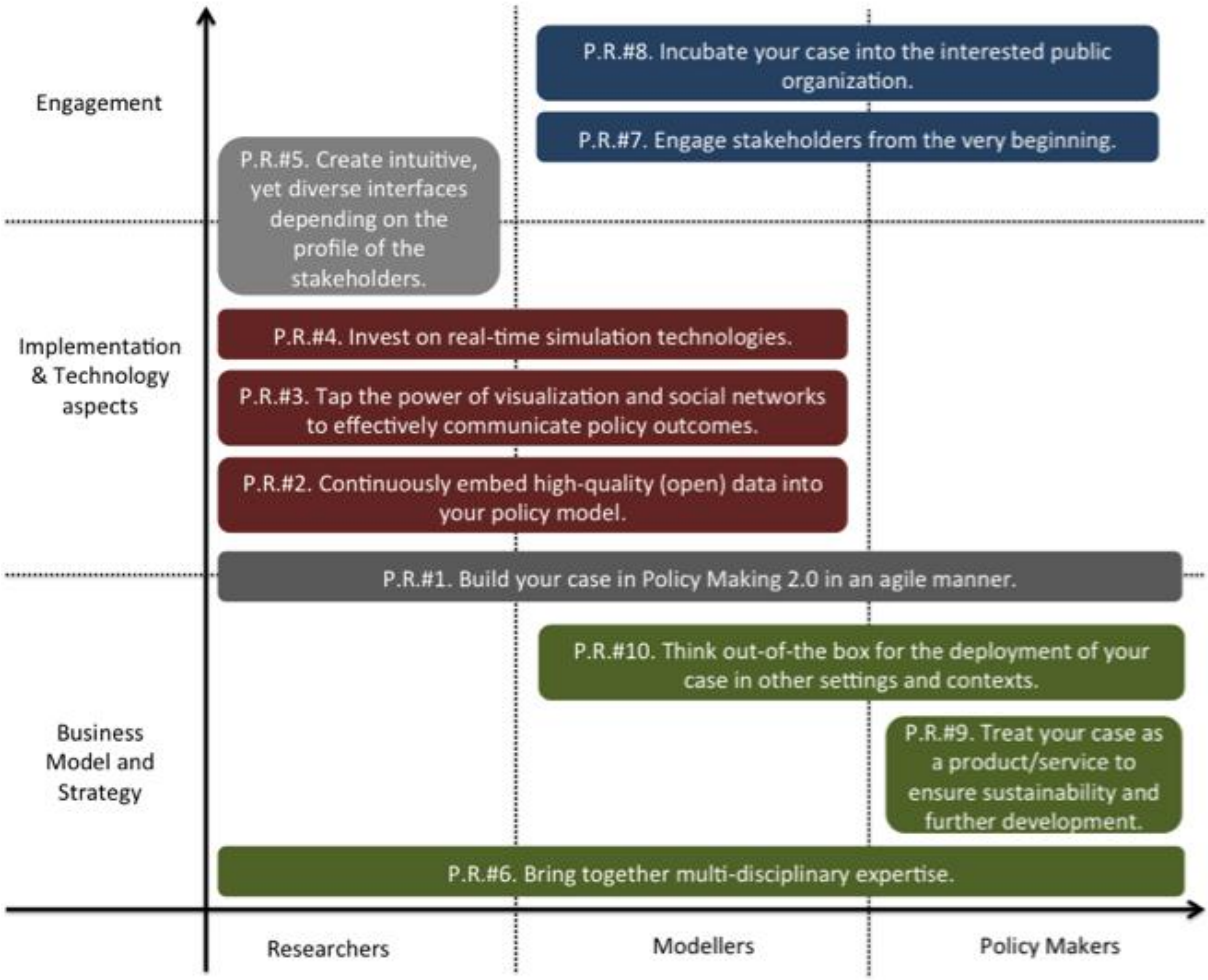


Figure 3: Policy Recommendations per Stakeholder and Scope

The Policy Recommendations forming altogether the **"Decalogue of Policy Making 2.0"** are described in details here below.

Policy Recommendation 1. Build your case in Policy Making 2.0 in an agile manner.

Capitalizing on the experiences gained in the Web 2.0 domain, cases in Policy Making 2.0 should follow the agile pattern for implementing light-applications with constant, iterative cycles of design, development and testing. Since building a generic model to cover all aspects is impossible and specialization in certain domains and application of already established knowledge is the most recommended way to go, platforms/ apps and their accompanying policy models should be gradually developed incorporating feedback received by the users in each major and minor release.

Relevant Policy Implications from: GLEAM, Opinion Space 3.0, UrbanSim
Stakeholders Addressed: Researchers, Modellers, Policy Makers
Scope of Recommendation: Business model and Strategy, Implementation & Technology Aspects

Policy Recommendation 2. Continuously embed high-quality (open) data into your policy models.

No matter how well-defined or detailed a policy model is, high-quality data represent the holy grail of policy making. Particular attention thus needs to be given to collect, filter, curate and intelligently tap bottom-up data, available from multiple sources (i.e. through open data initiatives, social media and participatory sensing tools, or even data gathered for commercial purposes). As current policy making cases typically struggle to cope with too much or too little data at the appropriate level (i.e. in terms of dimensionality and time-variance), reliable data sources need to be foreseen from the very beginning and incorporated in policy models in a real-time manner to allow for pragmatically informed decisions.

Relevant Policy Implications from: 2050 Pathways Analysis, GLEAM, UrbanSim
Stakeholders Addressed: Researchers, Modellers
Scope of Recommendation: Implementation & Technology Aspects

Policy Recommendation 3. Tap the power of visualization and social networks to effectively communicate policy outcomes.

Policy models typically hinder such a high level of complexity that tends to discourage stakeholders from contributing or even trying to understand the policy issue at stake. In essence, visualization holds the promise of providing valuable insights to non-specialists and explaining the more complex principles that drive and influence policies, while social networks provide an unprecedented opportunity for spreading knowledge. By taking the best of breed out of both research streams, a case is by-design more tuned to solicit concrete inputs from its stakeholders.

Relevant Policy Implications from: 2050 Pathways Analysis, UrbanSim
Stakeholders Addressed: Researchers, Modellers
Scope of Recommendation: Implementation & Technology Aspects

Policy Recommendation 4. Invest on real-time simulation technologies.

In a rapidly moving world, the importance of real-time data and simulation for quick decisions gains more and more momentum. To this end, it is necessary for a case not only to gather real-time data, but to allow for the direct experimentation with the policy models to anticipate the outcomes of various policy alternatives. Only through advanced simulation capabilities, different models can be calibrated at a satisfactory degree and eventually converge to suggesting best policy options and alternatives.

Relevant Policy Implications from: GLEAM
Stakeholders Addressed: Researchers, Modellers
Scope of Recommendation: Implementation & Technology Aspects

Policy Recommendation 5. Create intuitive, yet diverse interfaces depending on the profile of the stakeholders.

Policy models by their nature depict part of the reality as conceived by policy makers and interpreted by policy modellers. In order to bridge the gap of modelling literacy, though, all stakeholders irrespectively of their background need to understand the effect of their own actions on the results of models. Finding the balance between the complexity required for policy making purposes and the simplicity needed to ensure high engagement is always a challenging task. In this respect, intuitive user interfaces (which are also accessible from multiple devices and platforms) in order to engage a wide range of stakeholders (policy modellers, policy makers and citizens) seem a crucial success factor.

Relevant Policy Implications from: 2050 Pathways Analysis, GLEAM, Opinion Space 3.0, UrbanSim
Stakeholders Addressed: Researchers
Scope of Recommendation: Implementation & Technology Aspects, Engagement

Policy Recommendation 6. Bring together multi-disciplinary expertise.

The need for multi-disciplinary approaches in policy making has been long debated. With policy challenges that are both global in nature and local in required action, it is more necessary that ever to bring in a wide range of expertise that will not only construct a solid and close to reality model, but also interpret the results correctly and catch the realm of citizens and policy makers needs.

It needs to be noted that such expertise should emerge from researchers, practitioners, policy makers, NGOs and other stakeholders who are motivated to be heavily involved. Significant added value is attached to a case in Policy Making 2.0 by establishing a balance between research activities and real-life applications to constantly improve the actual impact of the ICT tools and underlying models.

Relevant Policy Implications from: 2050 Pathways Analysis
Stakeholders Addressed: Researchers, Modellers, Policy Makers
Scope of Recommendation: Business Model and Strategy

Policy Recommendation 7. Engage stakeholders from the very beginning.

In order to consider a case in Policy Making 2.0 as successful, a wide range of stakeholders needs to be involved at various engagement levels: from active, everyday participation to merely briefing. Opening up dialogue with all stakeholders is a time consuming task that should not be underestimated. To this end, an engagement strategy with targeted activities for each stakeholder group needs to be outlined and put into effect from the very beginning, although it might seem difficult when dealing with pure research concepts. Successful cases get known one way or another via word of mouth/ Web2.0 and satisfied users, high level testimonials, especially policy makers, are the best ambassadors of a case.

Relevant Policy Implications from: 2050 Pathways Analysis, Opinion Space 3.0, UrbanSim
Stakeholders Addressed: Modellers, Policy Makers
Scope of Recommendation: Engagement

Policy Recommendation 8. Incubate your case into the interested public organization.

Typically, research is conducted in sort of "sterilized" laboratory environments with little interaction with the end-users. In the case of Policy Making 2.0, research needs to go hand-in-hand with practice in order to allow for quick implementation of ideas in real-life settings. Along these lines, research teams should incubate in public organizations with a policy agenda in order to ensure smooth communication and seamless advancement of research through its direct application to policy issues and practical needs.

Such an approach will also help research teams to validate their assumptions based on real-life data while policy makers will be able to propose requirements, as captured during implementation, which will help to further optimise the offered solutions. Public organisations should thus build specialised teams within their structure that will consist of both policy experts and researchers that have developed the offered solutions in order to exploit the full potential of the offered tools and to connect practice with research.

Relevant Policy Implications from: 2050 Pathways Analysis, GLEAM, UrbanSim
Stakeholders Addressed: Modellers, Policy Makers
Scope of Recommendation: Engagement

Policy Recommendation 9. Treat your case as a product/ service to ensure sustainability and further development.

Following the paradigm of enterprise software (i.e. ERP or CRM) and services, cases in Policy Making 2.0 should be viewed under a long-term perspective for their target audience and potential users, especially policy makers. They should not represent a one-off effort that may become obsolete and easily deprecated, but rather embody the commitment of the corresponding public organization to keep the initiative live through periodic funding injections.

By treating a case as a service/product, the interest of the research and stakeholder community can be more effectively maintained, the underlying models can be further elaborated and optimised and the sustainability of the offered solution can be maintained in a more proper and effective manner. Of course, alternative sources of funding should be also identified. At the bottom line, policy makers should realise that Policy Making 2.0 cases, in other ICT domain (such as Social Media), possess a ROI that cannot be measured and witnessed directly, however benefits do exist and they can only be sustained by the proper funding instruments.

Relevant Policy Implications from: 2050 Pathways Analysis, GLEAM, Opinion Space 3.0, UrbanSim
Stakeholders Addressed: Policy Makers
Scope of Recommendation: Business Model and Strategy

Policy Recommendation 10. Think out-of-the box for the deployment of your case in other settings and contexts.

The team responsible for a case in Policy Making 2.0 should keep its horizons open and ensure its maximum outreach both within and beyond the organization for which it was originally developed. Interaction with stakeholders from different domains may pave new directions for the application of a case and cover diverse needs of policy makers that had not been originally foreseen. As such it is important to spread the knowledge and the overall experience of a case with as many stakeholders as possible in order to trigger their eagerness and explore new directions for application that may lie ahead.

Relevant Policy Implications from: 2050 Pathways Analysis, GLEAM, Opinion Space 3.0, UrbanSim
Stakeholders Addressed: Modellers, Policy Makers
Scope of Recommendation: Business Model and Strategy

5. Enhancing the CROSSOVER Roadmap on Policy Making 2.0

5.1 Reflections of the Case Studies towards the CROSSOVER roadmap

For the very beginning of this analysis, the effort has been to select a set of cases that shall cover as many of the steps of the policy making cycle as possible (i.e. Agenda Setting, Design, Implementation, Monitor and Evaluation)[48] and this has been also reflected in the criteria for the selection of the cases and their analysis.

The following table presents the coverage of the policy making cycle by the investigated cases, as indicated by the people engaged in the creation and management of the cases themselves*.

Final Cases / Policy Cycle Steps	2050 Pathways	GLEAM	Opinion Space 3.0	UrbanSim
Agenda Setting	@		X	
Design	X	X		X
Implementation		@	X	
Monitor and Evaluation		@		

Table 4: Cases Coverage of the Policy Making Cycle

***X's marks the answers retrieved directly for the responsible team of each case, while @'s mark potential usage as envisaged during the analysis**

As shown in the table above, according to the cases' managers interviewed, most of the cases selected target the "Design" of policies, while there is a limited coverage of the "Agenda Setting" and the "Implementation" and "Monitor and Evaluation" phases.

However, it has to be noted that some of these cases could potentially cover also the last step of the policy making cycle (i.e. "Monitor and Evaluation"), but they are currently not used for that purpose. However, some of their characteristics (such as the "real-time data input" of the GLEAM model) could be implemented to actively monitor and evaluate the success rate and other factors of different policies that are already in place. It is possible that existing methodologies and tools can be applied to other fields or with other purposes and still deliver useful results that could assist policy makers.

This is also a natural consequence of the set of key challenges that policy makers are facing today which have been identified by the CROSSOVER's Roadmap as the following[48]:

- The need to detect and understand problems before they become unsolvable.
- The generation of the necessary preconditions for high involvement of all stakeholders and especially citizens in policy making.
- The identification of "good ideas" and innovative solutions to long-standing problems (by bringing the wisdom of the crowd).

[48] Taken from CROSSOVER Deliverable D2.1.1 - International Research Roadmap on ICT Tools for Governance and Policy Modelling - Interim Version

- The reduction of uncertainty on the possible impacts of policies.

The above mentioned key challenges reveal the emphasis that policy makers put (or should put) on proactive activities that could benefit policy making as one of their major concerns is that of delivering high quality, evidence-based and impact oriented policies and not perform trials on real conditions. As such, the "Design" phase seems to prevail over the others when it comes to tools that are mostly desired by policy makers, as this is the point where they can easily and without harm experiment with the various options they have for policies to be formulated.

In other words, the "Design" phase is the actual "trial&fail" or "trial&succeed" testbed, during which policy makers are able to both explore their options and seek for the ex-ante assessment of the policies under consideration from the citizen's perspective.

Departing from this step means that most decisions have been already taken and then the emphasis is laid on the implementation of policies. The major concern during the "Implementation" phase is that of increasing the acceptance, the understanding and the collaboration between the decision makers and the citizens based on already deployed terms, and of course on the monitoring and evaluation of the interventions implemented. However, it should be note that the improved collaboration is handled by tools and methods that focus on the communication and conveyance of messages that will help the smooth implementation of a policy, an area that deals with communication strategies and which does not belong to the "core" Policy Making 2.0 methods and tools, but finds a close relation with them.

Moreover, when examining the last step of the policy making cycle, that of "Monitor and Evaluation", where decision makers get informed about the impact of the already deployed policies, one can identify only few ICT-based tools and methods that are really having an impact and engage fruitfully with stakeholders and citizens. Of course there are many discussion tools, like forums and blogs, however for the purpose of the current research such tools have been considered as not suitable as they have been already experimented by policy makers, but so far with many limitations and constraints.

The same also applies for the "Agenda Setting" step, as there is an absence of new ways to massively engage citizens during the early procedures that lie before the actual design phase. The majority of tools used have been around since many years now, and in some cases are re-furbished with some new tweaks and upgraded features that try to infuse some Web2.0 and other characteristics. Crowdsourcing seems to fit very well this stage, as it can be used to address issues selected in a top-down fashion (by policy makers themselves). But again, the impact of such experiments remains anecdotal and the results are not embedded in policy-making, at least for the cases analysed..

Regarding the various tools and methods that are being used in the different steps of the policy making cycle, it needs to be mentioned that the four cases selected for the analysis, as emerging from the methodological approach followed, capture a broad spectrum of the research challenges of the CROSSOVER roadmap on ICT tools for Governance and Policy Modelling. The relation of the cases to the research challenges (as extracted from CROSSOVER deliverable D2.2.1 - International Research

Roadmap on ICT Tools for Governance and Policy Modelling - Interim Version) is presented in the following table.

Final Cases / Research Challenges	2050 Pathways	GLEAM	Opinion Space 3.0	UrbanSim
Policy Modelling				
Systems of Atomised Models				X
Collaborative Modelling	X	X	X	
Easy Access to Information and Knowledge Creation			X	
Model Validation		X		
Immersive Simulation	X	X		X
Output Analysis and Knowledge Synthesis	X	X	X	
Data-powered Collaborative Governance				
Big Data		X		X
Opinion Mining and Sentiment Analysis			X	
Visual Analytics		X	X	X
Serious Gaming for behavioural Change	X			
Open Government Data	X	X	X	
Collaborative Governance	X			
Participatory Sensing				
Identity Management				

Table 5: Cases Relations to the CROSSOVER Research Challenges

Based on the previous table, the four cases investigated are not focusing only on one specific research challenge. This is obvious in many of the other cases reviewed during the analysis. Tools and methods are in fact most commonly built in order to address specific issues and not specific phases of the policy making cycle, while an orientation towards just a sole research challenge would have turned each case to a very specific tool that would be usable only by a very small group of stakeholders.

Such an approach would also result into acquiring important data which would then need further specialised tools to be processed, interpreted and carried on forward towards transforming it to highly usable information for policy making.

As a result – and this usually constitutes the “winning argument” of these cases – they are not focused on solving isolated issues but try to cover a wider spectrum of issues, employing a large set of tools and methods available, though in some cases (e.g. GLEAM) a specific policy issue is addressed. This need is a natural outcome of the high complexity of the problems that policy makers have to tackle, and as these call for multi-disciplinarity in research and development, it is clear that this can only be achieved by combining different tools, practices and scientific disciplines.

At this point it has to be mentioned that the four cases analysed did not show any evidence of technologies or methodologies that fall under the “Participatory Sensing” and “Identity Management”

research challenges of the CROSSOVER's Roadmap. The main reasons behind this fact are multiple and some insights are presented in the following sections.

The analysis of the case studies has also revealed which research areas are met in each step of the policy making cycle. The result of this exercise is presented in the following table, which combines Tables 4 and 5.

Again, this table is derived from the results of the analysis of the four cases solely, and thus should not be viewed as a generic perception of the overall domain, but rather reveals the information extracted from the cases under investigation. However it could serve as a starting point for further research and generalisation in order to effectively link the different research challenges with the policy making cycle.

Policy Cycle Steps / Research Challenges	Agenda Analysis	Design	Implementation	Monitor and Evaluation
Policy Modelling				
Systems of Atomised Models		X		
Collaborative Modelling	X@	XX	X@	@
Easy Access to Information and Knowledge Creation	X		X	
Model Validation		X	@	@
Immersive Simulation	@	XXX	@	@
Output Analysis and Knowledge Synthesis	X@	XX	X@	
Data-powered Collaborative Governance				
Big Data		XX	@	@
Opinion Mining and Sentiment Analysis	X		X	
Visual Analytics	X	XX	X@	@
Serious Gaming for behavioural Change	@	X		
Open Government Data	X	X	X@	@
Collaborative Governance	@	X		
Participatory Sensing				
Identity Management				

Table 6: Mapping the Policy Cycle to CROSSOVER Research Challenges

(X mark direct links as seen by the cases' project's team and @ mark further links as identified through the analysis)

5.2 Practical Recommendations for the CROSSOVER Roadmap

Based on the analyses performed during the in-depth investigation of case studies, a short list of high-level recommendations to be used to further enhance the CROSSOVER Roadmap in its final version has been developed.

Roadmap Recommendation 1. Think of the Roadmap's Elements as Nodes in a Connected Graph

Highly complex environments have a unique characteristic: the elements they include are related and linked to each other based on various types of relationships. The analysis presented in Table 5 has led to the creation of a graph revealing the relations between the different research challenges as listed in the draft CROSSOVER Roadmap on Policy Making 2.0 (Figure 5 below).

The graph contains in blue all the Research Challenges deriving from the 1st Grand Challenge "Policy Modelling", while the orange ones come from the 2nd Grand Challenge "Data-powered Collaborative Governance". The edges between the different nodes represent the relationships between the different research challenges, as documented in the four cases under investigation, as a result of finding the relations between the different columns of Table 5 that belong either to the 1st Grand Challenge (rows 3-8) or to the 2nd (rows 10-17). For example, in the case of GLEAM and when isolating the sets of research challenges that belong to the different Grand Challenges, one could see that "Collaborative Modelling" is connected to "Immersive Simulation", and "Open Government Data" is connected to "Visual Analytics".

However, as practice has shown, the two Grand Challenges are not isolated sets of research elements, as many connections between their elements exist. The green dotted edges reveal these relationships between the research challenges of the two grand challenges. Having GLEAM as an example again, one could see that it includes both "Open Government Data" and "Collaborative Modelling", so the green dotted edge represents the evidence of such a relationship.

The thickness of the edges reveals the number of relationships identified in the four cases (see Roadmap Recommendation #2).

As figure 5 shows, there are many relations between the different research areas of Policy Making 2.0, even when looking at a very small (but with a wide span) *specimen*, such as the 4 cases analysed in the study. In fact, as it was already made evident in the previous sections, research and development during each case analysed focused in more than one research challenge as it aimed to solve specific problems which are by nature multi-disciplinary. Such a behaviour seems natural as Policy Making 2.0 is a domain that contains diverse research fields that should however be combined and tackled in parallel in order to deliver working and usable applications and methodologies that could support the policy making process.

This is also a need that derives directly from the fact that such applications target many different

stakeholder groups, with diverse backgrounds and thus it is necessary to combine different parts of the identified research challenges in an effective manner.

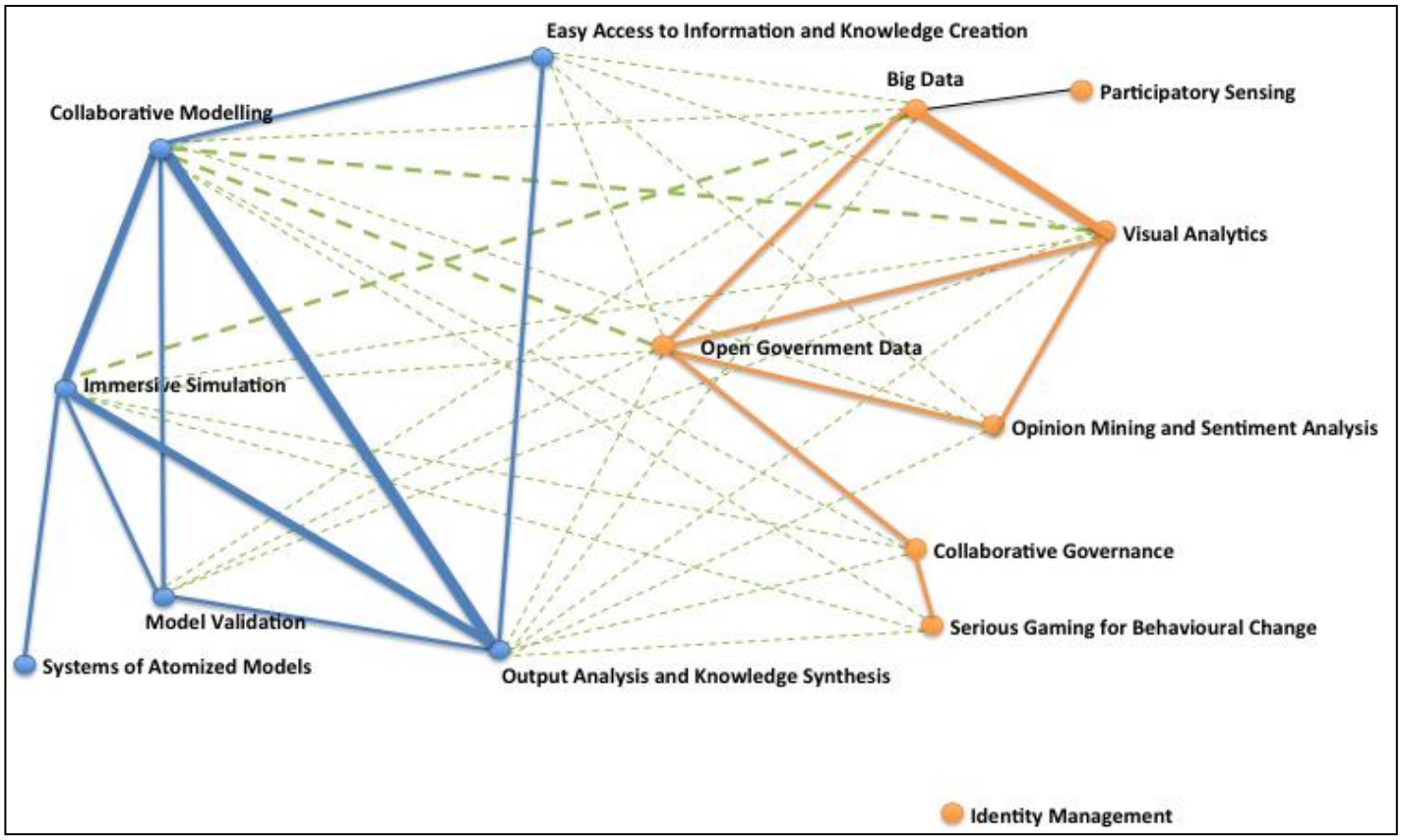


Figure 4: The Graph of Policy Making 2.0 Research Challenges

Looking at the graph, only the research challenges "Participatory Sensing" and "Identity Management" have not been identified in the four cases and therefore are not connected to the graph in the same manner as all other research challenges.

However, during discussion with experts and reviewers, it has been decided to link "Participatory Sensing" to "Big Data" as it obviously sits on top of it and the two have very close relations. Thus this edge is coloured black in order to show the difference with the relationships that have been extracted from the analysis. On the other hand "Identity Management" remains disconnected, though this does not mean it should be removed from the Roadmap or that it is a not important element of it (see Roadmap Recommendation #2 for further comments on this).

Roadmap Recommendation 2. Build Clusters of Research Challenges and Define Policy Making "Enablers"

The graph presented in Figure 5 also reveals which specific areas have stronger bonds between each other by observing the thickness of the edges that represent how many times the relation between two nodes has been witnessed in the four cases analysed. For example, the link between "Big Data" and "Visual Analytics" has been witnessed three times in the sample of the four representative cases, while "Systems of Atomized Models" is present only once in a case which also included "Immersive Simulation".

Based on the findings of the four case studies, it seems that the research challenges "Collaborative Modelling", "Immersive Simulation", "Output Analysis and Knowledge Synthesis", "Open Government Data", "Big Data" and "Visual Analytics" are met more times than the rest. This could lead to the creation of different clusters around them, as they seem to be quite dominant and present in most cases.

As mentioned before, there exist numerous links between the various research challenges of the two Grand Challenges (and they seem stronger between the research challenges "Immersive Simulation"-"Big Data" and "Collaborative Modelling"-"Visual Analytics"-"Open Government Data". This should be considered alongside the Roadmap Recommendation #1 in order to construct clusters of research challenges that could lead to more applied research in order to advance quicker from purely theoretical investigation of specific issues to the development of real life applications and methodologies. In such a context, the roadmap could point out clusters that not only include elements from one Grand Challenge, but also combine multidisciplinary elements that are required towards developing successful policy making applications and cases.

Based on the results of the analysis and on the number of edges observed in the graph of Figure 5, it seems that a possible re-ordering of the research challenges could also be of benefit, especially in case this graph is further populated by findings of other cases towards a more generic image of the relations between the nodes. However, from the preliminary work that has been conducted based on the analysis of the four cases, one might argue that some research challenges (like for example "Collaborative Modelling") sit on top of others and can be seen as supersets of other challenges.

Furthermore, as already mentioned above, the study also reveals that the Research Challenge "Identity Management" seems disconnected from the other Research Challenges (and this has been also evident in the long list of the cases analysed as part of this research: see Annexes). Thus it could seem at first sight not finding a place amongst the other research challenges of the Roadmap. However, as this is a very important area and a prerequisite for many eGovernment and Policy Making applications, it is suggested to be treated as a "Policy Making" enabler. Thus, it is proposed to complement the Research Roadmap with a set of Policy Making "Enablers".

Policy Making "Enablers" can be seen as bits of supportive technologies and methodologies that can be directly exported from neighbouring domains and could be used to support the creation of applications and Policy Making 2.0 tools. These include elements from domains such as Identity Management, Cloud Computing, Social Media, Mobile Technologies, Human Computer Interaction, etc. that are being

thoroughly researched and have already delivered quite substantial results. In this context, Policy Making 2.0 should identify the best-of-breed solutions coming from these domains and directly introduce them to existing or under development cases in order to refrain from re-inventing the wheel, but focusing on the research topics and themes that are more relevant to the policy making cycle and to the decision procedures that need to be improved. To this extent, the cross-checking of the existing research questions and issues underlying the various challenges identified by the Roadmap with a well-defined and structured taxonomy documenting the current knowledge of the domain and of neighbouring ones should take place.

Roadmap Recommendation 3. Promote Shift from Gov Labs to Open Apps

One of the fundamental characteristics of Policy Making 2.0 is the inclusion of citizens in the decision making process through their interaction with the government facilitated by various tools. Of course, the direct engagement of the whole of society on every aspect of policy making is not possible (and to many also not desirable). Although many citizens have skills that allow them to utilise the various tools and methods under investigation, most of these tools are too complicated to be used by many groups of the population in most countries in the world. This is quite evident and it is one of the main issues behind the lock-up situation of Policy Making 2.0 in a top-down approach, where a clearly bottom-up (crowdsourced based) approach that is actively being exploited and used by policy makers is still lacking.

As the "magic quadrant"[49] developed building on the analysis of case studies and presented in Figure 6 shows, the current landscape of Policy Making 2.0 research challenges could be divided in four spaces:

- "Gov Labs" where applications are still highly experimental and they are only addressed (or can be used) by policy experts,
- "Gov Farms" where again policy experts are the users but applications and tools are already in a highly mature and operational state,
- "Open Labs" where direct engagement of citizens is quite high but applications are yet experimental, and finally
- "Open Apps" where there exist at the same time high engagement of citizens and maturity of applications to be used for policy making and other decision making purposes.

It should be mentioned that, differently from most 'magic quadrants' the Policy Making 2.0 magic quadrant developed does not contain tools, but the research challenges as identified by the CROSSOVER research roadmap. Its purpose is to act as a "sample" of the current Policy Making 2.0 landscape, and therefore the placement of the research challenges represents the "median" value of the actual placement on this 2D area of the elements/tools/technologies/methodologies they include.

[49] http://en.wikipedia.org/wiki/Magic_Quadrant

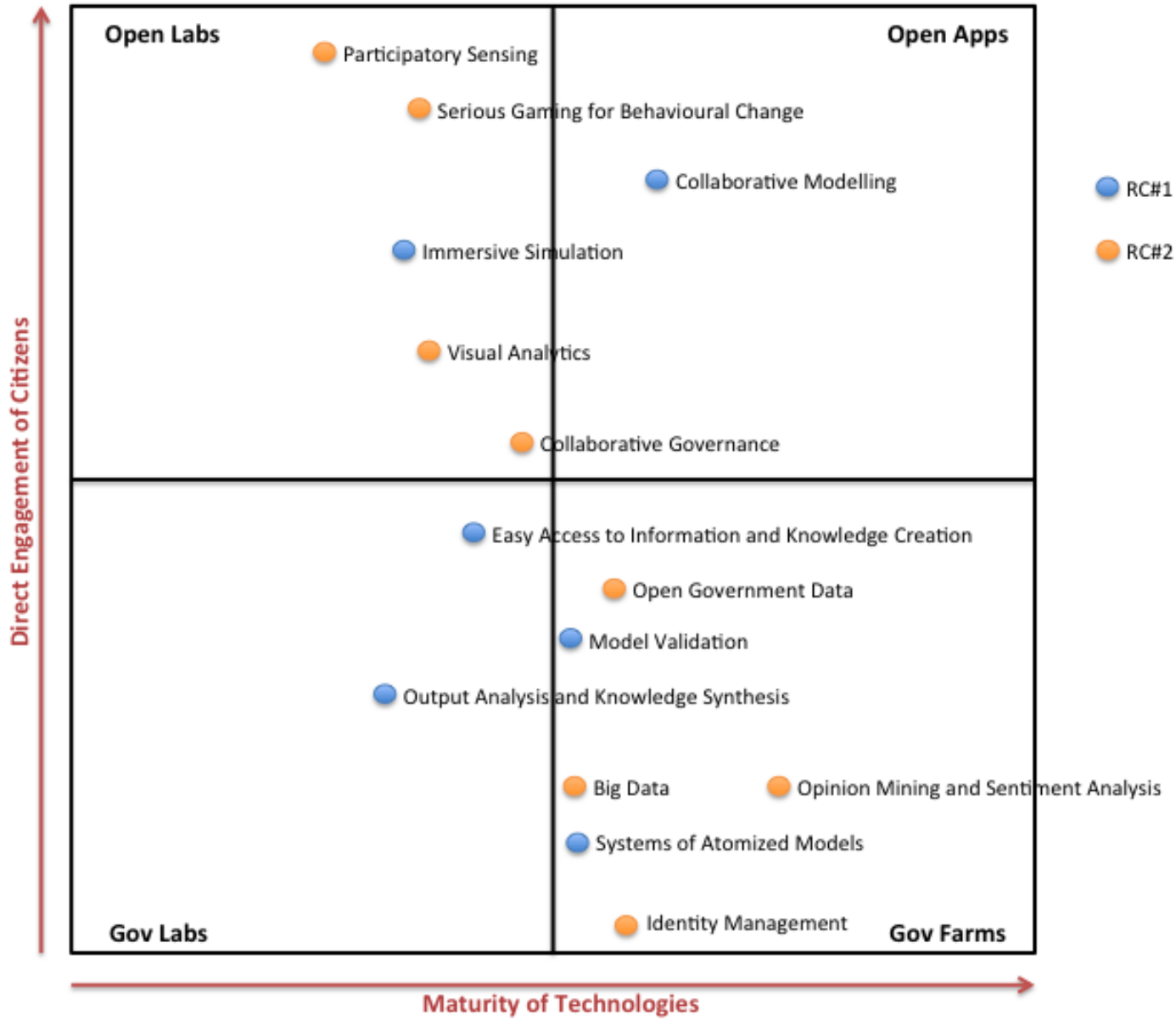


Figure 5: Magic Quadrant of Policy Making 2.0 Research Challenges

As Figure 6 shows, most of the research challenges that involve the direct engagement of citizens are still considered as quite immature, and this also argues for their lower utilisation and verifies their importance for the research roadmap. At the same time, the research challenges that at the moment do not engage citizens in a direct manner, are considered more mature, however they have just passed the infancy years and results of their utilisation and impact on the policy making process is still to be proved or it is becoming evident only since the last few years.

Therefore, although these are considered as more "ready-to-use" applications, research is still required in order to implement further and integrate them in the everyday activities of policy makers. Further research is required also to enhance their social characteristics so that they could eventually engage citizens in a more direct and fruitful way.

Roadmap Recommendation 4. Define the Timing Horizon for Research

A final practical recommendation for the CROSSOVER roadmap, which is generated as a consequence of the analysis of the four case studies and as indirect implication of the previous roadmap recommendations (e.g. CROSSROAD) is that all research challenges should be clearly accompanied by a time horizon. Such a horizon shall focus research and policy efforts towards achieving measurable and quantifiable results in a given time frame.

Figure 7 below presents a conceptual hype curve (or hype cycle)[50] regarding the research challenges identified in the CROSSOVER roadmap. This hype curve is based on information that derives from:

- current ICT trends (in general) and of the Policy Modelling domain in particular
- views that have been recorded during the interviews that took place during the study. This was possible as the interviewed people elaborated their thoughts on the future research activities regarding their case, the desirable improvements and the potential extensions in terms of utilisation and exploitation of emerging or existing technologies and methodologies over an horizon of the upcoming 10 years.

One should consider that the placement of each research challenge on the curve has been performed having in mind both the mature and the immature sub-areas it contains. In general, the position of the different research challenges on the curve in Figure 7 is in accordance with their maturity level as presented in 6. As a result, an indicative timeframe for research can be drawn, grouping research challenges into those that are considered:

- more mature and could deliver concrete results in a short term horizon of no more than 3 years,
- on the verge of maturity and could produce results within 3 to 5 years of research and
- still in infancy and require more intense and long-lasting research efforts, putting their major concrete contribution to the domain of Policy Making 2.0 in a timeframe that lies 5 to 10 years ahead from today.

[50] http://en.wikipedia.org/wiki/Hype_cycle

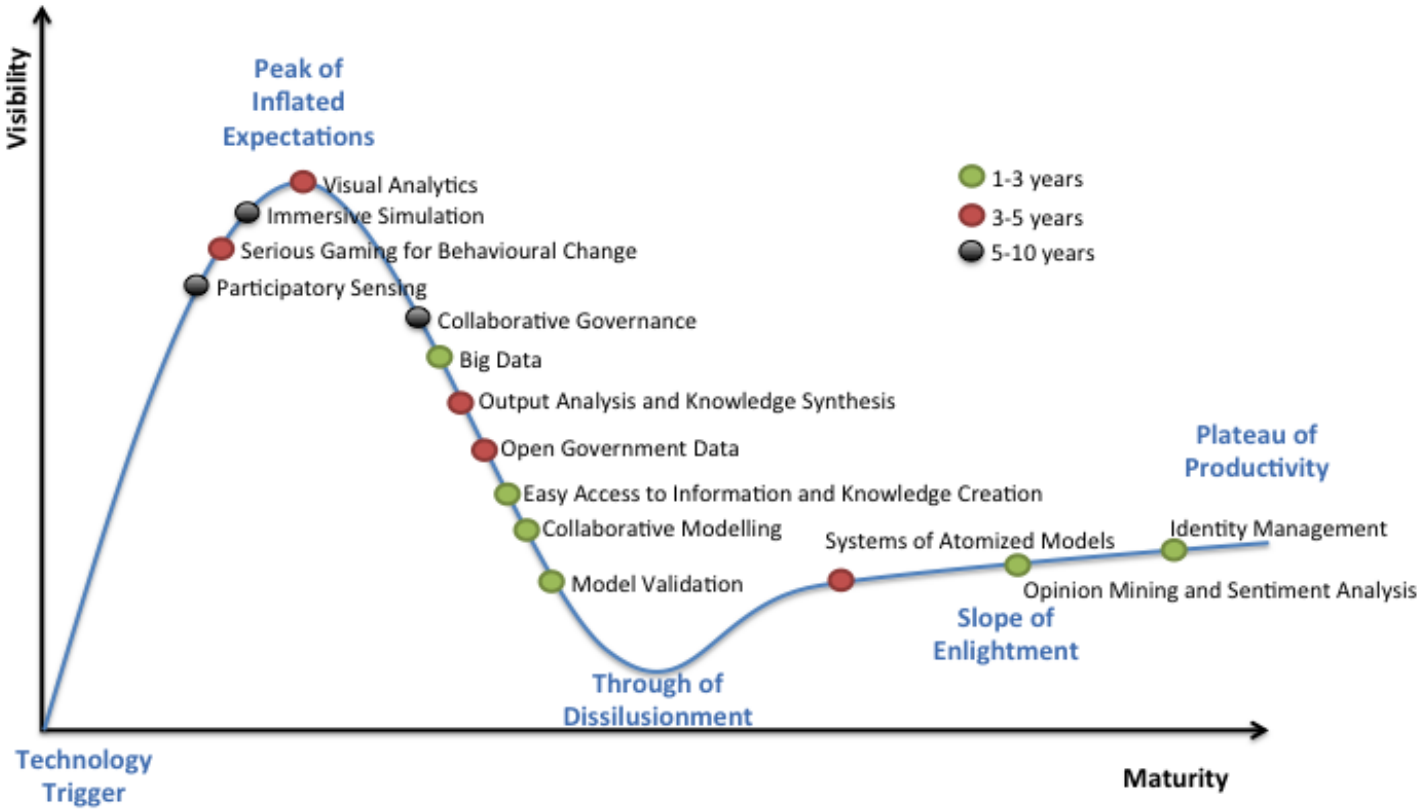


Figure 6: Policy Making 2.0 Research Challenges Hype Curve

Based on the previous recommendations, it has to be noted that the timeline presented in Figure 7 is neither fixed, nor it represents the complete image of the domain. It is based mainly on the findings of the analysis of the four cases investigated in-depth and therefore further analysis, including the opinions of experts in all these fields are required in order to adjust the placement of these research challenges on the hype curve and so defining their degree of possible deployment and maturity.

Although the cases analysed are considered representative enough of the Policy Making 2.0 domain, further investigation of other cases and exploration of the links between the various research challenges is needed in order to optimise the time horizon for future research and policy proposals. Moreover, a cross analysis of the proposed timelines, of the graph relationships of the research challenges and of their position regarding their maturity and engagement of citizens is necessary in order to derive more precise recommendations to be included into the final roadmap on Policy Making 2.0 so to possibly reveal well-coordinated mechanisms for exploiting the potential of the domain in the most timely and efficient way.

6. Conclusions

As presented in the initial sections of this report, the research conducted has reviewed and analysed a long list of existing cases in the domain of Policy Making 2.0 and after choosing a representative set of 4 cases which cover a wide spectrum of policy-making steps, domains and methodologies/technologies/tools, proceeded to a deeper analysis that was able to shed light to important dimensions that have been analysed for being considered to be integrated into the CROSSOVER roadmap on Policy Making 2.0.

The recommendations set out in this report, which are the direct outcome of the activities of in-depth analysis of case studies and the work of mapping and identification of promising cases, are aligned with the nature of the Policy Making 2.0 domain, which calls for more open, collaborative and evidence-based decisions. These needs are still not fully covered, as the analysis conducted reveals that many of these prerequisites are still missing even after several years of research and deployment. Seamless access to information and data, preferably following an open and cost effective approaches are still lacking, while public agencies are over-protective and reluctant to the idea of sharing their data and other datasets are too expensive to be used by research teams. At the same time, policy makers are still treating emerging cases as “freeware” products and are not investing in their further development, nor in the necessary staff which possess the required background to turn the potential of these tools to digestible facts and figures for policy makers. Moreover, there is still confusion about which tools are of direct interest for policy makers and which can be used by potentially all citizens, while almost all research efforts follow a top-down approach, neglecting the fact that open innovation and crowdsourcing is gaining a tremendous momentum in the current Web2.0 era.

This analysis ends up with two sets of recommendations addressed both to policy makers and to practitioners/researchers active in the Policy Making 2.0 domain. The first set of recommendations that have been generated by analysing and identifying these issues deals with the presentation of policy implications as captured by the analysis and the interviews conducted with people involved in the various cases identified. Those are summarised in the 'Decalogue of policy Making 2.0' as follows:

P.R.#1. Build your case in Policy Making 2.0 in an agile manner.
P.R.#2. Continuously embed high-quality (open) data into your policy models.
P.R.#3. Tap the power of visualization and social networks to effectively communicate policy outcomes.
P.R.#4. Invest on real-time simulation technologies.
P.R.#5. Create intuitive, yet diverse interfaces depending on the profile of the stakeholders.
P.R.#6. Bring together multi-disciplinary expertise.
P.R.#7. Engage stakeholders from the very beginning.
P.R.#8. Incubate your case into the interested public organization.
P.R.#9. Treat your case as a product/service to ensure sustainability and further development.
P.R.#10. Think out-of-the box for the deployment of your case in other settings and contexts.

The second set of recommendations aims to provide the necessary input in order to complement and

further enhance the CROSSOVER Roadmap on Policy making 2.0, based on the reflections of the findings gathered and the in-depth analysis of the four cases on the emerging results of the roadmapping exercise.

Those are the summarised by the following:

R.R.#1. Think of the Roadmap's Elements as Nodes in a Connected Graph
R.R.#2. Build Clusters of Research Challenges and Define Policy Making "Enablers"
R.R.#3. Shift from Gov Labs to Open Apps
R.R.#4. Define the Timing Horizon for Research

These recommendations are the main conclusions of the in-depth analysis of selected case studies and could be used (possibly upon further validation with other cases and by the community of experts, practitioners, researchers and policy makers involved in the Policy Making 2.0 debate) for the enrichment of the final version of the CROSSOVER Roadmap on Policy Making 2.0.

Despite the impact and the benefits for both researchers and policy makers that the roadmap will bring, it is inarguable that even more than 5 years after the launch of this research priority as part of the EC FP7 work programme, these communities are "not yet there" when it comes to fully exploiting the benefits of ICT for governance and policy-making and interweaving ICT within the policy-making processes and in support of various public policies.

In fact, one of the main reasons for designing a roadmap for research, policy and practice is to deal with this reality. It is difficult to deny that there is an urgent need for better policy-making to drive Europe out of its current crisis contributing towards the achievement of the objectives of the Europe 2020 strategy; at the same time there is still a considerable gap between the potential and the real impact of ICT tools in support of governance and policy-making.

The CROSSOVER roadmap should put in perspective important missing pieces of the puzzle of the Policy Making 2.0 domain. However, with a view to Horizon 2020, further coordination activities are needed to help accelerate the transition of this important domain from its present and promising status, in which it has been stuck for too long, to a really useful, impact-oriented and beneficial one, especially for the younger generation which strives to engage into the decision making processes both at the European and global level.

ANNEXES

Annex A – Detailed Review of the Four Case Studies

A.1 2050 Pathways Analysis

A1.1 Case Description

URL	http://www.decc.gov.uk/en/content/cms/tackling/2050/2050.aspx
Status	Ongoing
Sector	Environment, Climate Change
Policy Making Cycle Stage	• Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Immersive Simulation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Open Governmental Data
	  ○ Serious Gaming for Behavioural Change
	  ○ Collaborative Governance

The UK Department of Energy and Climate Change (DECC) built the 2050 Calculator to help the public engage in the debate, and for Government to ensure that its short- and medium-term planning was consistent with achieving the long-term aim. More specifically, as the UK is committed to reducing its greenhouse gas emissions by at least 80% by 2050, relative to 1990 levels, a transformation of the UK economy is needed while ensuring secure, low carbon energy supplies to 2050, and face major choices about how to do this. In the Carbon Plan published in December 2011, the Calculator was used to illustrate three 2050 futures that show some of the plausible routes towards meeting the target.

The 2050 Pathways Analysis features four resources:

1. A web-based tool for the public to try their own ideas for reducing greenhouse gas emissions.
2. An in depth Excel-based tool and reporting system which includes the methodology/the models that are used for the analysis.
3. A web-based presentation for younger audiences about greenhouse gas emissions.
4. A toolkit for leading an energy debate in schools.

The 2050 Calculator is targeted at citizens, policy makers, senior officials and politicians as well as technical experts through different interfaces.

The 2050 Pathways presents a framework through which it is possible to consider some of the choices and trade-offs we will have to make over the next forty years. It is system-wide, covering all parts of the economy and all greenhouse gases emissions released in the UK. It is rooted in scientific and

engineering realities, looking at what is thought to be physically and technically possible in each sector.[51]

2050 pathways is a tool to help policy makers, the energy industry and the public understand these choices. For each sector of the economy, four alternative trajectories have been developed, ranging from little or no effort to reduce emissions or save energy (level 1) to extremely ambitious changes that push towards the physical or technical limits of what can be achieved (level 4).

The 2050 Pathways Calculator – available on the DECC website - allows users to develop their own combination of levels of change to achieve an 80% reduction in greenhouse gas emissions by 2050, while ensuring that energy supply meets demand.[52]

The supportive tools of the initiative provide different ways of securing a low-carbon future for the UK and they can be tried out:

- By creating each user's own pathway using the 2050 Web Tool.
- By exploring what a low-carbon UK might look like in 2050 by playing the simplified My2050 simulation.
- By taking the debate into the classroom in the schools toolkit.

The procedure that 2050 Pathways follows in order to perform the aforementioned analysis can be found in the following figure:

[51] Department of Energy and Climate Change http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CDcQFjAA&url=http%3A%2F%2Fwww.decc.gov.uk%2Fen%2Fcontent%2Fcms%2Ftackling%2F2050%2F2050.aspx&ei=ifXQUNHlO6eM4ATCoIDwAg&usg=AFQjCNEEZYMQSr60aPcSKWGM-xOV7dODIQ&bvm=bv.1355534169,d.bGE

[52] HM Government (2010). 2050 Pathways Analysis. Available at: http://www.decc.gov.uk/assets/decc/what%20we%20do/a%20low%20carbon%20uk/2050/216-2050-pathways-analysis-report.pdf

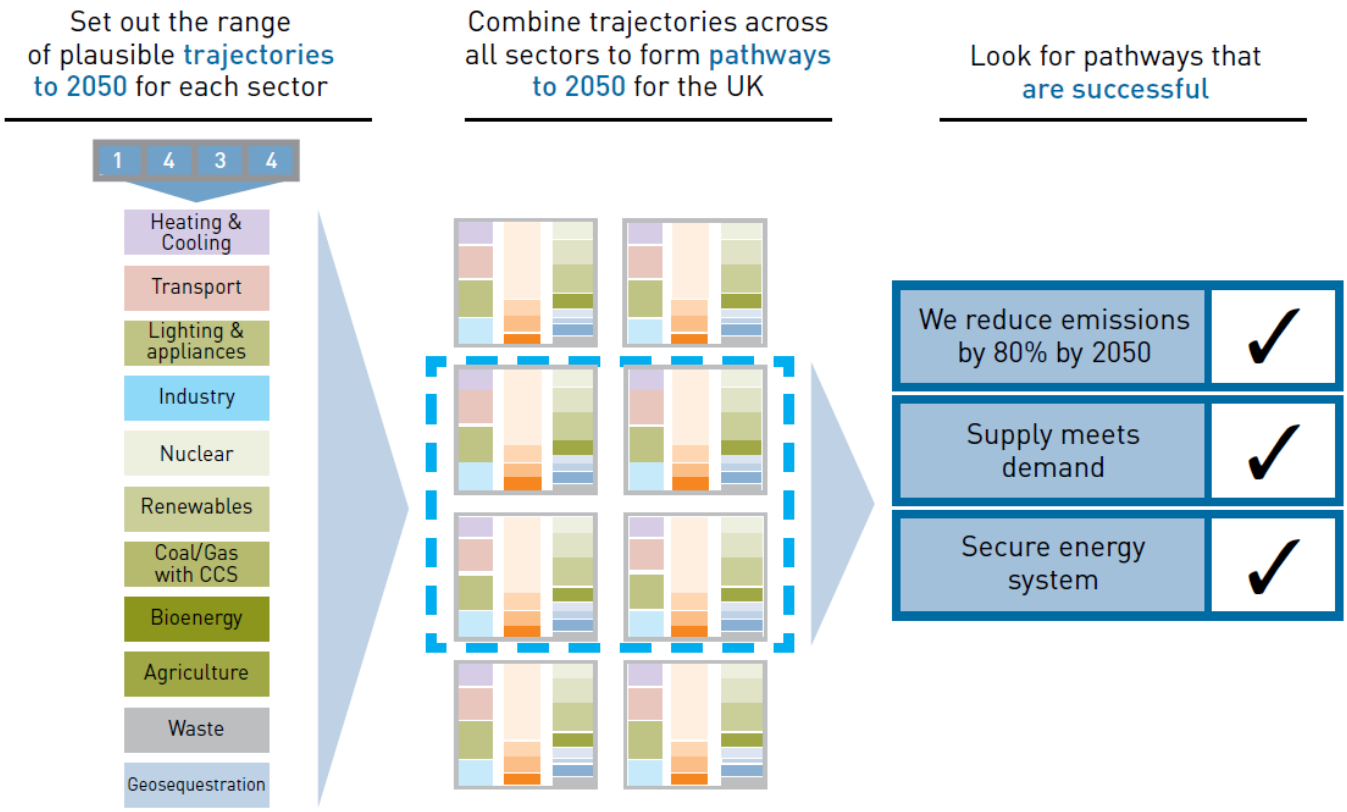


Figure A1: 2050 Pathways Analysis Procedure

A1.2 Case Motivation and Deployment

The 2050 Pathways project was initiated in the summer of 2009. At that time, the UK Department of Energy and Climate Change (DECC) was newly formed and tried to formulate its first white paper. The department had at that time to work towards some initially set targets (e.g. reduce greenhouse gas emissions by at least 80% by 2050), without having concrete answers on whether this objective was possible or the way this target could be achieved due to lack of data and appropriate models. This need sparked the idea for a brand new initiative - the 2050 Calculator.

The DECC already had in hand various analytical models (such as MarkAl[53]) that could be used; however, these models were really complicated and hard to use. In addition, decision makers were doubtful on which model was the proper one to use, especially when two (or more) alternative models gave different answers on the same questions. As a result of that, the department decided that a different, new kind of model was needed in order to be fast, transparent, stable and effective. Thus, this was a fine opportunity for the 2050 Pathways project to start. The DECC White Paper[54] had close attention of various administrations (e.g. Secretary of State, Permanent Secretary, Director-Generals, Director of Strategy). In addition, the chief scientific advisor of the department at that time, Professor

[53] http://www.iea-etsap.org/web/Markal.asp
[54] http://www.legislation.gov.uk/all?title=Energy%20and%20climate%20change

David MacKay, was really keen on this piece of work and was really found of an idea like the 2050 Calculator.

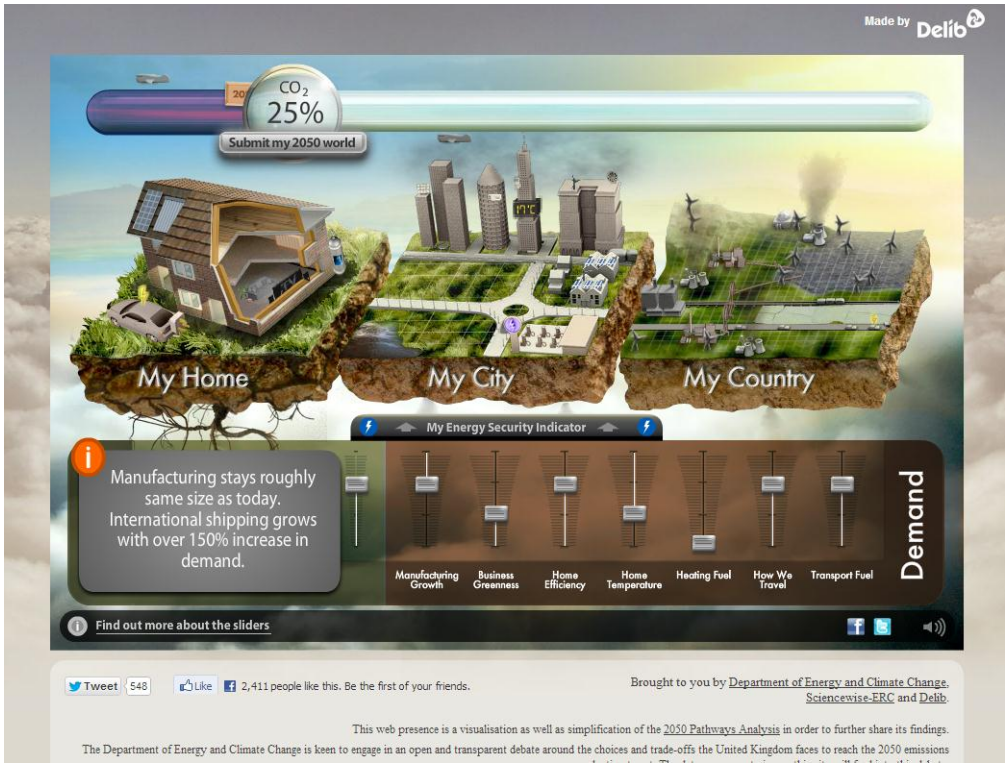


Figure A-2: Playing the My2050 Game for the demand side

In a fully operational (with Excel model and user-friendly web tool) model, the project was available in 2010. The tool was updated twice in 2011, including launching the Game version My2050.

Concerning the deployment, there were lots of involved stakeholders. There was a core team (6-10 people) of the DECC (who were leading the work), people from other governmental departments (e.g. transport, industry department) and probably hundreds of external stakeholders (from NGOs, academia, industry, experts). All the needed development was based in collaboration with various actors. Indicative categories of the actual effort included:

- 6-10 persons for the first phase, about a year (designing and building the model)
- Searching and collecting the necessary information
- Call for evidence (6 people for 7 months)
- Adding costs analysis (4 people for 9 months)
- Maintaining and improving model (4 people)
- International and UK engagement work (4 people)

The various stakeholders were also involved in the deployment of the project, in two distinguished, yet interdependent, phases:

- The building phase, which included modellers, peer reviewers of the numbers that were used
- The running phase

Regarding the funding sources, the project was initiated and initially funded by the DECC. Small parts of extra funding were occasionally found from other sources (e.g. a public engagement organization helped to fund the My2050 game (53.000 pounds)). More recently, two million pounds were provided

by the International Climate Fund so as to help promote the 2050 Pathways initiative in 10 developing countries (besides the UK).

As far as the CROSSOVER Policy Cycle[55] is concerned, the project probably fits in the first step, this of Agenda Setting. This is due to the fact that the concept is a high-level one (e.g. reduce gas emissions to 80% by 2050). As the data are currently being updated and a comparison between the projected and the actual results will take place, probably the case could in the near future fit into the Monitor and Evaluation Policy Cycle step as well.

A1.3 Implementation

The implementation of the project was itself a pretty challenging task. As a first step, an experienced/ lead modeller (using the most recent version of MS Excel) was engaged in order to fulfil the demanding task of modelling the necessary components. The overall 2050 Pathways Analysis model[56] was build using MS Excel (so MS Excel was used as the modelling tool) which parsed different functions and numbers in order to provide the final results of the model.

In addition, a project management team was needed in order to put all the stakeholders together and coordinate the whole work. Moreover, experts were engaged in a role of a "team leader", coordinating the work in individual teams that dealt with specific issues. A partner with Web2.0 and programming experience was also involved.

[55] http://crossover-project.eu/Portals/0/Material/0204F01%20International%20Research%20Roadmap%20on%20ICT%20Tools%20for%20Governance%20and%20Policy%20Modelling.pdf

[56] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/16285/6854-2050-calculator-with-costs__1_.xlsx Open Source Calculator

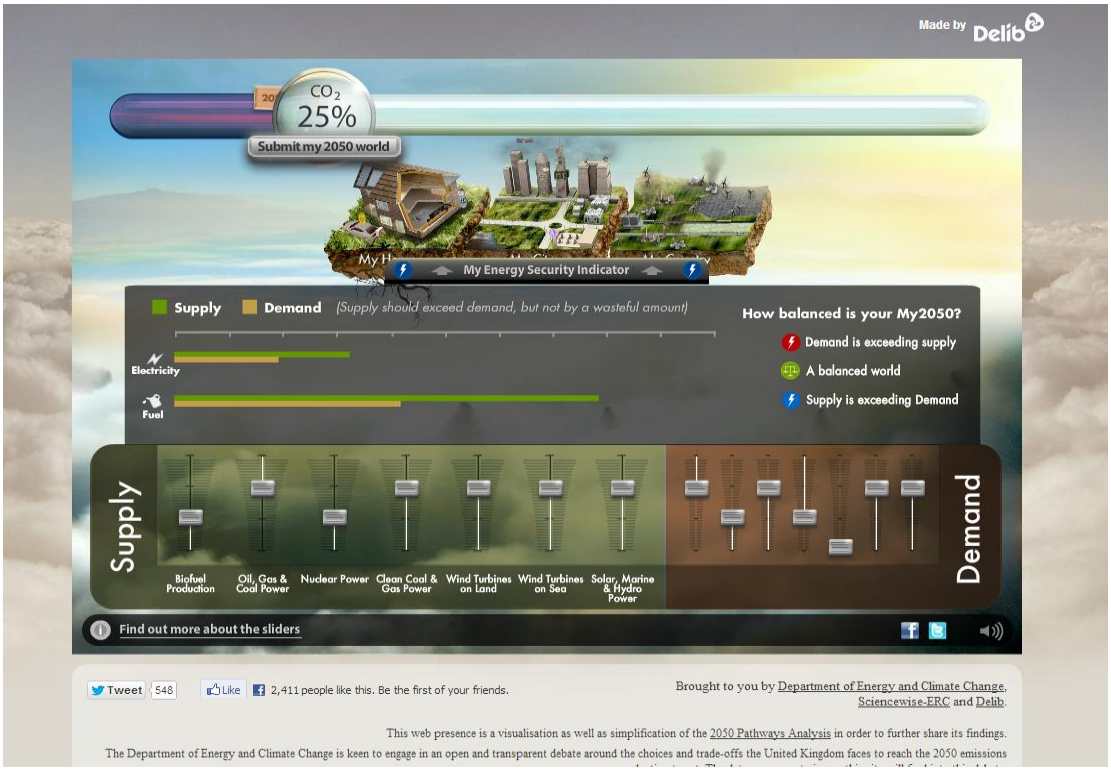


Figure A-3: Indicative results of My2050 Game

Other necessary intangible "components" of the project's implementation were objectivity, diplomacy, transparency, collaboration and understanding.

The main model of the case is based on a spreadsheet. The project uses mostly open source software, which was a strategic decision of the project team. In addition, the platform provides the end user with the ability to comment and make propositions for ameliorating the platform and the whole concept. There is also integration with social media: the platform gives the end user the opportunity to share his/ her Pathway to Facebook and Twitter.

In the course of the three years of the project's life, various additional components have been added. Compared to the initial implementation of 2009, the greatest addition was the My2050 serious game (available in 2011). Secondly, a cost analysis notion was added. Moreover, some updates took place in the model (including visualisation), in order to make it easier to understand and more user friendly.

It has to be noted that the end users of the platform have the ability to correct the data embedded in the model. They can download and remove the initial data and upload their own, something that actually happened in South Korea case. The aforementioned model has been specifically set up to support the energy system and notion and it would probably be difficult to be implemented in other policy areas. Nevertheless, following the same principles, the same work could be performed for any other policy areas from scratch.

Regarding the data used in the project, they fall into the category of public/ open (e.g. official UK population). They do not always exist in the format needed (as expected), but they are always open. It still is one of the main challenges to look for the best and most reliable data sources. As mentioned before, the tool itself gives the end user the opportunity to see the utilized data himself.

A1.4 Results Achieved and Impact

At the start of the project there were no specific KPIs set. However, the numbers of visitors and of interactions with the tool have demonstrated the success and impact of the case. In the first three months from the official project launch there were about 10.000 unique visitors in the platform. Regarding My2050 there are over 16.000 pathways up to the date. Regarding the stakeholders, about 200 were involved in the initial (building) phase and after the launch about 500 stakeholders were contacted. Moreover, a week-long online debate including 5-6 experts took place with lots of comments from open public.

One of the project's main purposes was (and still is) to inform policy makers in a documented manner; from this point of view, it can be considered as successful. The most concrete example is the UK "Carbon Plan 2011" government document (how will the UK look in 2050), published in late 2011 which included as one of the main pieces of evidence and visualisation the 2050 Pathways Calculator. In addition, the same tool was used in budget Annual Energy Statements. Moreover, the tool was used in General Election briefing work.

It is important to note that there are Master's programs, both in and outside of the UK, that engage the 2050 Pathways models and tools in their courses. In addition, the my2050 game is also communicated to pupils of various schools in the UK; there is a "schools' toolkit" available and downloadable from the project's website, as well as from other websites, including the department of Education website.

It has to be noted that due to the project's open source nature, it is quite difficult to tell how many and who exactly are using the platform.

In addition, a large number of presentations have been conducted in workshops, schools, conferences, NGOs, international colleagues etc. A presentation was made to the European Commission too. Really positive media coverage has also been noticed (around 15 key articles regarding the project[57,58]). Other references to the case have also been made (e.g. cultural festivals).

The main pillar of the success of the project is definitely the innovations that it brings to life. One of these core innovations is the radical transparency and the ease of use. The model aims to encompass all technically possible futures and form a fruitful debate based on realistic scenarios (and not on guesses). The model provides actually valuable feedback to high-level decision makers relative to communicating and interrogating different scenarios (e.g. what citizens really want, which conveniences they are willing to sacrifice etc.).

A1.5 Challenges Encountered and Lessons Learned

Complex and ambitious projects such as Pathways 2050 always face quite a number of challenges. Effective collaboration and dialogue is always time consuming; this was the case for Pathways 2050 also. The identification of time limits to be spent in dialogue is of critical manner. Another challenge is to try to keep the ethos of the project alive, despite changes in personnel. In addition, although tools

[57] https://www.gov.uk/2050-pathways-analysis
[58] http://www.involve.org.uk/2050-pathways-public-dialogue/

and technologies may seem easy to use by experts, they might still be difficult for open public; facilitators are always of use. Last but not least, keeping the interest towards the initiative alive for a long time (especially after the initial success) is also a challenging task.

Based on the Pathways 2050 experience up to today, there are many lessons that have been learnt and can be offered as recommendations. One of the core lessons learnt was that there is a need to involve stakeholders as early as possible. In addition, being open and transparent is estimated by end users. Collaborative working is also one of the main assets of every large scale project, provided that proper people have been selected for each position. The 2050 Pathways team included members from government, industry, NGOs, academia etc.

Moreover, actual innovation can really excite people and make them efficient. In addition, it was concluded that if something is designed in a correct and efficient manner, it could find acceptance to audiences that were not targeted at the beginning.

A dynamic, instead of a static approach is also more possible to find acceptance in the end users. Additionally, “be simple” is another lesson learnt; simplifying things helps both stakeholders and end users.

A1.6 Sustainability

As every on-going initiative, 2050 Pathways took specific actions in order to engage stakeholders from the very beginning and sustain (or even increase) them up to today.

As also mentioned previously, the main plan for increasing the stakeholders’ engagement was presenting them the whole initiative and involving them from the very beginning. The project team also published regularly “Calls for Evidence” so anyone that may have been missed/ overseen would get to feed in his/ her evidence. The development of new tools for different audiences (e.g. Excel, web tool, My2050, school toolkit) has also proved to be a successful stakeholder engagement strategy.

Peaks were recorded when the project first went online and when an article was published in BBC website[59]. The project has not made the most out of social media, but it provides the user with the capability to share his/ her Pathway on Facebook/ Twitter.

The project’s stakeholders’ engagement strategy also includes various organisations that work with schools and promote the initiative, as well as periodic newsletters.

Looking towards the future, the 2050 Pathways team is currently updating all possible data. In addition, a comparison between the (in the past) projected and the actual results will also take place, in order to test the credibility of the model and its results.

Secondly, an international implementation of the project, aiming at 10 developing countries (including China, Indonesia, South Africa, Bangladesh etc.), is under preparation (it will probably be running by the end of 2014).

In addition, the inclusion of historical data (meaning data between the initiation of the project up until today) in the model (in order to provide a more complete image) is also a future plan.

Last but not least, there is a constant will to make the tools more efficient and attractive.

[59] http://www.bbc.co.uk/news/science-environment-12633622

A.2 GLEAM

A.2.1 Case Description

URL	http://www.gleamviz.org
Status	Ongoing
Sector	Health - Epidemiology
Policy Making Cycle Stage	• Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Model Validation
	  ○ Immersive Simulation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Visual Analytics
	  ○ Open Governmental Data
	  ○ Big Data

To effectively limit the social and economic damage caused by infectious diseases, the public health communities need to be in the position to anticipate the spatial and temporal evolution of epidemics and evaluate the potential impact of available containment and prevention strategies.

The global epidemic and mobility model, GLEAM, combines real-world data on populations and human mobility with elaborate stochastic models of disease transmission to deliver analytic and forecasting power to address the challenges faced in developing intervention strategies that minimize the impact of potentially devastating epidemics.[60]

GLEAM is a discrete stochastic epidemic computational model based on a meta-population approach in which the world is defined in geographical census areas connected in a network of interactions by human travel fluxes corresponding to transportation infrastructures and mobility patterns. The GLEAM 2.0 simulation engine includes a multi-scale mobility model[61] integrating different layers of transportation networks ranging from the long range airline connections to the short range daily commuting pattern.[62]

Elaborate stochastic infectious disease models to support a wide range of epidemiological studies are used, covering different types of infections and intervention scenarios in order to respond to the spread of a pandemic crisis in very short times.

Real-world data on population and mobility networks are used and integrate those in structured spatial epidemic models to generate data driven simulations of the worldwide spread of infectious diseases.

GLEAM runs on high performance computers to create in-silico experiments that would be hardly feasible in real systems and to guide our understanding of typical non-linear behaviour and tipping points of epidemic phenomena.

[60] GLEAM Vision. Available at: http://www.GLEAMviz.org
[61] http://www.gleamviz.org/model/
[62] GLEAM in Detail. Available at: ww.GLEAMviz.org/GLEAM-in-detail/

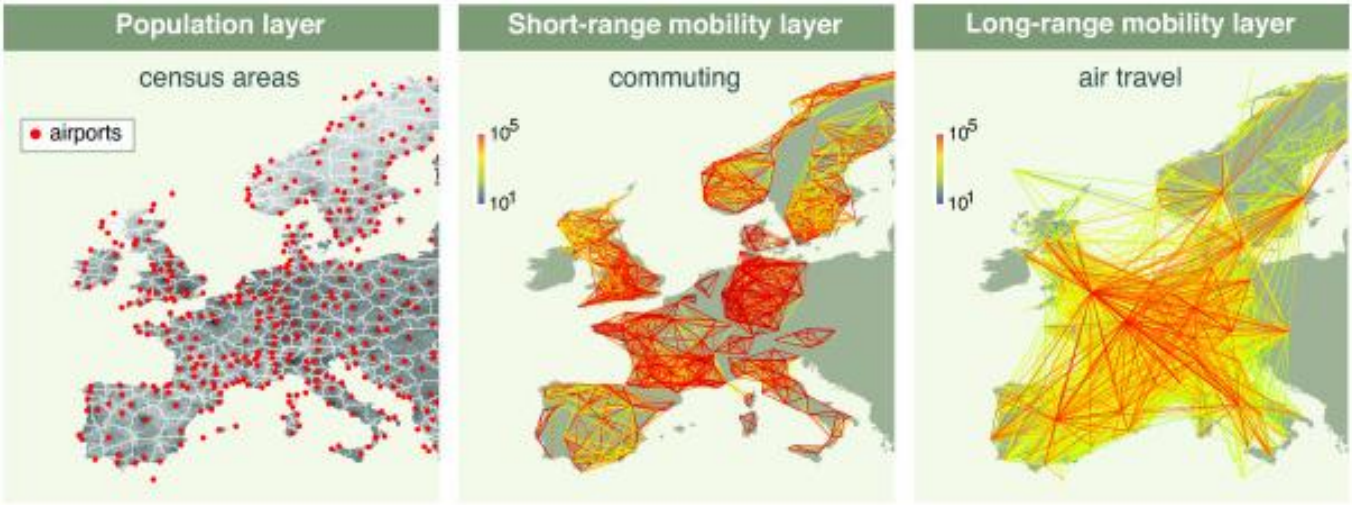


Figure A-4: The three population and mobility data layers in GLEAM

A suite of computational tools is provided to help modelling the spread of a disease, understanding observed epidemic patterns, and studying the effectiveness of different intervention strategies that policy makers think to put forward to minimize the exposure of population and to neutralise the disease spread. The tools are available to researchers, health-care professionals and policy makers either as direct download from the GLEAM website (light version), or via communication with the GLEAM team in order to get the full infrastructure. The tools allow end users to create their own models and simulate them through the GLEAM platform, so anyone can construct his own model with different parameters. Of course, relevant competences are needed, such as a background in modelling, epidemiology, computer simulation, etc. As it is argued below, the use of such a model requires the support of people or of groups that posses interdisciplinary skills, in order not only to construct a solid and close to reality model, but also to interpret the results correctly.

The basic structure of GLEAM model consists of three distinct layers:

- The population layer
- The mobility layer
- The epidemic layer

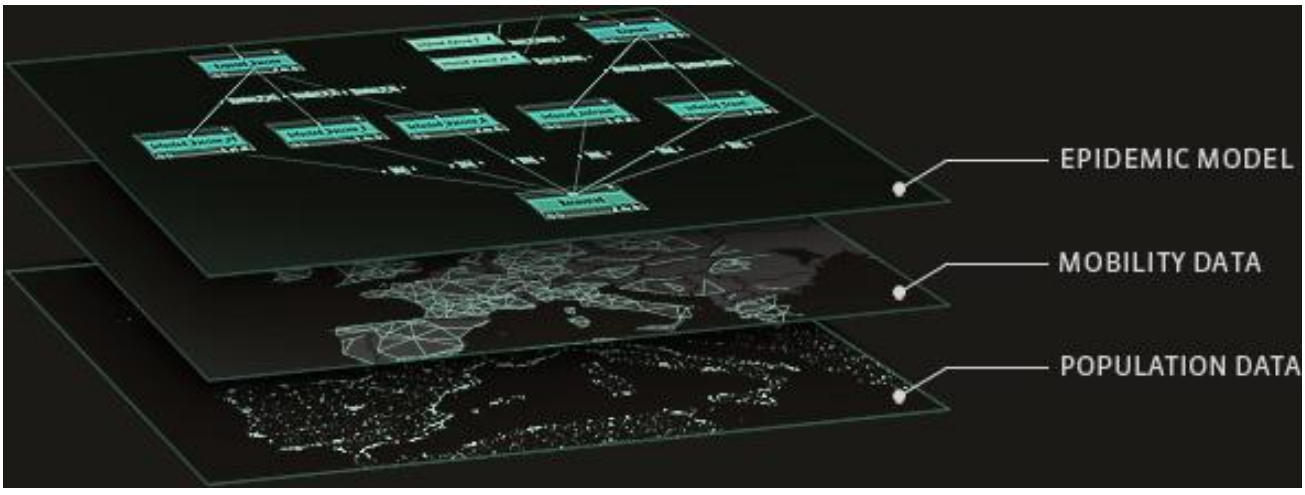


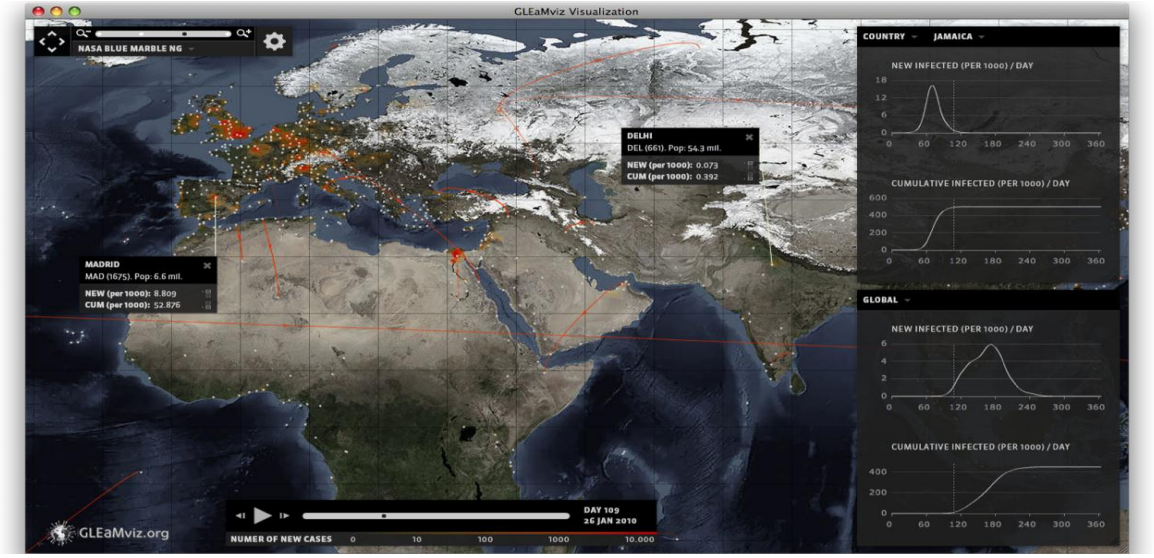
Figure A-5 - GLEAM model layers

A.2.2 Case Motivation and Deployment

The initial motivation for GLEAM was a research question of public health concern: *"can we do forecasting regarding the global spreading of diseases?".* Under forecast it is not meant to predict when the next pandemic will strike (or what it will be), but, given the fact that the World Health Organisation (WHO) or some other similar agencies provide some warnings about a cluster of cases of a small outbreak of epidemics, to try to be in a position to create a forecasting infrastructure for the geographical and time spreading of these infectious diseases. This concept is quite similar to creating a weather forecast.

The main starting point was based on research to find the algorithms, the needed data etc. From 2003 till 2009, the GLEAM team was occupied with the creation of the basic computational model that integrates all the available/ collected data. Categories and sources of data included: data from census agencies, data regarding population at very high resolutions, data from a world map implemented by NASA with the world population divided to 5x5 miles area boxes, the entire database of airlines, about 40 databases from different countries for local mobility, transfer, etc.

All this data has to be integrated into the model that simulates the spreading of the diseases. This is just the engine of the GLEAM infrastructure and the motivation to develop the entire infrastructure came in 2009 where the team was working with agencies and private companies for analysing the H1N1 pandemic. It was realised that it was more than difficult to communicate large amounts of data to stakeholders as nobody knows what people are really interested in and, at the same time, modification questions are constantly popping up in order to calibrate the model for studying different issues. Thus, it was decided to create a computational infrastructure that allowed the GLEAM team to setup a basic model in case of an emergency and to do almost the same heavy calibration that is performed in a supercomputer environment, and also to make this data available for exploration through a visual interface to agencies and people who could try to change the model's parameters, try different containment measures, etc. without coming back to the GLEAM team for these needs of support.



A-6: GLEAM simulation visualisation

In addition, it was decided as a main principle to have parts of the model public, in order to let them be used for academic purposes and to empower students and people teaching about infectious diseases spread and so the public version evolve which does not contain all features of the full platform.

The GLEAM research team started working on the project prior to looking for funding and projects willing to sponsor the attempt. Initially the work performed in areas such as computational epidemiology, network of diseases etc. was funded as part of scientific research, but not as part of the GLEAM project. Once the idea was more concrete, GLEAM got funding from various US agencies (NIH[63], Defence Agency) and from the EC through some research projects (EPIWORK IP project[64] and EPIFOR[65]). In the website the list of all funders is available. Also, funding is still coming from 2 major corporations (their names cannot be disclosed).

At this time, the case is supported through funding for new features. EPIWORK project funding is used to expand the functionality of the platform, to provide APIs to introduce specific agent based models within the existing model and to integrate the platform with another epidemic data sharing platform that is constructed in EPIWORK. There are many research areas that allow GLEAM to keep the platform alive and still advance development. Another part of the funding comes from various research contracts and from corporations that want to use the platform for their epidemic preparation plans (e.g. to evaluate the number of workers within an area that could get infected).

As also mentioned before, there are many deployments of GLEAM, including the US Defense Agency, agencies like the EC JRC ISPRA[66] that uses and implements GLEAM in its Crisis Management Unit or the INSERM institute (see section 3.2.8), and other undisclosed corporations.

A.2.3 Implementation

In an initiative such as GLEAM, the expertise required in the research team is very interdisciplinary. The team includes people coming from physics, computer science, mathematical biology, public heath institutes, graphic designers for the interface, HCI experts. Having such a multidisciplinary team and creating a common vision and goal is quite difficult in terms of unifying languages, skills, understanding of each other, and different way of work.

People from JRC have played a critical role in the course of implementation, as they have been constantly providing feedback and can be considered the first link to policy making. The GLEAM team has also been talking a lot with policy makers from agencies that work on public health and disease prevention, aiming to receive additional feedback.

The 1st release of the platform took place in 2010 (2012 was the 3rd year of the fully operating release). There have been 4 major releases up to today (current release: GLEAMViz 4.0) and the major changes focused on improving visualisation and additional capabilities. Moreover, the last release has a

[63] National Institutes of Health. Available at: http://www.nih.gov

[64] EpiWork -Developing the framework for an epidemic forecast infrastructure. Available at: http://www.epiwork.eu

[65] EpiFor - Complexity and predictability of epidemics: toward a computational infrastructure for epidemic forecasts. Available at: http://www.epifor.eu

[66] JRC-Ispra. Available at: http://ec.europa.eu/dgs/jrc/index.cfm?id=6450

different updated engine for the simulation that is 10 times faster than the previous one. A number of 3-4 minor updates are also performed every year.

The GLEAM platform is an open nature. Commercial software has been used only for development, like Adobe Air for the client (needs licensing for developers), but for the end user it still remains free. However, the public release available to anyone does not include all the features of the software; the full software is released only to specific agencies (like the JRC) that are then in a position to install and maintain the software on their servers. For several reasons the full model cannot be offered to all users (e.g. the GLEAM team cannot directly support 20 or 50 installations and therefore support is only provided to important agencies that are running the full model). Moreover, the full release runs on HPC that we provide to the community so we cannot allow every user to use all the features, as a super-computing centre would be necessary; something that is not feasible at the moment.

The basic model is developed by the GLEAM research team and is considered as a unique model, as the GLEAM team is the one of the very few groups with global capabilities at this time in terms of epidemic modelling. Creation of specific APIs and collaboration with other 2 groups to create an integration of the GLEAM model with localised agent based models which are much more detailed and will bring in the platform other computational models too is currently being planned.

The data used for the tool is mostly public data, but when talking about specific implementations (like a pandemic plan for a big corporation), then the tool integrates data from these organisations that are not public and cannot be publicly shared. Moreover, the tool also integrates commercial data, like the IAA data, the OEG database, data from various census bureaus etc. These, not open, data is only used for computations and cannot be redistributed through the tool. Everything else can be accessed through the tool (like world population data, etc.) and is publicly available in various sources.

The GLEAM website has also a library of models (4-5 models available) and this will be enlarged by a future release (to 10-12 models). Last but not least, the GUI allows the end user design his/ her own models on a drag and drop canvas.

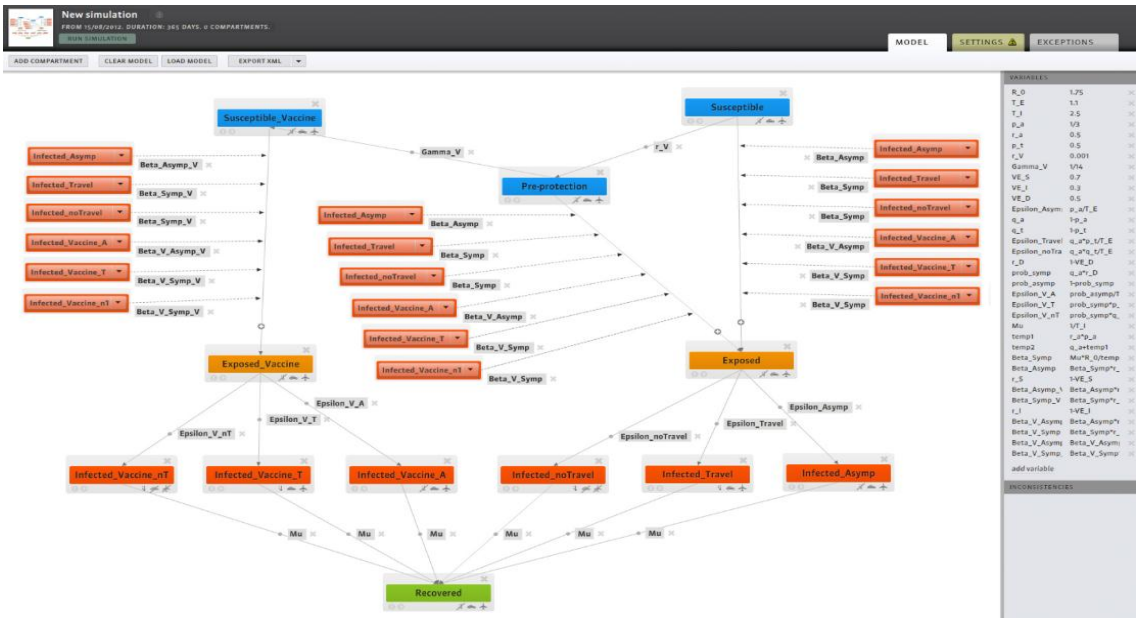


Figure A-7: GLEAMviz Simulator

A.2.4 Results Achieved and Impact

The main achievement of GLEAM so far was the production of the forecast for the H1N1 pandemic in real-time which was a quite successful exercise and showed the power of the model. A validation paper[67] has been published in December 2012 showcasing that the GLEAM predictions were quite spot on.

Many stakeholders are also using the software and support their policy-making procedures in terms of designing measures to prevent or constrain the spread of diseases. Examples include the US Defence Agency, the JRC, and other corporations that are using the software. It has to be noted that JRC is using the tool in its long-term strategy for studying and responding to the spread of epidemics (through communicating the simulation results to DG SANTO policy officers), based on the experience that has been accumulated from using the GLEAM toolkit during the H1N1 disease.

The core innovation of GLEAM lies within the computational model which can integrate data from various sources and provide a close to real time forecast (by combining various real-time data sources) on the spread of epidemics on a global level, which was not possible before at that level of precision and punctuality.

Moreover, through the visual interface users are in a position to create their own models and investigate specific diseases and issues that they are interested in.

A.2.5 Challenges Encountered and Lessons Learned

The main challenge in the GLEAM case has to do with sustainability. The research effort so far has sustained the tool, but at a certain point policy makers need to provide funding for maintaining such ICT computational tools for actual policy making, as it is happening with other product categories. Only few agencies have small crisis management units that can maintain such tools. Many big agencies do not have a computational or modelling unit and this requires a change of culture from the institution and the agencies.

The first lesson learnt is that the use of Web2.0 technologies for the policy-making domain is not an easy task, as policy makers are not used to work with these tools. There is some scepticism or in some other cases too much trust. These computational tools are quantitative and it can be taken for granted that policy making cannot be done solely by looking at the numbers. What needs to happen is to complement the policy making process with this quantitative information but neither to disregard nor underestimate the value of such information. This is due to the fact that behind each model there are assumptions, modelling compromises, incomplete/ missing data, etc.

Based on the above, more and more accurate data is always needed. Policy makers are used to work with data not suited for quantitative use. This way the modeller might end up with very rough statistics that are not proper for precise calculations. The same applies for forecasting; the better data you have, the better and more accurate the forecast will be. With very poor data you might get a very disturbed

[67] Michele Tizzoni, M., Bajardi, P., Poletto, C., Ramasco, J., Balcan, D., Gonçalves, B., Perra, N., Colizza, V., Vespignani, A., (2012). Real-time numerical forecast of global epidemic spreading: case study of 2009 A/H1N1pdm, BMC Medicine, 10:165.

picture of the future. So one needs to deal with how we can improve and create a culture in the policy making environment for real-time high quality data. It is also surprising that satellites are available for weather, but there is no such map for human mobility (so in the case of GLEAM it had to be created from scratch). The actual technology was there but it was not used to get this kind of data. People in the policy making environment need to understand that those data can provide an edge to the decision making process.

The major key success factor of GLEAM has definitely been the fact that the predictions regarding H1N1 pandemic were really accurate, while working in real time helped to build a dynamic dialogue with the policy makers, starting to build a trust relationship.

Of course, success means amongst other things to provide something which is needed and that no one else can provide. There are many groups working at different levels (local/ regional/ country). GLEAM escalated to a global level, not reinventing the wheel but specialising and providing innovative things and views.

Based on the GLEAM experience there are some recommendations that can be derived. A first recommendation will be to build into the agencies' units that can deploy, operate and further develop such tools. Agencies should use people that work in this research projects and let them lead inter-agency for moving the tools to the new level within these organisations and focus on the issues they need to tackle.

Moreover, it can be taken for granted that such tools and Web2.0 technologies are being replicated easily. One should aim at integrating different tools and methods in an effort to help to achieve better policy making. It has been seen that with the US storm, where 20 models were used and one could see different dimensions, but the models were converging in similar results. So it is a matter of creating different models that converge to similar results.

Moreover, there is a real need for creating and sharing high quality data in real time.

A.2.6 Sustainability

In the initial steps of GLEAM there was no sustainability strategy, as the community of epidemic modelling and computation tools is pretty small. The major stakeholders have been contacted during conferences, workshops, etc. It was the H1N1 pandemic which brought many people to the platform and then the tool has been disseminated by word of mouth based on its application on different pandemic scenarios.

At this time, the GLEAM team is actively participating in conferences and meetings to present the tool. Moreover, other material has been/ is being created, such as short movies, brochures, advertisement events, while we have also a component called "Epidemic Planet" that is exhibited in museums to attract audience. In this content, GLEAM tries to push the tool into the education environment to facilitate students to learn more about epidemic spreading and global diseases, in order to make the younger generation more familiar with the tool and the project.

In addition, future plans include several improvements and enrichments regarding the tool itself. Another direction of work has been towards human infection diseases, and the creation of a model for

vector born diseases (like malaria) that require the knowledge from other vectors such as mosquitos is foreseen. In this context, the tool can be surely used for other issues as well.

Another direction is to move into other areas of contagion, so as to deal not only with infectious diseases, but also work with knowledge information for other epidemiological concepts.

Moreover, the GLEAM team plans to include more data and models in the platform and, depending on the resolution and the needs of the users, to create different ways to investigate the evolution of the epidemic. In principle, the basic idea is to use social media like Twitter for such purposes, which will bring the tool also cover early detection and not only forecasting, and also investigate how this can be applied in other phenomena. This can be seen as a task for the next 5-10 years.

A.3 Opinion Space 3.0

A.3.1 Case Description

URL	http://www.state.gov/opinionspace/ http://opinion.berkeley.edu
Status	Ongoing
Sector	Foreign affairs, Global policies
Policy Making Cycle Stage	• Agenda Setting • Monitor and Evaluation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Easy Access to Information and Knowledge Creation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Opinion Mining and Sentiment Analysis
	  ○ Visual Analytics
	  ○ Open Governmental Data

Launched by the U.S. Department of State[68] in collaboration with Berkeley University which developed it, "Opinion Space" bridges the worlds of politics and social media in an interactive visualization forum, where users can engage in open dialog on foreign affairs and global policies. It invites users to share their perspectives and ideas in an innovative visual "opinion map" that will illustrate which ideas result in the most discussions and which ideas are judged most insightful by the community of participants.

Using an experimental gaming model, Opinion Space incorporates techniques from deliberative polling, collaborative filtering, and multidimensional visualization. The result is a self-organizing system that uses an intuitive graphical "map" that displays patterns, trends, and insights as they emerge and employs the wisdom of crowds to identify and highlight the most insightful ideas.

[68] U.S. Department of State. Available at: http://State.gov

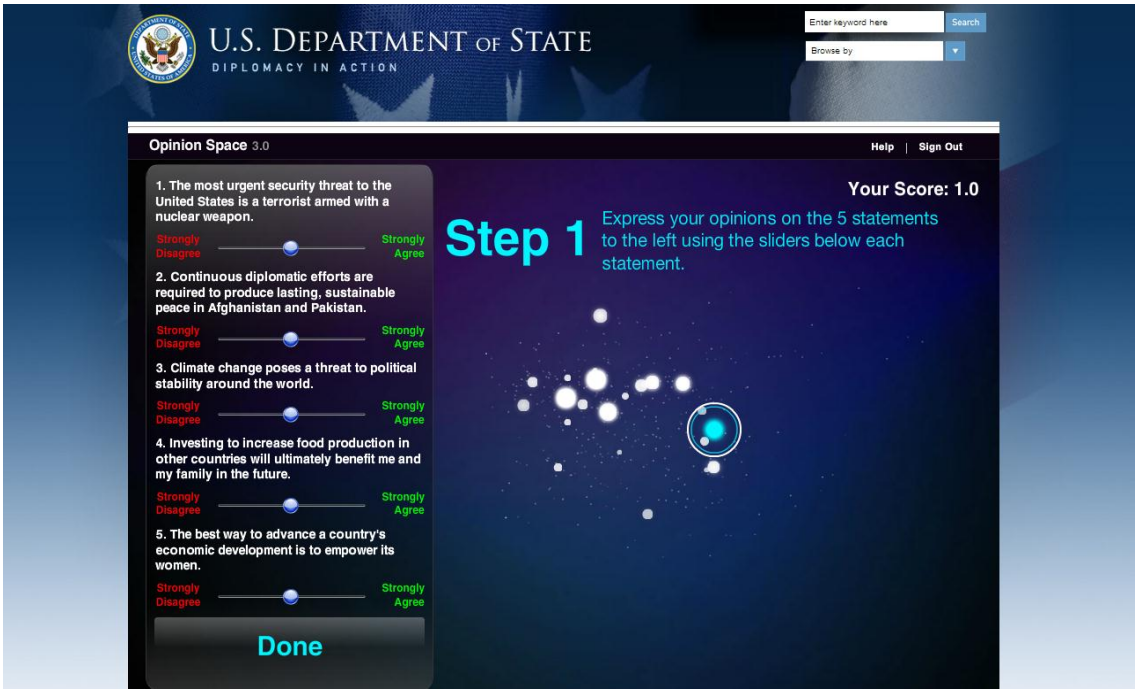


Figure A-8: Expressing opinions in Opinion Space

Opinion Space exploits the power of connection technologies to 'depolarize' discussions by including all participants on a level playing field and by encouraging communication between people who may not agree with each other. In Opinion Space the layout is determined completely by the data entered by participants: it is computed using statistical dimensionality reduction techniques. Using Principal Component Analysis (PCA) from advanced mathematics, multiple opinions (more than two) can be projected onto two dimensions and still approximate original distance relationships. So if the yellow dot that represents a user is located on the left, that doesn't mean you're more liberal. Opinion Space is designed to move beyond the usual left-right linear spectrum to display "constellations" of opinions. Opinion Space also includes "landmarks" (blue dots) that represent the opinions of public figures based on "educated extrapolation."

Actually, rather than solidifying opinions into binary silos that are by nature oppositional, Opinion Space gathers information from users on a range of topics and then places each user on a map in relation to the opinions of others. The "geography" of the map changes as new users enter the system. Clusters of orbs, resembling little solar systems, form around certain combinations of shared opinions.

In an illustrative example, the user once sign in the platform has to answer 5 questions that deal with nuclear weapons, proactive diplomacy, climate change, investing in food and women empowerment. The user selects whether he agrees with the statements presented (using an analogue slider to express his agreement/disagreement) and his position (marked by a blue spot) gets placed in the 2D opinion Space. Then the user is presented with more questions that he can answer using free text to state his position. After that, the user is able to explore other user's opinions, where he can state the degree he agrees with these statements or not.

In summary, Opinion Space helps policy makers:

- Understand the diversity of their communities.
- Solicit feedback and creative suggestions on specific topics.
- Rapidly identify the most insightful ideas and suggestions.
- Increase satisfaction and engagement with their communities.

Opinion Space also helps citizens:

- Visualize their relationships to other people.
- Express thoughtful ideas and suggestions about emerging issues.
- Engage in friendly competition with other people.
- Learn and gain insights from other people.

A3.2 Case Motivation and Deployment

The initial concept behind Opinion Space was to bring the world of big data to brainstorming (the process of generating ideas): how can the end user take advantage of the world of big data in the process of generating ideas? Can algorithms and statistical techniques (that worked well in other areas, such as robotics) operate towards this direction?

After the election of President Obama, the government had a social media orientation, which provided fertile ground for the first trigger case.

Opinion Space was based on a few prior projects that dealt with:

- Recommending NPOs to people so as to donate,
- Recommending jobs (background recommendation systems in general).

The combination of recommendation systems and visualisation was the main trigger behind Opinion Space. Policy makers need to know what the population they serve thinks; and this is definitely a complicated problem. Surveys are not the solution; they can be communicated only to a certain number of people and need processing. Policy makers need to be able to take a quick “snapshot” of what people think. That’s the need that Opinion Space solves.

Opinion Space has been based on a mix of funding grants (e.g. NSF grants). In addition, every individual project has also received some industry funding.

Typically the way that individual implementations work is through initial contacts that lead to implementation; there are no contracts in the business sense. Organisations fund Opinion Space in order to view the results of this kind of research in their domains (e.g. Fujitsu funded Opinion Space in order to see the results of sentiment analysis on e-learning).

The first two projects of Opinion Space (in 2009) were with the US State Department. Then, by generalising the system, Opinion Space worked with a US auto-maker (that requested to stay anonymous), with an insurance company, an HR department in UniLever (what employees thought about various policy decisions in the company), in various academia-oriented questions, in local state measures (e.g. California) etc.

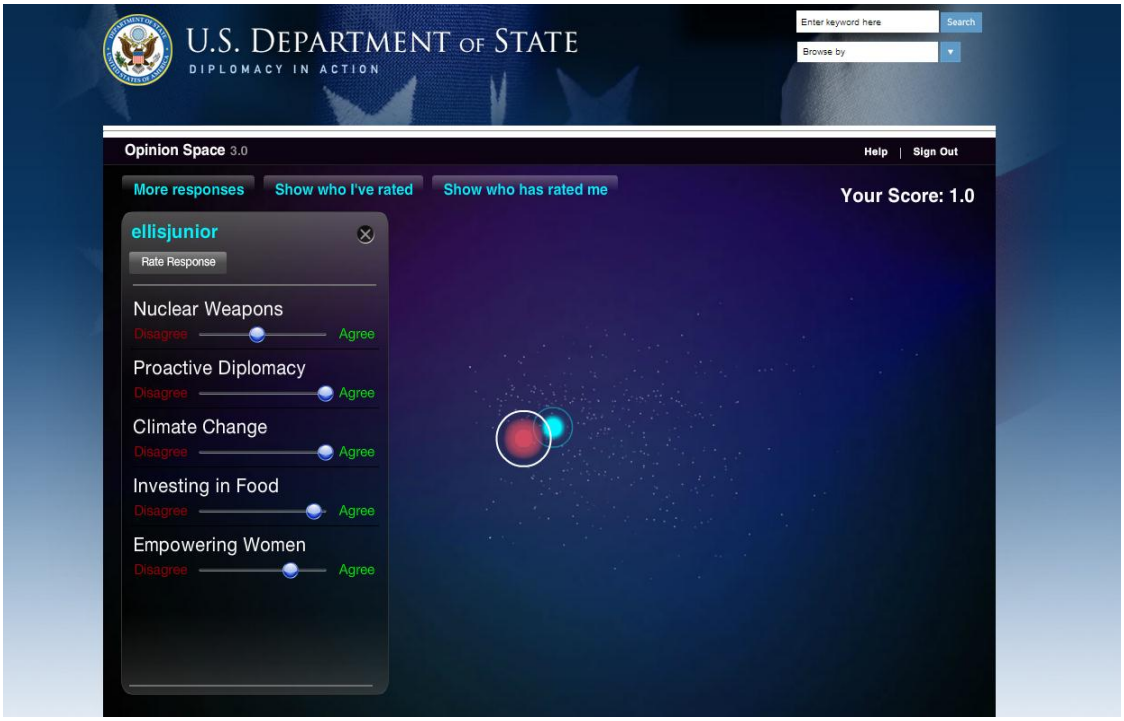


Figure A-9: Rating other opinions' in Opinion Space

Opinion Space is fully operational in its current state. Nevertheless, as a research platform it still remains experimental. The great amount of data is very structured and this helps towards continuing research on text analysis, statistical modelling etc.

A.3.4 Implementation

Opinion Space uses a technique in order to project a five-dimension (up to eight-dimension) space in the two-dimension space. This is used in order to visualise diversity, which is critical for the purposes of Opinion Space. This technique was selected because it is established in other domains, such as robotics. Visual analogue slider is also used in the frames of Opinion Space in order to give users the ability to rate in a continuous manner and not in a binary one (like/ dislike).

Thus, mathematics, mathematical modelling, industrial and artificial intelligence background can be found in the members of the Opinion Space team. Design groups and human-computers interaction groups were/ are also consulted.

Policy makers are also directly involved. They make their questions but they always need our assistance. The Opinion Space team involvement is not necessary, but it actually makes the system operate in a better way. Policy makers are also involved in the course of the development: the development is modular and they provide feedback in every step. In this way, they also provide initial ideas and they get familiar with the whole system.

Opinion Space has been running since 2009. Besides 1.0, 2.0 and 3.0 (current version), there were various unnamed versions of the initiative (mostly based on the 3.0 code).

Version 1.0 basically just visualised diversity and it was not really an idea generation platform. In version 2.0 the development tried to capture and visualise the user interaction and the main innovation introduced was the ranking system; users could evaluate each other's ideas. In version 3.0 the idea was

to make the whole platform user centric. We incorporated ideas from human-computer interaction into the platform. Another innovation was the introduction of more and more sophisticated statistical tools. After that the main focus was on increasing traffic.

In addition, there is an additional moderator space for policy makers. It gives them a wrap-up of the top ideas and allows them to change ideas etc.

Opinion Space primarily uses open source software. However, Opinion Space's license is assigned to the Berkeley University.

Specific technologies and tools include a web application that hooks up to a database analytic system (a relational database to be more specific, as a lot of the available data is extremely structured) through middleware. The UI is a flash-based interface and the statistical platform is Python-based. Opinion Space also incorporates techniques from deliberative polling, collaborative filtering, statistical inference, and dimensionality reduction. Opinion Space's techniques can be easily applied to other sets of existing open data.

A.3.5 Results Achieved and Impact

One of the first and main indicators was the participation rate; users that arrive in the platform for the first time and those that become active participants. People that arrive in websites are always more than those who actually participate (in some projects the rate was close to 50% and in others around 10%).

In the State Department instance (of Opinion Space 3.0), more than 2000 different ideas were collected (about US foreign policy). In addition, more than 5000 individual responses were collected. It cannot be said whether the final decisions were based on some of the ideas provided, but a detailed report was provided to the policy makers. The project with a US auto-maker (targeted towards recognising ways of improving their image) resulted to about 1000 ideas and about 100.000 ratings evaluating these ideas (e.g. more specifically they talked about green vehicles).

Based on the previous paragraphs and to Opinion Space's understanding, the results exceeded even the optimistic expectations, taking into consideration that the target groups are specific and limited in most of the implementations. If the cases targeted towards vast amounts of open public, the goal was not met. But in terms of specific target groups, they exceeded expectations.

One of the core innovations and successes of Opinion Space is the very fast way to browse (and rate) amongst a large number of ideas (even if this is a visualisation-oriented innovation). From the scientific point of view, the greatest innovation was bringing statistical analysis in structured discussion/ data.

One of the best endorsements regarding Opinion Space was Hillary Clinton's reference to the initiative. Other endorsements include high level officers of collaborating companies as presented in the Opinion Space website.

As far as the Opinion Space team is aware of, Opinion Space has not yet been incorporated in any formal decision making procedures. The State Department, however, uses "informally" Opinion Space in order to get ideas and opinions on specific policies.

A.3.6 Challenges Encountered and Lessons Learned

Challenges that the Opinion Space teams need to tackle with are of various natures. Firstly, the Opinion Space platform performs a lot of actions so maybe a lighter version should be considered.

In terms of policy makers, many concerns on privacy have been raised; different regulations regarding data make things even more complex.

In addition, when introducing a new concept/ technology, users might be reluctant in using it.

Last but not least, the choice to implement the platform on Flash has led to loss of all Apple-devices users.

In terms of risks, two principal risks can be identified:

(i) implementation – the result might not be the desired or requested one,
(ii) not well structured ideas/ questions (e.g. what is the meaning of life) or inability to refer to the proper audience may result to failure in participation.

Regarding lessons learnt, above all is that the slightest effort needed by the user really affects participation; everything needs to be easy and user friendly. For example, by increasing the start-questions from 5 to 8, participation decreased almost 50%. In addition, the Opinion Space team learnt more about machine learning techniques and algorithms and their capabilities and sensitivities.

From the policy makers point of view (State Department to be more specific), they learnt that ideas can be very diverse and scattered; and many times this is neglected by media and press.

In addition, when someone applies social media systems in policy making procedures he always seeks for the lightest application possible, which works across all platforms (operating systems, mobile devices) and is easily set and operated.

Regarding the overall Opinion Space concept, one can say that the platform works particularly well when you apply it to a specific use case or/ and a well-formulated idea.

A.3.7 Sustainability

First of all, Opinion Space can trigger/ invite users of other/ older Opinion Space cases to participate in new ones. The “core” users of Opinion Space are about a couple of hundreds.

In addition, the Opinion Space team uses Google adwords, SEO and sends emails to relative emailing lists.

The increase of users really depends on the timing, as well as on how interested are people about the specific subject under consideration.

Opinion Space is technically capable of handling any kind of question. Any brainstorming/ idea generation project in any kind of organization can be supported.

In addition, there is a continuous effort to make the platform easier and more user-friendly. Opinion Space team is working on a lighter Opinion Space implementation, without the initial five questions; it

will just ask the user to comments and his/ her comments will be evaluated. In addition, work is performed on a “global” version of Opinion Space based on HTML, which will work across any platform.

In terms of research, the team is working on machine learning techniques that can help dealing with larger amounts of data. Moreover, amelioration of algorithms is also a continuous research theme.

There is also a plan of collaborating between Opinion Space and the State Department once again. Last but not least, independent projects come up in the course of time.

A.4 UrbanSim

A.4.1 Case Description

URL	http://www.urbasim.org
Status	Ongoing
Sector	Transport
Policy Making Cycle Stage	• Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Systems of Atomized Models
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance
	  ○ Big Data
	  ○ Visual Analytics

UrbanSim is a software-based demographic and development modelling tool for integrated planning and analysis of urban development, incorporating the interactions between land use, transportation, environment, economy and public policy with demographic information. It simulates in a 3D environment the choices of individual households, businesses, and parcel landowners and developers, interacting in urban real estate markets and connected by a multi-modal transportation system. The 3D output of the aforementioned process is presented using indicators, which are variables that convey information on significant aspects of the simulation results.

This approach works with individual agents as done in agent-based modelling, and with very small cells as in the cellular automata[69] approach, or even at building and parcel levels. UrbanSim differs from these approaches by drawing together choice theory[70], a simulation of real estate markets, and statistical methods in order to achieve accurate estimation of the necessary model parameters (such as land policies, infrastructure choices, etc.) in order to calibrate uncertainty in its system. As an example of its use, one could refer to the project on Modelling Land Use Change in Chittenden County[71] , where the model parameters based on statistical analysis of historical data, the model then integrated market behaviour, land policies, infrastructure choices in order to produce simulations on household, employment and real estate development decisions (where the first two were based on an agent-based approach while the latter on a grid-based approach).

[69] http://en.wikipedia.org/wiki/Cellular_automaton
[70] http://en.wikipedia.org/wiki/Choice_theory
[71] http://www.uvm.edu/rsenr/countymodel/Workshop08bv3.ppt

Figure A-10: UrbanSim Land Maps

In the above figure (Figure 11), the blue grid lines delimit 150-by-150 meter grid cells used to model development and location choices made by households and businesses; red lines define traffic analysis zones used to model the flow of vehicles.

The first documented application of UrbanSim was a prototype application to the Eugene-Springfield, Oregon setting[72,73]. The system has been applied to the modelling of several U.S. cities, including Detroit, Michigan[74], Salt Lake City, Utah[75,76], San Francisco, California[77], and Seattle, Washington[78]. In Europe, applications of the UrbanSim system include Paris, Brussels, Belgium and Zurich, with various other applications not yet documented in academic literature.[79]

[72] Waddell, Paul (2000). A behavioral simulation model for metropolitan policy analysis and planning: residential location and housing market components of UrbanSim. Environment and Planning B: Planning and Design Vol 27, No 2 (247 – 263).

[73] Waddell, Paul (2002). UrbanSim: Modeling Urban Development for Land Use, Transportation and Environmental Planning. Journal of the American Planning Association, Vol. 68, No. 3, (297-314)

[74] Waddell, Paul, Liming Wang and Xuan Liu (2008) UrbanSim: An Evolving Planning Support System for Evolving Communities. Planning Support Systems for Cities and Regions. Richard Brail, Editor. Cambridge, MA: Lincoln Institute for Land Policy. pp. 103-138

[75] Waddell, P. and F. Nourzad. (2002). Incorporating Non-motorized Mode and Neighborhood Accessibility in an Integrated Land Use and Transportation Model System, Transportation Research Record No. 1805 (119-127)

[76] Waddell, Paul, Gudmundur Freyr Ulfarsson, Joel Franklin and John Lobb, (2007) Incorporating Land Use in Metropolitan Transportation Planning, Transportation Research Part A: Policy and Practice Vol. 41 (382-410)

[77] Waddell, P., L. Wang and B. Charlton (2007) Integration of a Parcel-Level Land Use Model and an Activity-Based Travel Model. World Conference on Transport Research, Berkeley, CA., June 2007

[78] Waddell, P., C. Bhat, N. Eluru, L. Wang, R. Pendyala (2007) Modeling the Interdependence in Household Residence and Workplace Choices. Transportation Research Record Vol. 2003 (84-92)

[79]: http://en.wikipedia.org/wiki/UrbanSim

In the case of Salt Lake City Utah, UrbanSim supports metropolitan planning and policy analysis in a more scientifically rigorous manner than the land-use model previously used by the Wasatch Front Regional Council[80], with land-use forecasts being influenced by the proposed transportation system. By integrating UrbanSim with the regional travel models, a range of land use and transportation policy interventions can be combined into policy scenarios and the systematic effects of these scenarios can be explored on urban development outcomes and the quality of the transportation system.

Three software tools (i.e. GIS[81], UrbanSim, and Travel Model[82]) are used concurrently and pass information back and forth to each other - for example, modified GIS layers were provided to UrbanSim, which in turn is able to modify the layer and port it back into the GIS as a new layer depicting a specific urban scenario. This flexible technology package, while not unique to this planning effort, allows planners to model future land use patterns and populations, create a travel model for the future community, and depict the results in tables and maps. Thus, alternative solutions can be created and evaluated.

A.4.2 Case Motivation and Deployment

UrbanSim as a software platform has been developed for the last 15 years now. The initial idea came after an extensive literature review mostly on urban economics, micro-simulation and GISs. The software platform itself was developed from scratch.

In the mid 1990's (when UrbanSim was first conceived) the original motivation was to interact in the policy analysis domain at the metropolitan scale, principally around the issues of transportation and land use, as well as environmental planning. The context was initially limited to the U.S. including the metropolitan planning organisations of each geographical area, which are the legally mandated organisations to undertake regional transportation planning, and to funnel federal funds for transportation projects.

The challenge that UrbanSim was initially trying to address was the shortcoming in analytical capacity of Metropolitan Planning Organisations (MPOs), as they were unable to effectively analyse the secondary or cumulative impacts of transportation investments (e.g. new highways, highway widening, rail transit) on urban development (e.g. where new housing gets developed). The consequence of this limitation was that there was a significant bias towards overestimating the benefits of new construction and highway capacity expansion and this became the basis for legal challenges, mainly by the environmental movement (they challenged legally decisions of implementing new construction projects without considering the long-term impact).

Thus, the UrbanSim platform was designed and implemented as a way to analyse the effects of changes in the transport system on urban development (travel patterns, effectiveness of transport projects).

Nevertheless, this original motivation has evolved over the years. It still maintains the core of allowing analysis of secondary/ accumulated effects of transport-related investments, but now more broadly encompasses the desire of many local and regional planning policy makers to assess the impacts of land

[80] http://urbansim.org/Community/SaltLakeCityUtah
[81] http://en.wikipedia.org/wiki/Geographic_information_system
[82] http://en.wikipedia.org/wiki/Transportation_forecasting

use policies (e.g. in California there is legislation to reduce greenhouse gas emissions not only by changing types of fuels/ vehicles; the law calls also for MPOs to coordinate with local cities to change land use patterns in ways that reduce the need to travel by car). So, based on this agenda, UrbanSim now deals with evaluating packages of measures of specific planning or transportation policies that include examining building codes, incentives, impact, different policies etc. At this time, UrbanSim has a portfolio of transfer-related projects but also land use policies.

More recently, increased interest has been noted in analysing policies that relate to portable housing (caravans), equity and economic development. In addition, increased interest has been shown towards engaging open public in decision making processes/ policy design (e.g. recent project in San Francisco area is aiming to develop a 3D visualisation system that would complement UrbanSim in providing capacity for community residents and local planners to be able to visualize alternative scenarios and have a stronger intuition around what these alternatives might look like in terms of their impact on urban development over the next 30 years[83]).

The initial funding came from a consulting project in order to design and develop and urban simulation model of the Honolulu MPO. Subsequently, a National Science Foundation grant was obtained (for an urban research initiative) which led to a substantial increase in the research on how to approach such a complex simulation and policy analysis platform. The initial findings led to several more grants from NSF (probably 6 different – over $10,000,000 in total). In addition, the EU FP7 project "Sustain City"[84] has brought some additional funding to further support the development of the tools and to work on introducing new characteristics.

Nevertheless, most of the real-world application growth has come from contracts with various MPOs that have actually used the system. There have been quite a number of deployments including USA, Europe and Africa.

It has to be noted that the experience in the US is very different than in Europe (and also other international applications). The main difference is that UrbanSim has been actively involved in developing the applications in close collaboration with NPOs in US and has moved from a research to an applied context (they are actually being used in formal/ legal planning efforts – public administrations fund and actually use the platform), while in Europe UrbanSim had a modest advisory role.

The reason behind the different philosophies of deployment in the US and in the EU case is not clear, yet it could be attributed to the following limitations in the EU endeavour:

- Since UrbanSim is a research project most of the work is being done by research teams scattered throughout Europe without any active involvement of government agencies. Much time has thus been devoted on doing research that the participating research teams were interested in, but with less engagement of the actual planning agencies.
- UrbanSim provided some innovations in terms of access to software/ algorithm/ models improvements. Yet there were difficulties caused by the new users of UrbanSim that had not interacted with the platform before and were not experienced in developing models, calibrating them, adding data etc. This is of course normal, as the tool has been available for more than 10 years in the US (but had never been deployed in the EU before), and as a result

[83] http://www.urbansim.org/Community/SanFranciscoCalifornia
[84] SustainCity. Available at: www.sustaincity.eu

US practitioners have used it to develop related models and are in that way highly experienced in creating such models.

A.4.3 Implementation

In terms of methodologies, UrbanSim uses preliminary data analysis to organize an integrated UrbanSim data system (data fusion[85] or data integration[86] methodology), behavioral models[87], metric models, regression models[88], free choice models[89] and equilibrating dynamics. Most recently methodologies for community engagement have been implemented (through a visual environment in which users can compare side by side two different propositions). In terms of technologies, free choice modelling can be also considered as a technology, technologies for analysing uncertainty, techniques for validating models, technologies for 3D urban modelling).

Due to its complex nature, UrbanSim requires a multidisciplinary development team: Ph.D. graduates in computer science, computer graphics, urban planning, transportation planning and modelling, civil engineering, urban real estate design and development and finance. The core team also closely collaborates with experts in community engagement and participation.

Policy makers have been involved in the implementation, especially in the US cases. When applied projects with planning organizations are implemented, the end-users are active participants in the whole process (even from the research part). Planners and analysts from the PAs are actively involved in what UrbanSim calls “agile modelling” which is actually a continuous iteration od modelling activities in order to streamline and optimise the models that will be used for the tool. UrbanSim follows a very modular approach that allows the team to reconfigure and add any required part of the model, due to the fact that the model may alter dramatically amongst various application cases due to the different characteristics of each area. Policy makers are also involved in monthly iterations where they use and test the model under development and provide feedback. This helps not only in terms of feedback, but also in terms of the policy makers getting familiar with the model and platform.

The first platform implementation was implemented in Java. In 2005 a decision was taken in order to re-implement it in Python. Most recently (during the last year), a new extension of UrbanSim has been developed, UrbanVision[90], which is a 3D urban visualisation and supports also editing scenario analysis, where the user can edit parcels, building or zoning data and generate and visualise this alternative scenarios.

[85] http://en.wikipedia.org/wiki/Data_fusion
[86] http://en.wikipedia.org/wiki/Data_integration
[87] http://en.wikipedia.org/wiki/Behavioral_modeling
[88] http://en.wikipedia.org/wiki/Regression_analysis
[89] http://en.wikipedia.org/wiki/Choice_modelling
[90] http://www.urbansim.org/Documentation/UrbanVision#The_UrbanVision_Zoning_Editor_Wo

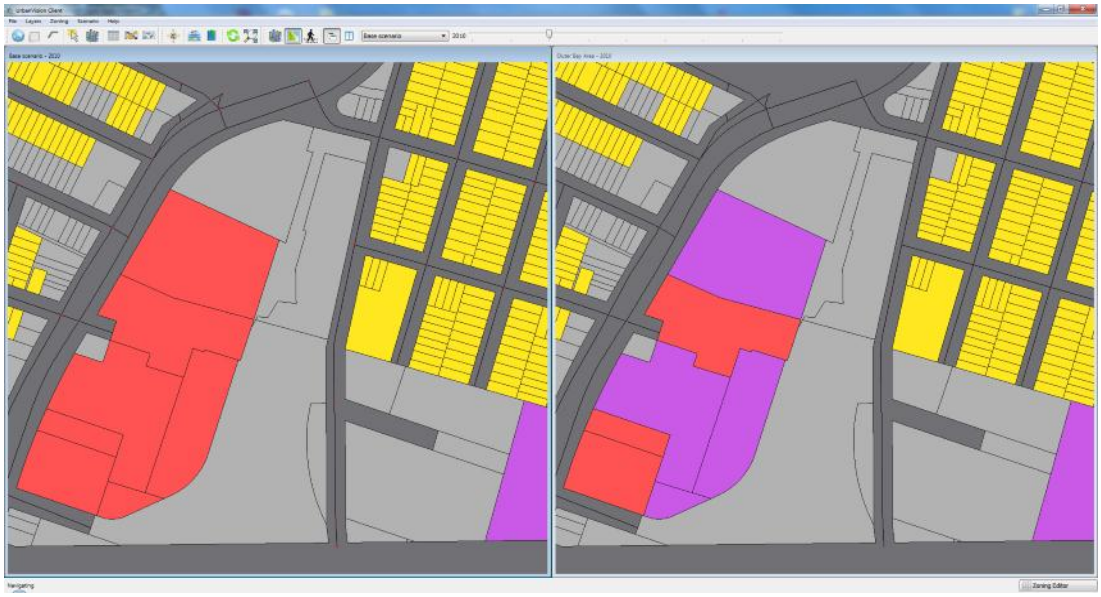


Figure A-11: UrbanSim zoning data scenarios comparison

Initially, UrbanSim was available as an open source license downloadable from the web for more than 10 years. UrbanVision and some additional extensions are implemented in a new platform in C++. Those were decided to be distributed as closed source, with various pricing profiles (e.g. for public agencies, private agencies, educational/ research institutes etc.). The decision was taken mostly due to competition from commercial entities.

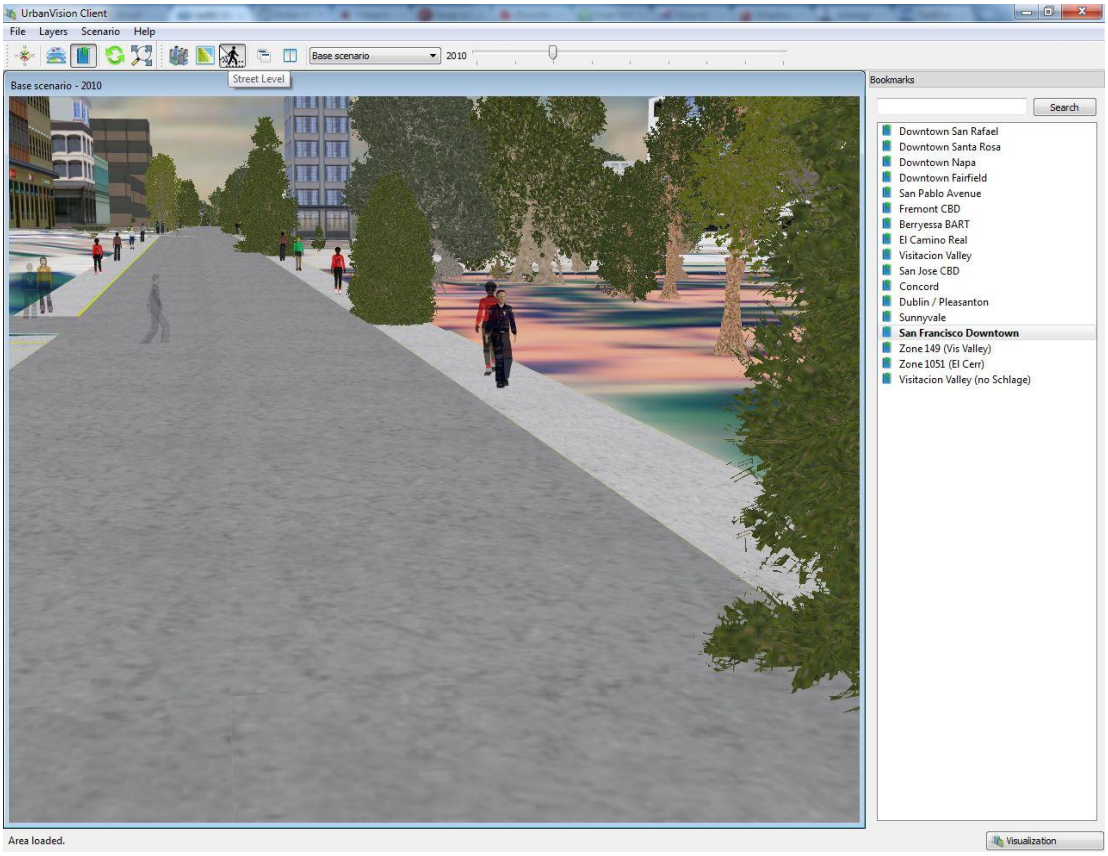


Figure A-12: UrbaSim 3D street level simulation at San Francisco Bay Area

With the modularity followed in UrbanSim, different configurations for any models can be created and the user (e.g. policy makers, expert consultants etc.) is taught how to change those configurations (e.g. change a residential location model with another). However, users have very diverse interests and technical background levels. The number of users that actually want to go deep into the models is relatively small. Support is provided towards any UrbanSim-related activity.

As far as the data utilized in the frames of the whole UrbanSim approach are concerned, in the past, the various involved agencies (e.g. public authorities) have typically been very protective of their data. Some data (the minority of them) were indeed legally protected/ confidential/ proprietary (in various senses), while the majority was open. Yet, authorities were protective with all of them and kept them private after the completion of the project. What UrbanSim is beginning to do, both by working with a university (University of California, Berkeley) and by developing the proper tool, is to create an online platform in which it is requested from agencies to contribute their data in order to become publicly available and create an API to access them. This could constitute a valuable offer towards enriching the notion and actual quality of Open Data. This repository could be used both for research and for the models (having access to an archive of data is a key factor towards successful models).

A.4.4 Results Achieved and Impact

As far as the impact is concerned, the European case is not at the same level as the US ones. In the US there are quite a number of MPOs that actively utilize the UrbanSim platform. The most indicative application, representing the approach common in the US, is probably the San Francisco Bay one. The results of the aforementioned case have involved examining and analysing five alternative scenarios that required articulating a set of assumptions about land use policies, transport policies and macro-economic growth (the analysis in now complete – relevant publications will be available in the next few months).

In one of them, analysing visibility of the proposed policy though reverse engineering was attempted, that made the task much more challenging, both in terms of research and implementation. The agency has now accepted the results, with documentation and visualization supporting them.

In the San Francisco case, the 3D visualization system (output shown in Figure 12) was created in order to achieve higher visibility amongst citizens than the plain UrbanSim tool. The intention was to use this system in a number of workshops held during January 2012. User engagement was intense even from the development/testing phase. In addition, the public agencies used it in a series of meetings with community organizations. Each of these meetings had from 15 up to 200 participants each. The point of these meetings was to communicate the different scenarios to the public and to receive feedback on the preferences of the citizens.

One of the most innovative elements of UrbanSim is the combination of various technological and theoretical aspects, as well as the withdrawal of strong assumptions regarding urban planning and adoption of less strong assumptions (than markets are an equilibrium). For example, the impacts of transport projects on urban planning are far from being instantaneously realized (in fact they might evolve over decades). In addition, the capacity of being able to support these less strong assumptions can also be considered as a core innovation.

The core innovation in the particular case of San Francisco can be found between the following two:

(i) the visualization, that resulted to higher community engagement (UrbanVision component) and
(ii) the creation of a new approach towards modelling real estate markets, based in pro forma analysis.

The case has been recognized by policy makers and incorporated in their formal procedures. Thus, it can be said that it has been incorporated in the long-term policy making by policy makers of the San Francisco area.

A.4.5 Challenges Encountered and Lessons Learned

One of the key lessons learnt from the UrbanSim case has been the fact that having a balance between academic research (mostly funded by NSF but also others) and real-world applications towards producing real working systems, is a really effective approach.

Moreover, when dealing with such applications, it is very important to engage people from the early steps of the project, in order to get them familiar with the tool and acquire as much feedback data as possible.

Another recommendation deals with early engagement; policy makers and end users (e.g. expert consultants) in general need to be engaged in the project as soon as possible.

Adequate time for the development of the models and testing of the models is also necessary.

Additionally, finding out a new public engagement strategy, more capable on avoiding public disruption movements is also advisable (probably through smaller meeting and interaction through the web), as public disruption was eventually an unexpected challenge.

Some of the main challenges faced were the very short time frames of the project (regarding its implementation) and having rather poor data available from agencies to begin the project.

Having too much software development at the same time was another (probably inevitable in such projects) risk.

A.4.6 Sustainability

The agile modelling approach mentioned earlier is part of the stakeholders' engagement strategy, as well as early collaborative testing of the model and the visualisation tools. The stakeholders' engagement strategy did increase the participation over some months, but participation spiked during January 2012, when the public meetings took place. After this phase, more analytical modelling followed, and another round of public engagement took place.

UrbanSim is already exploring transportation and land use domains, as well as urban design. Environmental issues (e.g. greenhouse gas emissions) were motivation to some projects (such as

UrbanSim for Canada[91]); so environmental planning is also quite relevant. Energy consumption and/ or water consumption constitutes issues of interest too. Modelling the impact of climate change (e.g. on weather) is also a topic of interest. Finally, as also mentioned earlier, economic development/ policies are also under consideration.

The UrbanSim team is currently thinking on how to organize communicating UrbanSim to European public administrations (and establish an office in Europe as well) and other countries (e.g. Singapore, Argentina). In addition, the expansion of the UrbanSim development team and the establishment of more partnerships are on-going.

In addition, the online platform in which agencies are asked to contribute their data is still an on-going effort. Moreover, further amelioration of the robustness and generalization of the model is also an on-going piece of work. There is also collaboration with academia on big data, based on an NSF grant.

[91] http://res.ca/UrbanSim/UrbanSimIntro.htm

Annex B - Interviews conducted with the Four Case studies

B.1 2050 Pathways Analysis

B1.1 Interview with Case Project Team

The interview regarding the 2050 Pathways Analysis case took place through teleconference infrastructure (Skype) on Friday 30/11/2012 at 15:00 CET.

The attendees of the meeting were the following:

2050 Pathways Analysis Team

- Edward Hogg - edward.hogg@decc.gsi.gov.uk
- Clare Maltby - Clare.Maltby@decc.gsi.gov.uk
- Ruth Curran - Ruth.Curran@decc.gsi.gov.uk

CROSSOVER Team

- GianlucaMisuraca - gianluca.misuraca@ec.europa.eu
- Francesco Mureddu - francesco.mureddu@tech4i2.com

NTUA Team

- Sotiris Koussouris - skous@me.com
- Fenareti Lampathaki - flamp@epu.ntua.gr
- Panagiotis Kokkinakos - pkokkinakos@epu.ntua.gr

1. Rationale

Question 1.1 - What was the motivation/justification to design, develop and deploy the case? Which needs of policy makers are you addressing? How is your case linked to the policy cycle? Was it based on previous work/project or did you start it as a new initiative? Who were the initiators of the initiative?

The project began in summer 2009 and the my2050 simulation was not part of the initial work (it came a bit later). At that time, the Department of Energy and Climate Change was newly formed and tried to formulate its first position/ strategy/ white paper. The department had at that time to work towards some targets (e.g. reduce greenhouse gas emissions by at least 80% by 2050), without having the answers on whether it was possible or how it could be done. This need sparked the idea for the 2050 Calculator – it was a new initiative.

The department already had various analytical models (such as MarkAl) that could be used, but these models were really complicated and hard to use. In addition, decision makers were not sure which model was the right one to use, especially when two (or more) models gave different answers on the same questions. As a result of that, the department decided that a different kind of model was needed

in order to be fast, transparent, stable and effective. Thus, this was a fine opportunity for the project to start. The White Paper had close attention of the most senior people (e.g. Secretary of State, Permanent Secretary, Director-Generals, Director of Strategy) In addition, the chief scientific advisor of the department at that time, Professor David MacKay, was really keen on this piece of work and was really fond of an idea like the 2050 calculator.

Concerning the implementation, there were lots of involved stakeholders. There was a core team (6-10 people) of the department of Energy and Climate Change (who were leading the work), people from other governmental departments (e.g. transport, industry department) and probably hundreds of external stakeholders (from NGOs, academia, industry, experts). All the needed development was based in collaboration with various actors.

Regarding the Policy Cycle, the project probably fits in the first step, this of Agenda Setting. This is due to the fact that the concept is a high-level one (e.g. reduce gas emissions to 80% by 2050). As the data are currently being updated and a comparison between the projected and the actual results will take place, probably the case could in the near future fit into the Monitor and Evaluation Policy Cycle step.

Question 1.2 - What was your funding source at the beginning? How did you manage to get this funding? Which stakeholders have been involved? What is your case's business model at the moment?

The project was initiated by the Department of Energy and Climate Change, which was also the funding source. Indicative categories of the actual effort included:

- 6-10 persons for the first phase, about a year (designing and building the model)
- Searching and collecting the necessary information
- Call for evidence (6 people for 7 months)
- Adding costs analysis (4 people for 9 months)
- Maintaining and improving model (4 people)
- International and UK engagement work (4 people)

Small extra funding were found occasionally (e.g. a public engagement organization helped to fund the My2050 game (53.000 pounds) and the so called "Deliberative Dialogue", but still the main source of funding is the leading department. More recently two million pounds were provided by the International Climate Fund so as to help promote the initiative in 10 developing countries besides the UK.

Question 1.3 – Describe the different deployments of your initiative/case. Where is it deployed? What are the themes/topics of interest? Is it in experimental mode or fully operational? What is the role of various stakeholders involved?

The project was launched in summer 2010, fully operational with Excel model and user-friendly web tool. The tool was updated twice in 2011, including launching the Game version My2050. With additions and ameliorations, the only completely operating deployment of the case is the one described in the document at hand and it can definitely be considered as fully operational. An international version of the project (existing in China, Belgium, South Korea and aiming at 10 developing countries) is in the making.

As far as the various stakeholders involved are concerned, two phases can be distinguished:

- The building phase, which included modellers, peer reviewers of the numbers that were used
- The running phase

2. Implementation

Question 2.1 - Which specific methodologies/approaches were used? How were they selected? What is the expertise required of the research team involved and how is the interaction with users addressed? Are policy makers involved in the implementation as users?

First of all an experienced/ lead modeler (using the most recent version of Excel) was necessary in order to fulfill the demanding task of modeling the necessary components. In addition, a project management team was needed in order to put all the stakeholders together and coordinate the whole work. Moreover, experts were put as leaders in individual teams that dealt with specific issues. Of course, a partner with Web2.0 and programming experience was also involved. Other necessary "components" are objectivity, diplomacy, transparency, collaboration and understanding.
We have identified as potential challenges touched by 2050 Pathways Analysis the following:

- Policy Modelling
    - Collaborative Modelling
    - Immersive Simulation
    - Output Analysis and Knowledge Synthesis
- Data-powered Collaborative Governance
    - Open Government Data
    - Serious Gaming for Behavioural Change
    - Collaborative Governance

Question 2.2 - How long have you been running the platform/system? How many major updates have you implemented and what was the reason for these, if any?What specific technologies/ tools were used? Were they open source/ free/ commercial? Are there any other technologies you are planning to deploy?

The project started in the summer of 2009. The greatest addition was the my2050 game that was not available from the very beginning (available in 2011). Secondly, a cost analysis notion was added, which was quite a challenging task. Moreover, some updates have taken place in the model (including visualisation), making it easier to understand and more user friendly.
The my2050 is considered a serious game.
The main model of the case is based on Excel. The project uses open source software, which was a strategic decision of the project team. In addition, the platform provides the end user the ability to comment and make propositions for ameliorating the platform and the whole concept. There is also integration with social media: the platform gives the end user the opportunity to share his/ her pathway to Facebook and Twitter.

Question 2.3 - Which are the policy/simulation/computational models you are using to support the platform/system? Can other models replace them, or is the platform/system built entirely on their operations/ input-outputs? What kind of data do you use for your cases (open data/big data/public sector data/private date/etc.)? How are you handling them?

The end users have the ability to correct the data that is embedded in the model. They can download and remove the initial data and upload their own (e.g. that happened in South Korea case).
The model has been specifically set up to support the energy system and notion and it would probably be difficult to be implemented in other policy areas. In any case, following the same principles, the same work could be done for any other policy areas from scratch.
All data used in the project are public/ open (e.g. official UK population). They do not always exist in the format needed, but they are always open. The challenge is to look for the best and most reliable possible source. The tool itself gives the end user the opportunity to see the utilized data himself. Of course, one can find many different types of data in the model; from simple (like population) to sophisticated (like data referring to engineering or physics).

3. Results Achieved and Impact

Question 3.1 - What are the main results achieved by the case/initiative? What are the key indicators of the project/ initiative (either impact-oriented or operation/ technology-oriented)? How were they selected/ developed? Were/ Are they met?

At the start of the project there was no specific set of KPIs set. In the first three months from the official project launch there were about 10.000 unique visitors in the platform. Regarding the my2050 there are over 16.000 pathways up to the date.
Regarding the stakeholders, about 200 were involved in the initial (building) phase and after the launch about 500 stakeholders were contacted. Moreover, a week-long online debate including 5-6 experts took place with lots of comments from open public.
In addition, a large number of presentations have been conducted in workshops, schools, conferences, NGOs, international colleagues etc. A presentation was made to the European Commission too. Really positive media coverage has also been noticed (around 15 key articles regarding the project). Other references to the case have also been made (e.g. cultural festivals).

Question 3.2 - What is the impact achieved (or expected) of the project/ initiative both overall and per stakeholder group? Who were the stakeholders/ stakeholder groups involved / served? How (if) is the case been used in practice to support policy making?

The project's initial purpose was to inform in a documented manner policy makers; and it was very successful. The most concrete example is the UK "Carbon Plan 2011" government document (how will the UK look in 2050), published in late 2011 which included as one of the main pieces of evidence and visualisation the 2050 Pathways calculator. In addition, the tool was used in budget statements and Annual Energy Statements. Moreover, the tool was used in General Election briefing work.
It is important to note that there are Master's programs, both in and outside of the UK, that engage the

2050 Pathways models and tools in their courses. In addition, the my2050 game is also communicated to pupils of various schools in the UK (there is a "schools' toolkit" available and downloadable from the project's website, as well as from other websites – including the department of Education website). There are also a few other organisations that use the project's calculator.
NGOs are also utilizing the tool, in order to set their strategies and plans out.
It has to be noted that due to the project's open source nature, it is quite difficult to tell how many and who exactly are using the platform.

Question 3.3 - Which is the core innovation of your project / initiative? Has your case been recognised by policy makers? If so, to what extent? How has it been incorporated in long/short term policy making by decision makers?

One of the core innovations of the projects is the radical transparency and the ease of use. The model aims to encompass all technically possible futures and form a fruitful debate based on realistic scenarios (and not on guesses). The model provides actually valuable feedback to high-level decision makers relative to communicating and interrogating different scenarios.
The 2050 Pathways is part of a long-term governmental strategy. As also stated before it is part of the UK "Carbon Plan"document, published in late 2011.

4. Challenges encountered and lessons learned

Question 4.1 - What are the key lessons learned? Which were the key success factors and drivers that enabled positive developments?

One of the core lessons learned was that there is a need to involve people as early as possible; the early involvement of all kind of stakeholders was really helpful in the case. In addition, it helps to be open; people appreciate openness and transparency. Collaborative working was also fruitful and constituted a real benefit. Moreover, actual innovation can really excite people and make them efficient.
In addition, we learned that if you design something really well, it could find acceptance to audiences you did not have in mind at the beginning. A dynamic, instead of a static approach is also more possible to find acceptance in the end users. Additionally, "be simple" is another lesson learnt; simplifying things helps both stakeholders and end users.
Of course, recruiting the right people for the right position is critical for the success of each project. The team included members from government, industry, NGOs, academia etc.
As a high level conclusion also, without the internet, the project wouldn't have meaning, wouldn't have been implemented at all. Last but not least, you have to keep reminding people why you are doing what you are doing.

Question 4.2 - What are the main drawbacks of your case and the barriers you faced during implementation?

Effective collaboration and dialogue is always time consuming. One has to draw the line and identify the limits of the time that are needed to be spent in dialogue. Another challenge is to try to keep the

ethos of the project alive despite changes in personnel. In addition, although it may seem easy to use to experts, it may still be difficult for open public; facilitators can be of use. Keeping the interest alive for a long time (especially after the initial success) is also challenging.

Question 4.3 - Which recommendations would you provide based on the experience gained in your case? Which risks have you identified and should be taken under consideration? How to overcome the barriers faced?

Based on the up to today project's experience, we could say that the main recommendations are:

- Plan carefully; take into consideration the timelines of all stakeholders
- Involve people as early as possible
- Be simple and create simple to use tools
- Hire the right people at key positions, especially after launch for the steady state phase of the project

5. Sustainability

Question 5.1 - Was there any specific stakeholder engagement strategy so as to gain visibility and 'buy-in'? Did you manage a steady increase of participating users, or was there a peak due to a special event?

As before, the main plan increasing the stakeholders' engagement was presenting them the whole initiative and involving them from the very beginning; even from when we had a blank sheet of paper. There is also a Delphi debate for expert discussion.
The project team also published "Calls for Evidence" so anyone that may have been missed/ overseen would get to feed in his/ her evidence.
The development of new tools for different audiences (e.g. Excel, web tool, My2050, school toolkit) was also a successful stakeholder engagement strategy.
Peaks were recorded when the project first went online and when an article was published in BBC website. The project has not made the most out of social media, but it provides the capability to share on Facebook/Twitter.
The project's stakeholders' engagement strategy also includes various organisations that work with schools and promote the initiative. Newsletters also exist.

Question 5.2 - Do you think that your case/tools could be applied in other domains? If yes, please name them and discuss the possible changes that would be required.

The model has been specifically set up to support the energy system and it would probably be difficult to be deployed in other domains. In any case, following the same principles, the same work could be done for other policy areas from scratch.

Question 5.3 - What are your future plans/ steps regarding the case/initiative?

First of all, data is currently being updated and a comparison between the projected and the actual results will take place. As such, the case could probably in the near future fit into the Monitor and Evaluation Policy Cycle step. Secondly, an international implementation of the project, aiming at 10 developing countries (including China, Indonesia, South Africa, Bangladesh), is in the making (by the end of 2014). In addition, the inclusion of historic (earlier) data is also a future plan.
At the moment there is no strong link among the three models of the project and that's something the team is currently working into.We will keep informing all the stakeholders about the project's advancements and keep aiding decision makers in using the platform is also a continuous effort.
In addition, there is a constant will to make the tools more efficient and attractive.

B4.2 Testimonials from end-users

Nick Pidgeon, Cardiff University

We have been using the 2050 Pathways Analysis tool (in fact the My2050 Calculators) in academic research activities that are investigating how people would respond and whether they will be willing to accept changes in energy planning. This research is part of a 20m GBP project titled "Public Acceptance of Whole-Energy System"[92] and funded by the UK Energy Research Centre. At the beginning of the project the research team needed a tool to generate future scenarios and has decided to adopt the 2050 tool as it was in place and has showed quite good results. The main decision taken was to utilise the my2050 version of the toolkit, as it is more illustrative and user friendly and more appropriate for the general population. As stated in the briefing note of this project[93], the my2050 tool is a unique and useful tool for engaging members of the public around energy futures and energy transitions. It offers a positive basis for engagement focused on solutions, rather than problems, while the basis for it, the pathways calculator, is found to be too technical for use with non- specialists within the field of energy systems.

In the frame of the project, different workshops were held where the tool was used in order to generate future scenarios in order to investigate then their acceptance by people. One key aspect that was found as missing from the my2050 tool is "Cost", although it is clearly a very important factor when discussing energy futures. People want to know about cost and cost implications of various choices. Following the workshops, a big survey has been carried out, with over 2.000 people taking part. This was also based on the toolkit, however the project team worked heavily on the selection of people in order to create a representative set of the society, which is not the actual case in the original 2050 Pathways Analysis, as it is open to the public and there is no evidence whether the people participating are forming a representative set of the UK population. At the end of the studies, the results will be presented to the UK regional and national governments, as policy makers are heavily interested in the outcomes of this research.

Summing up, the model seems as a very interesting and quite accurate one regarding the realistic generation of scenarios and is ideal for a number of studies.

[92] http://www.ukerc.ac.uk/support/tiki-index.php?page=Transforming+the+UK+Energy+System
[93] http://www.ukerc.ac.uk/support/tiki-download_file.php?fileId=2420

B.2 GLEAM

B2.1 Interview with Case Project Team

The interview regarding the GLEAM case took place through teleconference infrastructure (Skype) on Thursday 29/11/2012 at 16:00 CET.

The attendees of the meeting were the following:

GLEAM Team

- Alessandro Vespignani - a.vespignani@neu.edu
- Nicola Perra - n.perra@neu.edu

CROSSOVER Team

- GianlucaMisuraca - gianluca.misuraca@ec.europa.eu
- Francesco Mureddu - francesco.mureddu@tech4i2.com

NTUA Team

- Sotiris Koussouris – skous@me.com
- Fenareti Lampathaki – flamp@epu.ntua.gr
- Panagiotis Kokkinakos – pkokkinakos@epu.ntua.gr

1. Rationale

Question 1.1 - What was the motivation/justification to design, develop and deploy the case? Which needs of policy makers are you addressing? How is your case linked to the policy cycle? Was it based on previous work/project or did you start it as a new initiative? Who were the initiators of the initiative?

The initial motivation for GLEAM was a research question of public health concern "can we do forecasting regarding the global spreading of diseases". With forecast we do not mean to predict when the next pandemic will strike (or what it will be), but, given the fact that the World Health Organisation (WHO) or some other agencies, raises some warnings about a cluster of cases of an infectious disease, be able to provide a forecasting infrastructure for its geographical and time spreading. This concept is quite similar to create a weather forecast.
The main starting point was based on research to develop the algorithms, collect the needed data, etc., and from 2003-4 till 2008-9 the team was occupied with the creation of the basic computational model that integrates all the data. GLEAM integrates data from census agencies, data regarding where people live at very high resolutions by the Socio-Economic Data and Application Center (SEDAC) that estimates population with a granularity given by a lattice of cells covering the whole planet at a resolution of 5x5 miles, 99% of the global air travels, about 40 databases from different countries for local mobility, commuting, transfer, etc.
All this data has to be integrated into the model that simulates the spreading of the diseases. This is

just the engine of GLEAM. In 2009 the team was working with agencies and private companies for analysing the H1N1 pandemic. We realised it was difficult to communicate large amount of data to stakeholders as you don't know what people are really interested in and at the same time modification questions are constantly popping up in order to calibrate the model for studying different issues. So we decided to create a computational infrastructure (GLEAMviz) that, using in the background GLEAM, allowed us to setup any model in case of an emergency and to do almost the same heavy calibration that we do in a supercomputer environment, and also to make this data available for exploration through a visual interface to agencies and people who could try to change the model's parameters, try different containment measures, etc. without coming back to the GLEAM team for needs of support.
Also we decided to have something public that can be used for academic use to teach large-scale infectious diseases spread modelling without being forced to implement the engine. The public version does not contain all features of the full platform.
Regarding the Policy Cycle, GLEAM is targeting mostly the middle steps of this, namely policy design and implementation phases, as it aims to forecast and identify how disease are spreading in order to allow decision makers to design policies and deploy policy measures.

Question 1.2 - What was your funding source at the beginning? How did you manage to get this funding? Which stakeholders have been involved? What is your case's business model at the moment?

The research team started at the beginning working on the project and then after some time it started looking for funding and projects willing to sponsor the attempt. Initially the work performed in areas such as computational epidemiology, disease spreading on networks etc. was funded as part of scientific research, but not as part of the GLEAM project. Once the idea was more concrete, we got funding from US agencies (NIH, Defense Threat Reduction Agency), the EC through some projects (EPIWORK IP project and EPIFOR). In the website (www.gleamviz.org) there is the list of all funders. Also funding is coming from 2 major corporations (cannot disclose name).
At this time, the case is supported through funding for new features. EPIWORK funding is used to expand the functionality of the platform, to provide APIs to introduce specific agent based model within the existing model, to integrate the platform with another epidemic data sharing platform that is constructed in EPIWORK. There are many research areas that allow us to keep the platform alive and still do development. Another part of the funding comes from research contracts, from corporations that want to use the platform for their epidemic preparation plans (e.g. to evaluate the number of workers within an area that could get infected).

Question 1.3 – Describe the different deployments of your initiative/case. Where is it deployed? What are the themes/topics of interest? Is it in experimental mode or fully operational? What is the role of various stakeholders involved?

There are many deployments, including the US Defense Threat Reduction Agency (DTRA), undisclosed corporations and agencies like the EC JRC that uses GLEAM in its Crisis Management Unit. The collaboration with JRC started during H1N1 pandemic and at that point the GLEAMviz tool was not available but now the agency is getting the full computational infrastructure. Moreover there are also

contacts with other agencies, such as the CDC, ECDC, WHO, etc. on a collaborative side.

2. Implementation

Question 2.1 - Which specific methodologies/approaches were used? How were they selected? What is the expertise required of the research team involved and how is the interaction with users addressed? Are policy makers involved in the implementation as users?

The expertise required in the research team is very interdisciplinary, so we have people coming from physics, computer science, mathematical biology, public health institutes, graphic designers for the interface, and HCI experts. You have to have a multidisciplinary team and create a common vision and goal, which is quite difficult in terms of unifying languages, skills, understanding of each other, and different way of work.

People from JRC have been providing feedback and can be considered the first link to policy making and we have been talking a lot with policy makers from agencies that are providing feedback. Now one of the developers is working at INSERM (National Institute for Heath in France). So the end users have been involved in the loop.

GLEAM touches the following Research Challenges of CROSSOVER:

- Policy Modelling
  - Collaborative Modelling
  - Model Validation
  - Immersive Simulation
  - Output Analysis and Knowledge Synthesis
- Data-powered Collaborative Governance
  - Visual Analytics
  - Open Governmental Data
  - Big Data

Question 2.2 - How long have you been running the platform/system? How many major updates have you implemented and what was the reason for these, if any? What specific technologies/ tools were used? Were they open source/ free/ commercial? Are there any other technologies you are planning to deploy?

The 1st release of the platform was in 2010 and now we are at the 3rd year of the full release. There have been 4 major releases (now we are in the GLEAMViz 4.0) and the major changes were on improving visualisation and capabilities. Moreover, the last release has a different engine for the simulation that is 10x faster and in total about dozen releases. 3-4 updates every year.

The platform is open and the software too. Commercial software has been used only for development like Adobe Air for the client (needs licencing for developers), but for the end user it is free. However we have a public release, which does not have all the features of the software, and the full software is released only to specific agencies (like the JRC) that are in a position to install and maintain the software on their server. For several reasons we cannot offer the full model to all users, as for example we cannot directly support 20 or 50 installation and therefore support is only provided to major

agencies that are running the full model. Moreover the full release runs on HPC that we provide to the community so we cannot allow every user to use all the features, as we would need a super-computing centre, which is not feasible at the moment.

Question 2.3 - Which are the policy/simulation/computational models you are using to support the platform/system? Can other models replace them, or is the platform/system built entirely on their operations/ input-outputs? What kind of data do you use for your cases (open data/big data/public sector data/private date/etc.)? How are you handling them?

The GLEAM research team develops the model. The tool is a unique model. We are the only group with global capabilities at this time in terms of epidemic modelling. We are planning to create APIs and collaborate with other 2 groups to create an integration of the GLEAM model with localised agent based models which are much more detailed and will bring in the platform other computational models too.
The tool allows people to create their own models and simulate them through the GLEAM platform, so anyone can construct his own model with different parameters.
The data used for the tool is mostly public data, but when talking about specific implementations like a pandemic plan for a big corporation, then the tool integrates data from these organisations that are not public and cannot be publicly shared. Moreover, the tool also integrates commercial data, like the IATA data, the OAG database, and data from various census bureaus. This data is only used for computations and cannot be redistributed through the tool. Everything else that can be accessed through the tool (like world population data, etc.) is publicly available in various sources.
The website has also a library of models (4-5 models available) and this will be enlarged by a future release (to 10-12 models) but the GUI allows to design your own models on a drag and drop canvas.

3. Results Achieved and Impact

Question 3.1 - What are the main results achieved by the case/initiative? What are the key indicators of the project/ initiative (either impact-oriented or operation/ technology-oriented)? How were they selected/ developed? Were/ Are they met?

The number of active users is above 100. However many user accounts are from institutional laboratories, Universities. Thus they correspond to multiple individual users.

Question 3.2 - What is the impact achieved (or expected) of the project/ initiative both overall and per stakeholder group? Who were the stakeholders/ stakeholder groups involved / served? How (if) is the case been used in practice to support policy making?

The main results of GLEAM so far were the production of the forecast for the H1N1 pandemic that was quite successful. A validation paper that will be published in December 13th, 2012 will showcase that the GLEAM predictions were quite spot on.
The main stakeholders that are using the software and support their policy-making procedures are the

DTRA, the JRC, and the corporations that are using the software.

Question 3.3 - Which is the core innovation of your project / initiative? Has your case been recognised by policy makers? If so, to what extent? How has it been incorporated in long/short term policy making by decision makers?

The core innovation of GLEAM lies within the computational model which can integrate data from various sources and provide a forecast on the spread of epidemics on a global level, which was not possible before.
Moreover, through the visual interface users are in a position to create their own models and investigate specific diseases and issues that they are interested in.
JRC is using the tool in its long strategy, starting with the H1N1 disease.

4. Challenges encountered and lessons learned

Question 4.1 - What are the key lessons learned? Which were the key success factors and drivers that enabled positive developments?

The first lesson learned is that the use of Web2.0 technologies for the policy-making domain is not an easy task, as policy makers are not used to work with these tools. There is some scepticism or in some other cases too much trust. These computational tools are quantitative but policy making cannot be done solely by looking at the numbers. What needs to happen is to complement the policy making process with this quantitative information but not to disregard neither to underestimate the value of such information, because behind each model there are assumptions, modelling compromises, missing data, etc.
Also more and accurate more data is needed. Policy making used to work with data not suited for quantitative use. This way you might end up with very rough statistics that are not proper for precise calculations. The same applies for forecasting; the better data you have, the better and more accurate the forecast will be, while with very poor data you might get a very disturbed picture of the future. So one needs to deal with how we can improve and create a culture in the policymaking environment for real-time high quality data. It is also surprising that we have satellites for weather, but there is no map for human mobility (so in the case of GLEAM we had to create it from scratch). The technology was there but not used to get his data. People in the policy making environment need to learn that those data can provide an edge to the decision making process.
The major key success factor has been the fact that we were good enough with the H1N1 pandemic predictions, while working in real time, which helped to build a dialogue with the policy makers, starting a trust relationship.
Of course success means providing something that no one else can provide. There are many groups working in different levels (local/regional/country) and we went into a global level, not reinventing the wheel but specialising and providing different things.

Question 4.2 - What are the main drawbacks of your case and the barriers you faced during implementation?

The main drawback in our case had to do with the sustainability problem. The research effort so far has sustained the tool, but at a certain point policy makers shall understand that they should provide funding for maintaining these ICT computational tools for policymakers, as it is happening with other product. Only few agencies (from the big ones) have small crisis management units that can maintain such tools. Big agencies do not have a computational or modelling unit and this requires a change of culture from the institution and the agencies.

Question 4.3 - Which recommendations would you provide based on the experience gained in your case? Which risks have you identified and should be taken under consideration? How to overcome the barriers faced?

A first recommendation will be to build into the agencies units that can deploy, operate and further develop such tools. Agencies should use people that work in this research projects and let them lead inter-agency for moving the tools to the new level within these organisations and focus on the issues they need to tackle.
Moreover, as we have watched that tools and Web2.0 technologies are being replicated easily, one should aim at integrating different tools and methods in an effort to help to do a better policymaking. We have seen that with the US storm Sandy, 20 models were on use and you could see different dimensions, but the models were converging in similar results. So it is a matter of creating different models that converge to similar results, so we can trust even more the results of the tools.
Moreover, there is a real need for creating and sharing high quality data in real time.

5. Sustainability

Question 5.1 - Was there any specific stakeholder engagement strategy so as to gain visibility and 'buy-in'? Did you manage a steady increase of participating users, or was there a peak due to a special event?

Initially there was not such strategy as the community of epidemic modelling and computation tools is pretty small. The major stakeholders have been contacted during conferences, workshops, etc. It was the H1N1 pandemic which brought many people to the platform and then the tool has been disseminated by word of mouth based on the other usage scenarios.
At this time we are actively participating in conferences and meetings to present the tools. Moreover other material has been/is being created, such as short movies, brochures, and advertisement events. We have also a component called “Epidemic Planet” that is exhibited in museums to attract audience. In this context we try to push the tool into the education environment to facilitate students to learn more about epidemic spreading and global diseases to make the younger generation more familiar with the tool and the project.

Question 5.2 - Do you think that your case/tools could be applied in other domains? If yes, please name them and discuss the possible changes that would be required.

GLEAM has been developed to model disease spreading. The basic contagion process involved has clear biological roots that allow simple modelization. Other types of contagion instead, as for example knowledge diffusion, and adoption of a convention or a product, have a completely different nature and are much more difficult to threat. One of the possible, ambitious, extensions of our framework is its application in these different domains tackling a broad range of contagion processes

Question 5.3 - What are your future plans/ steps regarding the case/initiative?

Our future plans include improvements and enrichments regarding the tool.
Moreover, so far we have been working on human infection diseases. We hope to extend the model considering also vector born diseases (like malaria) that require also the modeling of vectors such as mosquitos. In this context the tool can be surely used for other issues as well.
Another direction is to move into other areas of contagion, so to deal not only with infectious diseases, but also work with knowledge Information for other epidemiological concepts. Moreover we plan to include more data and models in the platform and depending on the resolution and the needs of the users to create different ways to investigate the evolution of the epidemic. The basic idea is to use social media like Twitter, etc. to raise a flag when the signal of a potential disease is detected, and then run the simulations to test its possible impact. This will allow using the tool also for early detection also for different phenomena. But this is a task for the next 5-10 years.

B4.2 Testimonials from end-users

Nikolaos Stilianakis, JRC

GLEAMviz is a tool covering epidemics at a global level. It is pretty sophisticated and one of the best tools around, however as it happens with most modelling tools the user has to understand what is going on in the model in order to use it. Moreover, the tool is not a simulation tool for every kind of disease but it is used specifically for fast spreading epidemics where the transportation plays a big role. It can be used as a prevention tool for planning and preparing by running scenarios, but it has to be noted that it is mainly used for global scope diseases, not small, local level outbreaks.

In this context, it is a good and valuable tool for a policy maker who understands how epidemics work and has a scientific background on the field so he can interpret the results correctly. This is a fact for almost all modelling tools, as they are all based on assumptions and one has to understand how these underlying models work. So an administrator in a National Public Health Institution, at a EU level or in the Commission has to have some scientists supporting him to use the tool in the proper manner.

The JRC has used the tool during various fast-spreading diseases (in collaboration with the GLEAM team in Torino), and has communicated the results to the DG SANCO's unit working the emerging public heath threats, which took them under consideration.JRC has the full version of the tool installed (not

just the light version which is publicly available to everyone) and it at any time ready to run a simulation if needed or upon request by DG SANCO for instance.

Vittoria Colizza, INSERM

In France, several epidemiological models have been deployed, but these mostly targeted threads on a national level (so within the country) and not on an international level. The GLEAM model has thus been employed but in most cases, as various institutes are only stuffed by doctors, medical stuff, epidemiologists or policy makers, there is a need for physicists and computer engineers to deploy the model and operate the toolkit.

Based on this need, a new attempt has been initiated under the HarMS-flu project[94] in order to be able to adapt the GLEAM model on a country level and ease out the complexity of modelling so that it will be utilised by policy makers and medical stuff directly. More specifically, quoting from its website, "the HarMS-flue project brings together modellers, developers, medical doctors, epidemiologists, and public health professionals in order to: (i) collect, analyse and understand hosts interactions and behaviours at different scales and under different conditions (e.g. during an epidemic or in the absence of it), as well as epidemiological data; (ii) formulate theoretical approaches and develop computational frameworks for the harmonization of the different scales at play, informed by the data collected, and assess their predictive power; and (iii) develop a data-driven multi-scale computational platform, integrating the data and modelling knowledge acquired in the previous directions of the project, for the simulation of an infectious disease spread and possible interventions"

Going back to GLEAM, what is quite difficult to achieve in order to operate such a model successfully is the fact that the user needs to feed the model with a huge amount of accurate facts and data that need to be estimated correctly. Moreover, once this is done, the next difficult task is to interpret the results in a correct manner and to convey them in the most appropriate manner to high-level policy makers so that they understand their importance. In order to overcome this difficulty, it is important to go step by step and side by side with policy makers over the whole modelling cycle, so that they understand first-hand the basic ingredients and philosophy of the model, what the model can produce ad which are the limitations that the model has.

Moreover there is a need to bring on board also other modellers for collaboration and for sharing data resources in order to further extend the model and its applicability and there is a need to construct emergency centres like the ECDC[95]. Also empirical data should be compared to the GLEAM outputs in order to see whether they converge and this will help researchers to study how to input specific data that may improve the predictions. This could be also boosted by the creation of a data sharing platform where people could upload datasets and share them with the community. This will help to develop a more streamlined process to link the model with other real-time input data and will allow a more dynamic validation mechanisms using also empirical data.

[94] http://harmsflu.weebly.com
[95] http://www.ecdc.europa.eu

Dennis Chao, Fred Hutchinson Cancer Research Center

GLEAM is definitely one of the most developed software tools in its category; actually, for this kind of product, there is actually not much competition.

One of the most interesting parts of GLEAM is the very detailed airline transportation model that they have; something difficult and expensive. In addition, GLEAM is efficient and user friendly as a piece of software itself (e.g. user interface, graphic design). Moreover, GLEAM as a product is better than others in terms of outreach; the GLEAM team has performed effectively towards this direction.

GLEAM could apply to all kinds of diseases and epidemics. It is configurable and capable of doing so. The model can be altered and/ or updated by the end user pretty easily. Although there is no personal experience in using GLEAM with policy makers, there definitely exists utilization of GLEAM in terms of European research (e.g. FP7 projects). Alternative uses of GLEAM would be teaching in universities; even high school students can easily use it and learn from it.

As future steps, collaborations with public administrations and/ or NGOs could be envisioned, in order to achieve great results in terms of public health and relative application. In addition, in case things are not too tightly coupled, the visualisation component –GLEAMViz- could be a stand-alone piece of software.

B.3 Opinion Space 3.0

B3.1 Interview with Case Project Team

The interview regarding the Opinion Space 3.0 case took place through teleconference infrastructure (Skype) on Friday 30/11/2012 at 08:00 CET.

The attendees of the meeting were the following:

Opinion Space 3.0 Team

- Sanjay Krishnan - sanjaykrishn@gmail.com

CROSSOVER Team

- Gianluca Misuraca – gianluca.misuraca@ec.europa.eu
- Francesco Mureddu - francesco.mureddu@tech4i2.com

NTUA Team

- Sotiris Koussouris – skous@me.com
- Fenareti Lampathaki – flamp@epu.ntua.gr
- Panagiotis Kokkinakos – pkokkinakos@epu.ntua.gr

1. Rationale

Question 1.1 - What was the motivation/justification to design, develop and deploy the case? Which needs of policy makers are you addressing? How is your case linked to the policy cycle? Was it based on previous work/project or did you start it as a new initiative? Who were the initiators of the initiative?

Initially, we wanted to bring the world of big data to brainstorming (the process of generating ideas): how can we take advantage of the world of big data in the process of generating ideas. Can algorithms and statistical techniques (that worked well in other areas, such as robotics) operate towards this direction?
After the election of President Obama, the government had a social media orientation, which provided fertile ground for the first trigger case.
Opinion Space was based on a few prior projects that dealt with: (i) recommending NPOs to people so as to donate, (ii) a job recommendation system (background recommendation systems in general). The combination of recommendation systems and visualisation was the main trigger behind Opinion Space.
Policy makers need to know what the population they serve thinks; and this is definitely a complicated problem. Surveys are not the solution; they can be communicated to a certain number of people and need processing. They need to be able to take a quick “snapshot” of what people think. That’s the need that Opinion Space solves.
Opinion Space can be seen definitely as belonging to Agenda Setting phase of the Policy Making cycle. Nevertheless, it can also be used in order to evaluate policies and actions. Therefore, it also fits in the Monitor and Evaluate phase.

Question 1.2 - What was your funding source at the beginning? How did you manage to get this funding? Which stakeholders have been involved? What is your case's business model at the moment?

Opinion Space has been based on a mix of funding grants (e.g. NSF grants). In addition, every individual project has also received some industry funding.
Typically the way that individual implementations work is through initial contacts that lead to implementation; there are no contracts in the business sense. It's more like the fund Opinion Space in order to view the results of this kind of research in their domains (e.g. Fujitsu funded Opinion Space in order to see the results of sentiment analysis on e-learning).

Question 1.3 – Describe the different deployments of your initiative/case. Where is it deployed? What are the themes/topics of interest? Is it in experimental mode or fully operational? What is the role of various stakeholders involved?

The first two projects (in 2009) were with the US State Department. Then, by generalising the system, we worked with the US auto-maker, with an insurance company, an HR department in UniLever (what employees thought about various policy decisions in the company), in various academia-oriented questions, in local state measures (e.g. California) etc.
Opinion Space is fully operational in its current state. Nevertheless, as a research platform it still remains experimental. The great amount of data is very structured and this helps towards continuing research on text analysis, statistical modelling etc.

2. Implementation

Question 2.1 - Which specific methodologies/approaches were used? How were they selected? What is the expertise required of the research team involved and how is the interaction with users addressed? Are policy makers involved in the implementation as users?

Opinion Space uses a technique in order to project a five-dimension (up to eight-dimension) space in the two-dimension space. This is used in order to visualise diversity, which is critical for the purposes of Opinion Space. This technique was selected because it is established in other domains, such as robotics. Visual analogue slider is also used in the frames of Opinion Space in order to give users the ability to rate in a continuous manner and not in a binary one (like / dislike).
Thus, mathematical, mathematical modelling, industrial and artificial intelligence background can be found in the members of the Opinion Space team. Design groups and human-computers interaction groups were also consulted.
Policy makers are directly involved. They make their questions but they always need our assistance. The Opinion Space team involvement is not necessary, but it actually makes the system operate in a better way. They are also involved in the course of the development: the development is modular and they provide feedback in every step. In this way they also provide initial ideas and they get familiar with the whole system.
We have identified as potential challenges touched by Opinion Space the following:

- Policy Modelling
  - Collaborative Modelling
  - Easy Access to Information and Knowledge Creation
  - Output Analysis and Knowledge Synthesis
- Data-powered Collaborative Governance
  - Opinion Mining and Sentiment Analysis
  - Visual Analytics
  - Open Governmental Data

Question 2.2 - How long have you been running the platform/system? How many major updates have you implemented and what was the reason for these, if any? What specific technologies/ tools were used? Were they open source/ free/ commercial? Are there any other technologies you are planning to deploy?

Opinion Space has been running since 2009. Besides 1.0, 2.0 and 3.0 (current version), there were various unnamed versions of the initiative (mostly based on the 3.0 code).

Version 1.0 basically just visualised diversity and it was not really an idea generation platform. In version 2.0 we tried to capture and visualise the user interaction and the main innovation introduced was the ranking system; users could evaluate each other's ideas. In version 3.0 the ideas was to make the whole platform user centric. We incorporated ideas from human-computer interaction into the platform. Another innovation was the introduction of more and more sophisticated statistical tools. After that the main focus was on increasing traffic.

In addition, there is an additional moderator space for policy makers. It gives them a wrap-up of the top ideas and allows them to change ideas etc.

Opinion Space primarily uses open source software. However, Opinion Space's licence is assigned to the university.

Specific technologies and tools include a web application that hooks up to a database analytic system (a relational database to be more specific, as a lot of the available data is extremely structured) through middleware. The UI is a flash-based interface and the statistical platform is Python-based. Opinion Space also incorporates techniques from deliberative polling, collaborative filtering, statistical inference, and dimensionality reduction.

Question 2.3 - Which are the policy/simulation/computational models you are using to support the platform/system? Can other models replace them, or is the platform/system built entirely on their operations/ input-outputs? What kind of data do you use for your cases (open data/big data/public sector data/private date/etc.)? How are you handling them?

Opinion Space's techniques can be easily applied to other sets of existing open data.

3. Results Achieved and Impact

Question 3.1 - What are the main results achieved by the case/initiative? What are the key indicators of the project/ initiative (either impact-oriented or operation/ technology-oriented)? How were they selected/ developed? Were/ Are they met?

One of the first and main indicators was the participation rate; users that arrive in the platform for the first time and those that become active participants. People that arrive in websites are always more than those who actually participate (in some projects the rate was close to 50% and in others around 10%).
In the State Department instance, more than 2000 different ideas were collected (about US foreign policy). In addition, more than 5000 individual responses were collected. It cannot be said whether the final decisions were based on some of the ideas provided, but a detailed report was provided to the policy makers. The project with a US auto-maker (targeted towards recognising ways of improving their image) resulted to about 1000 ideas and about 100.000 ratings evaluating these ideas (e.g. more specifically they talked about green vehicles).

Question 3.2 - What is the impact achieved (or expected) of the project/ initiative both overall and per stakeholder group? Who were the stakeholders/ stakeholder groups involved / served? How (if) is the case been used in practice to support policy making?

To Opinion Space's understanding, the results exceeded even the optimistic expectations, taking into consideration that the target groups are specific and limited in most of the implementations. If the cases targeted towards vast amounts of open public, the goal was not met. But in terms of specific target groups, they exceeded expectations.

Question 3.3 - Which is the core innovation of your project / initiative? Has your case been recognised by policy makers? If so, to what extent? How has it been incorporated in long/short term policy making by decision makers?

One of the core innovations and successes of Opinion Space is the very fast way to browse (and rate) amongst a large number of ideas (even if this is a visualisation-oriented innovation). From the scientific point of view, the greatest innovation was bringing statistical analysis in structured discussion/ data.
One of the best endorsements was Hillary Clinton's reference to Opinion Space. Other endorsements include high level officers of collaborating companies.
As far as the Opinion Space team knows, Opinion Space has not yet been incorporated in any formal decision making procedures. The State Department, however, uses "informally" Opinion Space in order to get ideas and opinions on specific policies.

4. Challenges encountered and lessons learned

Question 4.1 - What are the key lessons learned? Which were the key success factors and drivers that enabled positive developments?

The first and main lesson learnt is that the slightest effort needed by the user really affects participation; everything needs to be easy and user friendly. For example, by increasing the start-questions from 5 to 8, participation decreased almost 50%. In addition, we learnt more about machine learning techniques and algorithms and their capabilities and sensitivities.
From the policy makers point of view (State Department to be more specific) they learned that ideas can be very diverse and scattered; and many times this is neglected by media and press.

Question 4.2 - What are the main drawbacks of your case and the barriers you faced during implementation?

The Opinion Space platform performs a lot of actions so maybe a lighter version should be considered. In terms of policy makers, many concerns on privacy have been raised; different regulations regarding data make things complex. In addition, when introducing a new concept/ technology, users might be reluctant in using it. Last but not least, the choice to implement the platform on Flash has led to loss of all Apple-devices users.

Question 4.3 - Which recommendations would you provide based on the experience gained in your case? Which risks have you identified and should be taken under consideration? How to overcome the barriers faced?

First of all, when you apply social media systems in such procedures you always need the lightest application possible, which works across all platforms (operating systems, mobile devices) and is easily set and operated.
Regarding Opinion Space, the platform works particularly well when you apply it to a specific use case or/ and a well formulated idea.
In terms of risks, two principal risks can be identified: (i) implementation – the result might not be the desired or requested one, (ii) not well structured ideas/ questions (e.g. what is the meaning of life) may wh or inability to refer to the proper audience may result to failure in participation.

5. Sustainability

Question 5.1 - Was there any specific stakeholder engagement strategy so as to gain visibility and 'buy-in'? Did you manage a steady increase of participating users, or was there a peak due to a special event?

First of all, Opinion Space can trigger/ invite users of other/ older cases to participate in new ones. The "core" users of Opinion Space are about a couple of hundreds.
In addition, the Opinion Space team uses Google adwords, SEO and sends emails to relative emailing lists.
The increase of users really depends on the timing, as well as on how interested are people about the specific subject under consideration.

Question 5.2 - Do you think that your case/tools could be applied in other domains? If yes, please name them and discuss the possible changes that would be required.

Opinion Space is technically capable of handling any kind of question. Any brainstorming/ idea generation project in any kind of organization can by supported.

Question 5.3 - What are your future plans/ steps regarding the case/initiative?

First of all, there is a continuous effort to make the platform easier and more user friendly. We are working on a lighter Opinion Space without the initial five questions; it will just ask the user to comments and his/ her comments will be evaluated. In addition, we are working on a "global" version of Opinion Space based on HTML, which will work across any platform.
In terms of research, we are working on machine learning techniques that can help dealing with larger amounts of data. Moreover, amelioration of algorithms is also a continuous research theme.
There is also a plan of collaborating with the State Department once again. In addition, independent projects come up in the course of time.

B.4 UrbanSim

B4.1 Interview with Case Project Team

The interview regarding the UrbanSim case took place through teleconference infrastructure (Skype) on Thursday December 4, 2012 at 17:30 CET.

The attendees of the meeting were the following:

UrbanSim Team

- Paul Waddell - waddell@uanalytics.com

CROSSOVER Team

- Gianluca Misuraca – gianluca.misuraca@ec.europa.eu
- Francesco Mureddu - francesco.mureddu@tech4i2.com

NTUA Team

- Sotiris Koussouris – skous@me.com
- Fenareti Lampathaki – flamp@epu.ntua.gr
- Panagiotis Kokkinakos – pkokkinakos@epu.ntua.gr

1. Rationale

Question 1.1 - What was the motivation/justification to design, develop and deploy the case? Which needs of policy makers are you addressing? How is your case linked to the policy cycle? Was it based on previous work/project or did you start it as a new initiative? Who were the initiators of the initiative?

UrbanSim is a project based mostly on a software platform being developed quite a few years now. In the mid 1990's (when UrbanSim was first conceived) the original motivation was to interact in the policy analysis domain at the metropolitan scale principally around the issues of transportation and land use, but also environmental planning. The context was initially only USA with the metropolitan planning organisations of each area, which are the legally mandated organisations to undertake regional transportation planning and to funnel federal funds for transportation projects dealing with this matter. The challenge that UrbanSim was initially trying to address was the shortcoming in analytical capacity of Metropolitan Planning Organisations (MPOs); they were unable to effectively analyse the secondary or cumulative impacts of transportation investments (e.g. new highways, highway widening, rail transit) on urban development (e.g. where new housing gets developed). The consequence of this limitation was that there was a significant bias towards overestimating the benefits of new construction and highway capacity expansion and this became the basis for a legal challenges, mainly by the environmental movement (they challenged legally decisions of implementing new construction projects without considering the long-term impact). So we designed and implemented the UrbanSim platform as a way to analyse the effects of changes in

the transport system on urban development (travel patterns, effectiveness of transport projects. Regarding the Policy Cycle, the project probably fits in the Policy Design and Implementation phase
Nevertheless, motivation has evolved over the years. It still maintains the core of allowing analysis of secondary/ accumulated effects of transport-related investments, but now more broadly encompasses the desire of many local and regional planning policy makers to assess the impacts of land use policies (e.g. in California there is legislation to reduce greenhouse gas emissions not only by changing types of fuels/ vehicles; the law calls also for MPOs to coordinate with local cities to change land use patterns in ways that reduce the need to travel by car). So, based on this agenda, UrbanSim now deals with evaluating packages of measures of various policies that include examining building codes, incentives, impact, different policies etc. At this time, UrbanSim has a portfolio of transfer-related projects but also land use policies. Thus, the motivations have broadened in the course of time.
More recently, increased interest has been noted in analyzing policies that relate to portable housing, equity and economic development. In addition, increased interest has been shown in public engagement in decision making processes/ policy design (e.g. recent project in San Francisco area aiming to develop a 3D visualisation system that would complement UrbanSim in providing capacity for community residents and local planners to be able to visualize alternative scenarios and have a stronger intuition around what these alternatives might look like in terms of their impact on urban development over the next 30 years).
The initial idea came after a long literature review mostly on urban economics, micro-simulation and GISs. The software platform itself was developed from scratch.

Question 1.2 - What was your funding source at the beginning? How did you manage to get this funding? Which stakeholders have been involved? What is your case's business model at the moment?

The very initial funding was from a consulting project in order to design and develop and urban simulation model of the Honolulu MPO, Subsequently, a National Science Foundation grant was obtained (for an urban research initiative) which led to a substantial increase in the research on how to approach such a complex simulation and policy analysis platform. The initial findings led to several more grants from NSF (probably 6 different – over 10.000.000$ in total). In addition, an EU FP7 project called "Sustain City" (www.sustaincity.eu) has brought some funding.
Nevertheless, most of the real-life application growth has come from contracts with various MPOs that have actually used the system.

Question 1.3 – Describe the different deployments of your initiative/case. Where is it deployed? What are the themes/topics of interest? Is it in experimental mode or fully operational? What is the role of various stakeholders involved?

There have been a lot of deployments including USA, Europe and Africa. It has to be noted that the experience in the US is very different than in Europe (and also other international applications).
The main difference is that UrbanSim has been actively involved in developing the applications in close collaboration with NPOs in US and has moved from a research to an applied context (they are actually being used in formal/ legal planning efforts – public administrations fund and actually use the

platform), while in Europe we had a modest advisory role, we provided some innovations in terms of access to software/ algorithm/ models improvements but most of the work is being done by research teams scattered throughout Europe and the government agencies have not been active partners and much time has been devoted on doing research that the participating research teams were interested in, but with less engagement of the actual planning agencies.
The reason behind this lack of collaboration in the European case is not clear. Maybe due to the need for immediate innovation relevant to EU context. The two main limitation of the project deployment in the EU were: (i) not having active PA partners from the very beginning of the project and (ii) the difficulties caused by the new users of UrbanSim that had not interacted with the platform before and were not experienced in developing models, calibrating them, adding data etc.

2. Implementation

Question 2.1 - Which specific methodologies/approaches were used? How were they selected? What is the expertise required of the research team involved and how is the interaction with users addressed? Are policy makers involved in the implementation as users?

In terms of methodologies, UrbanSim uses preliminary data analysis to organize an integrated UrbanSim data system (data fusion or data integration methodology), behavioral models, metric models, regression models, free choice models and equilibrating dynamics. Most recently methodologies for community engagement have been used (though a visual environment in which users can compare side by side two different propositions. In terms of technologies, free choice modeling can be also considered as a technology, technologies for analyzing uncertainty, techniques for validating models, technologies for 3D urban modelling.
We have identified as potential challenges touched by URBASIM the following:

- Policy Modelling
  - Systems of Atomized Models
  - Immersive Simulation
- Data-powered Collaborative Governance
  - Big Data
  - Visual Analytics

UrbanSim has a quite multi-disciplinary team: PhD holders in computer science, computer graphics, urban planning, transportation planning and modelling, civil engineering, urban real estate design and development and finance. We are also collaborating with people that are experts in community engagement and participation.
Policy makers are definitely involved in the implementation, especially in the US cases. When applied projects with planning organizations are implemented, the users are active participants in the whole process (even from the research part). Planners and analysts from the PAs are actively involved in what UrbanSim calls “agile modeling”. UrbanSim follows a very modular approach that allows the team to reconfigure and add any necessary part of the model, due to the fact that the model may alter dramatically amongst various application cases. Policy makers are also involved in monthly iterations where they use and test the model under development and provide feedback. This helps not only in terms of feedback, but also in terms of the policy makers getting familiar with the model and platform.

Question 2.2 - How long have you been running the platform/system? How many major updates have you implemented and what was the reason for these, if any? What specific technologies/ tools were used? Were they open source/ free/ commercial? Are there any other technologies you are planning to deploy?

The first platform implementation was in Java. In 2005 a decision was taken in order to re-implement it in Python. Most recently (in the last year), a new extension of UrbanSim has been developed, UrbanVision, which is a 3D urban visualisation and supports also editing scenario analysis.
Initially, UrbanSim was available as an open source license downloadable from the web for more than 10 years. UrbanVision and some additional extensions are implemented in a new platform in C++. Those were decided to be distributed as closed source, with very differential pricing for public agencies, private agencies, educational/ research institutes etc. The decision was taken mostly due to competition from commercial entities.

Question 2.3 - Which are the policy/simulation/computational models you are using to support the platform/system? Can other models replace them, or is the platform/system built entirely on their operations/ input-outputs? What kind of data do you use for your cases (open data/big data/public sector data/private date/etc.)? How are you handling them?

With the modularity followed in UrbanSim, different configurations for any models can be created and the used is taught how to change those configurations (e.g. change a residential location model with another). However, the user community is very diverse in an interest and technical background level. The number of users that actually want to go deep into the models is relatively small. We also provide support towards any UrbanSim-related activity.
As far as the data as concerned: in the past, the agencies have typically been very protective of their data. Some data (the minority of them) were indeed legally protected/ confidential/ proprietary (in various senses), while the majority was open. Yet, authorities were protective with all of them and kept them in their computers after the completion of the project. What UrbanSim is beginning to do is, both by working with a university and by developing the proper tool, is to create an online platform in which we ask from agencies to contribute their data in order to become publicly available and create an API for access to them. This repository could be used both for research and for the models (having access to an archive of data is a key factor towards successful models).

3. Results Achieved and Impact

Question 3.1 - What are the main results achieved by the case/initiative? What are the key indicators of the project/ initiative (either impact-oriented or operation/ technology-oriented)? How were they selected/ developed? Were/ Are they met?

Regarding the European case, it can be said that it is not in the same level as the US ones. In the US there are quite a number of MPOs that actively utilize the UrbanSim platform. The most indicative application is probably the San Francisco Bay one. The results of the aforementioned case have involved examining and analyzing five alternative scenarios that required articulating a set of assumptions about land use policies, transport policies and macro-economic growth (the analysis in now complete).
In one of them, analyzing visibility of the proposed policy though reverse engineering was attempted, that made the task much more challenging. The agency has now accepted the results, with documentation and visualization supporting them.

Question 3.2 - What is the impact achieved (or expected) of the project/ initiative both overall and per stakeholder group? Who were the stakeholders/ stakeholder groups involved / served? How (if) is the case been used in practice to support policy making?

In the San Francisco case the 3D visualization system was created in order to attract more citizens. The intention was to use this system in a number of workshops held in January 2012. User engagement was intense even from the development/ testing phase. In addition, the public agencies used it in a series of meetings with community organizations. Each of these meetings had from 15 up to 200 participants each. The point of these meetings was to communicate the different scenarios to open public and to get feedback on the preferences of the citizens.
Unfortunately, the visualization was effectively used only in a couple of these meetings; they were obstructed by the Tea Party movement.

Question 3.3 - Which is the core innovation of your project / initiative? Has your case been recognised by policy makers? If so, to what extent? How has it been incorporated in long/short term policy making by decision makers?

One of the most innovative and controversial elements of UrbanSim the combination of various aspects (named in question 1.1) as well as the “move away” of strong assumptions regarding urban markets and adopt less strong assumptions (than markets are an equilibrium). For example, the impacts of transport projects on urban planning are far from being instantaneously realized (in fact they might evolve over decades. In addition, the capacity of being able to support this less strong assumptions can also be considered as a core innovation.
The core innovation in the particular case of San Francisco can be found between the following two: (i) the visualization way of community engagement (UrbanVision component) and (ii) the creation of a new approach towards modeling real estate development based in pro forma analysis (that enabled the reverse engineering exercise described in Question 3.1.
The case has definitely been recognized by policy makers and incorporated in their formal procedures. Thus, it can be said that it has been incorporated in the long term policy making by policy makers of the San Francisco area.

4. Challenges encountered and lessons learned

Question 4.1 - What are the key lessons learned? Which were the key success factors and drivers that enabled positive developments?

One of the main key lessons learned from the UrbanSim case has been the fact that there is always an option to have a balance between academic research (mostly funded by NSF but also others) and real-life applications towards producing real working systems.
Moreover, when dealing with such applications, it is very important to engage people from the early steps of the project, in order to get familiar and acquire as much data as possible.

Question 4.2 - What are the main drawbacks of your case and the barriers you faced during implementation?

Some of the main challenges faced were the very short time frames of the project and having rather poor data available from agencies to begin the project. In addition, public disruption was another challenge.
Moreover, having too much software development at the same time was another risk.

Question 4.3 - Which recommendations would you provide based on the experience gained in your case? Which risks have you identified and should be taken under consideration? How to overcome the barriers faced?

The first recommendation deals with early engagement; policy makers and end users in general need to be engaged in the project as soon as possible.
Adequate time for the development of the models and testing of the models is also necessary.
Additionally, finding out a new public engagement strategy, more capable on avoiding public disruption movements is also advisable (probably through smaller meeting and interaction through the web).

5. Sustainability

Question 5.1 - Was there any specific stakeholder engagement strategy so as to gain visibility and 'buy-in'? Did you manage a steady increase of participating users, or was there a peak due to a special event?

The agile modeling approach described earlier is part of the stakeholders' engagement strategy, as well as early collaborative testing of the model and the visualisation tools.
The stakeholders' engagement strategy did increase the participation over some months, but participation spiked during January 2012, when the public meetings took place. After this phase, more analytical modeling followed, and another round of public engagement took place.

Question 5.2 - Do you think that your case/tools could be applied in other domains? If yes, please name them and discuss the possible changes that would be required.

UrbanSim is already exploring transportation and land use domains, as well as urban design. Environmental issues (e.g. greenhouse gas emissions) were motivation to some projects, so environmental planning is also quite relevant. Energy consumption or water consumption constitute interesting issues too. Modelling the impact of climate change (e.g. on weather) is also o topic of interest. Finally, as also mentioned earlier, economic development/ policies are also under consideration.

Question 5.3 - What are your future plans/ steps regarding the case/initiative?

The UrbanSim team is currently thinking on how to organize communicating UrbanSim to European public administrations (and establish and office in Europe as well) and other countries (e.g. Singapore, Argentina). In addition, we have recently begun expanding our development team and partnerships. In addition, the online platform in which we ask from agencies to contribute their data if an on-going effort. Moreover, ameliorating the robustness and generalization of the model is also an ongoing piece of work. There is also collaboration with academia on big data, based on an NSF grant.

B4.2 Testimonials from end-users

Bilal Farooq, EPFL

Transportation is definitely not an independent entity; it is connected to land usage, energy usage etc. Thus, it definitely makes sense to model it as a complex interconnected system. The application of this approach was implemented in the context of the SustainCity[96] research project that took place in Paris, Brussels and Zurich. Already operating tools (MATSim for transportation and UrbanSim for land usage) have been selected due to the fact that UrbanSim was heavily advanced on the land use side, but no so much on the transportation side. UrbanSim was selected after an extensive state of the art desk research, where it was deduced that it was the most easy to transfer platform.

The UrbanSim models urge for large amounts of data; especially in the Brussels case, the greatest challenge was to locate, collect and transform in a useful form the necessary (statistic, demographic etc.) data. In addition, real estate markets, but also transportation systems are rather different in Europe than in the US. Thus, another challenge was to ascertain that the UrbanSim models were flexible enough in order to fit the European cities' needs.

The actual transfer was pretty difficult; the support from and collaboration with the UrbanSim team was critical in order to achieve the (eventually) strongly positive outcome. Various project partners performed updates, extensions and advancements in the platform too. The project is now in its final phase (out of an 18 months initial duration): various simulations (e.g. alternative policy implementation scenarios) are conducted.

[96] http://www.sustaincity.org

Various stakeholders (e.g. public administrations, consulting companies) are already involved in the procedure; however, the project is research-oriented. It is unclear whether it will be eventually used or not.

In terms of lessons learned, the early involvement of decision makers (and all other stakeholders) proved to be extremely fruitful (especially in the Zurich case). In addition, relevant to the aforementioned, regular communication between the project team and end users should be established. Moreover, UrbanSim provides the user with amazing data (large amounts of organised data); in SustainCity we were not able to fully exploit all these data. In terms of platform, it has to be supported (from a software point of view) and it also has to be flexible. As far as the 3D visualisations are concerned, although the were not intensively used in SustainCity, they are considered as highly useful, especially when dealing with non-experts, in order to help them understand the concept and the envisioned outcomes.

Annex C – Description of 25 shortlisted cases

Following the first phase of mapping and identification of promising cases, an initial database of 335 practices has been constructed (see Annex D). The analysis of the initial; cases consisted in gathering basic data and documentation from a number of sources, and examine their relevance to the specific needs and requirements of ICT for Governance and Policy Modelling. This allowed defining a shortlist of 25 cases that has been further analysed in order to identify the four cases to be selected for in-depth analysis. For each of the 25 practices identified, various data have been documented, such as the context of each case, the objectives, the performed activities, the main results and other relevant and useful material that could contribute or be aligned to the various research challenges defined in the CROSSOVER draft Roadmap.

This annex includes a brief description of the 25 practices that have been shortlisted, analysed according to the template developed in the first phase of Analysis (see Methodological section).

C1. ALERTS

GENERAL INFORMATION	
Acronym	ALERTS
Title	Automated Land Change Evaluation, Reporting, and Tracking System
Link	http://planetaryskin.org/rd-programs/resource-nexus/global-land-change-detection
Country/Region/City	Global
Contact Point	contact@planetaryskin.org
CASE DESCRIPTION	
Type of Case	Joint Project
Topic	Real-time global land use and land cover change detection
Sector	Urban Planning
Reach	International
Start Date	2008
End Date	-
Description Abstract	ALERTS, the Automated Land change Evaluation, Reporting and Tracking System, is a web-based prototype application for near real-time global land use and land cover change detection. ALERTS can provide timely (with as little as 6-8 week latency), global coverage of deforestation or other land change events and offers users a number of useful tools for identifying, characterizing and responding to disturbances. Because it uses existing satellite data products and machine-automated change detection algorithms, ALERTS is already providing global coverage at a 1-kilometer resolution and can be readily downscaled to provide national coverage at 250m.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	• Agenda Setting • Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Easy Access to Information and Knowledge Creation
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance

	○ Big Data ○ Visual Analytics ○ Collaborative Governance
Innovative policy elements of the case	ALERTS addresses land use challenges facing three types of decision-makers: government officials who want an 'instant snapshot' of land change at different scales; national governments and conservation stakeholders who want to be alerted of recent land changes in their areas of interest; and scientific and policy researchers who want to explore land change dynamics over a long period in greater detail, preferably in a geospatial environment.
Innovative technological elements of the case	ALERTS has three technical components: a change detection system; a geospatial analysis environment; and a web 2.0 portal that enables customized alerts of land change. Change detection system: ALERTS is based on geospatial data mining algorithms, developed by the University of Minnesota, that leverage MODIS time series data. These algorithms, which draw on ten years of research in signal processing and data mining technology and have been published in peer-reviewed journals, identify meaningful patterns in vegetation signals. The ALERTS suite of algorithms can identify sudden drops, gradual decreases, or gradual increases in vegetation, and are robust to missing data, poor quality observations, and image registration issues. Moreover, they can provide both a reconstructed historical spatial record of deforestation and near real-time change detection services. Geospatial visualization and analysis environment: ALERTS includes a web-based geospatial environment with a number of important features, including: • Selective visualization of disturbances at multiple scales • Direct access to vegetation reflectance time series for each disturbance to better understand the nature of land change • Ability to compare these time series to other environmental time series such as temperature and precipitation • Access to selected contextual layers, including protected areas, intact forests, and terrestrial carbon density, allowing pattern identification and prioritization • Analysis tools, such as polygon aggregation, animation of historical trends, layer transparency, and carbon calculation Web 2.0 platform: A web-based portal also allows users (i.e. governments, NGOs) to subscribe to alerts that send an automated notice whenever land change events are detected in an area of interest. Areas of interest can be defined based on contextual layers, including political boundaries and protected area status.
Motivator	Non-profit R&D Organization (Planetary Skin Institute)
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The Planetary Skin Institute unveiled the beta version of its Tropical Forest ALERTS 1.0 platform for monitoring global land change at the 16th Conference of the Parties to the UN Framework Convention on Climate Change in October 2010. The Government of Peru has stepped forward as an early adopter of Tropical Forest ALERTS 1.0 to provide near real time monitoring of 54

	million hectares of forests as part of the President of Peru's commitment to the UN General Assembly in September 2010.
Key Stakeholders and Involvement	The ALERTS platform represents the product of an intensive multi-year R&D collaboration across nations, across organizations/ sectors, and across disciplines. Research and Development partners include Planetary Skin Institute world class partners NASA, the Brazilian National Space Research Institute (INPE) Centre of Earth Systems Research, the University of Minnesota Computer Science Department, Peru's Ministry of Environment (MINAM), the Terrestrial Carbon Group and Cisco Systems.
Supportive Technologies	• Geospatial Visualisation • Visual Analytics
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	• National land use managers • Conservation organizations • Forest policy makers • Scientific communities
Reach (in terms of hits/opinions/etc)	N.A.
Availability of Results / Impact Assessment Study	http://ourplanetaryskin.org/ps/is/psi/index.php?loginGuestOne=1
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Geospatial visualization, Global land change, Alerts, Change detection algorithms
Social Media Readiness	Unknown
Social Media Interfaces	None

C2. A Thousand Visions

GENERAL INFORMATION	
Acronym	A Thousand Visions
Title	A Thousand Visions
Link	http://www.spokanetransportationvision.com/game1.php
Country/Region/City	Spokane Country, Washington
Contact Point	http://www.spokanetransportationvision.com/comment.php
CASE DESCRIPTION	
Type of Case	Local Administration Initiative
Topic	Regional transportation planning
Sector	Transport
Reach	Regional
Start Date	2010
End Date	-
Description Abstract	A Thousand Visions is an interactive way to understand transportation improvements in Spokane County and offers an opportunity to the public to share their vision. During the past several months, the initiative

	responsibles met with city leaders, the business community and residents of Spokane County to gather ideas for the Transportation Vision Project. With their help they identified projects that will increase connectivity, support existing infrastructure and provide access to a countywide multi modal transportation system.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data-powered Collaborative Governance
	  ○ Collaborative Modelling
	  ○ Open Governmental Data

Innovative policy elements of the case	Citizens allowed to deal with the actual budget numbers of Spokane Country
Innovative technological elements of the case	N/A
Motivator	Government
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The user is in charge of determining a fiscal budget for the communities of Spokane County's contribution to transportation infrastructure. There are three steps to the game: 1. Select the preferred level of funding based on a review of new sources. 2. Choose the preferred projects and identify levels of investment. 3. Review results and measures of performance.
Key Stakeholders and Involvement	Citizens act as policy makers and decide on the budget
Supportive Technologies	• Visualisation Platform • Deliberation Platform
Funding Source	Governmental
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Budget, Participation, Spokane
Social Media Readiness	Publishing policies in social media
Social Media Interfaces	One to Three

C3. Arbeitsmarktmonitor

GENERAL INFORMATION	
Acronym	Arbeitsmarktmonitor
Title	Arbeitsmarktmonitor

Link	http://www.arbeitsagentur.de/nn_690808/Navigation/zentral/Servicebereich/Ueber-Uns/Aufgaben/Arbeitsmarktmonitor/Arbeitsmarktmonitor-Nav.html
Country/Region/City	Germany
Contact Point	Zentrale Auslands- und Fachvermittlung (ZAV), Villemombler Str. 76, D - 53123 Bonn Tel: 0049 228/ 713 - 0 zav@arbeitsagentur.de
CASE DESCRIPTION	
Type of Case	Case from German Labour Agency
Topic	Labour
Sector	Labour
Reach	National
Start Date	-
End Date	-
Description Abstract	Arbeismarktmonitor is an ICT-based platform and simulation tool of the labour market and workforce in German regions.
Status	Ongoing
Languages Supported	German
Policy Making Cycle Stage	• Design • Monitor and Evaluation
CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data-powered Collaborative Governance ○ Visual Analytics
Innovative policy elements of the case	Presentation and Communication of data to network of agencies
Innovative technological elements of the case	Interactive visualizations
Motivator	German Labour Agency
CASE IMPLEMENTATION	
Implementation Approach - Deployment	Arbeismarktmonitor offers the following services: • Regionalized data on industries and occupations • Visualizations to regional structural data • Success stories to labor market issues • Presentation and overview of labor market relevant networks in Germany • Collaboration infrastructure for inter-organizational collaboration • Contact with experts for various labor market issues
Key Stakeholders and Involvement	German Labour Agencies collect and provide the data to the system, which is then presented through the platform. Data provision is also performed by different industries and organisations.
Supportive Technologies	Visualisation Technologies
Funding Source	Own Funding from the German State
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens Enterprises
Reach (in terms of	N/A

hits/opinions/etc)	
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Labour, Monitor
Social Media Readiness	Unknown
Social Media Interfaces	None

C4. C-ROADS

GENERAL INFORMATION	
Acronym	C-ROADS
Title	C-ROADS (Climate Rapid Overview and Decision Support) simulator
Link	http://climateinteractive.org/simulations/C-ROADS
Country/Region/City	Multiple
Contact Point	Drew Jones or Beth Sawin, Sustainability Institute, apjones@sustainer.org, bethsawin@sustainer.org
CASE DESCRIPTION	
Type of Case	Deployment of tool
Topic	Climate Change, Greenhouse gas emissions
Sector	Environment
Reach	International
Start Date	1997
End Date	N/A
Description Abstract	C-ROADS is a computer simulation that is oriented towards decision-makers that helps users understand the long-term climate impacts of policy scenarios to reduce greenhouse gas emissions. It allows for the rapid summation of national greenhouse gas reduction pledges in order to show the long-term impact on our climate and encapsulates the insights of more complex models.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	• Design • Implementation • Monitor and Evaluation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Systems of Atomized Models
	  ○ Collaborative Modelling
	  ○ Easy Access to Information and Knowledge Creation
	  ○ Model Validation
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance
	  ○ Visual Analytics

Innovative policy elements of the case	C-ROADS provides a consistent basis for analysis and comparison of policy options, grounded in well-accepted Science. C-ROADS has been constructed using the tools of System Dynamics, a methodology for creating simulation models that help people improve their understanding

	of complex situations and how they evolve over time. The simulation model is based on the biogeophysical and integrated assessment literature and includes representations of the carbon cycle, other GHGs, radiative forcing, global mean surface temperature, and sea level change. C-ROADS has been calibrated against global climate models used by the Intergovernmental Panel on Climate Change (IPCC). The model can be readily revised and expanded based on user feedback and new developments in climate science, and as new data become available.
Innovative technological elements of the case	C-ROADS is designed to capture the key insights from larger integrated assessment models or detailed General Circulation Models (GCMs) and make them available for rapid policy experimentation. The model has been subjected to a suite of rigorous tests, documented in the C-ROADS reference guide. Model output has been tested against the output of large, disaggregated models such as MAGICC, BERN, ISAM, MiniCAM, AIM, CETA and MERGE and the resulting temperature output of C-ROADS has been found to align very closely under a range of emissions scenarios including those in the Fourth Assessment Report of the IPCC. C-ROADS emphasizes: • Transparency: equations are available, easily auditable, and presented graphically. • Understanding: model behavior can be traced through the model structure to determine the causal factors contributing to results; we don't say "because the model says so." • Flexibility: the model supports a wide variety of user-specified scenarios at varying levels of complexity. • Consistency: the simulator is consistent with historic data, the structure and insights from larger models, and the IPCC AR4. • Accessibility: the model runs with a user-friendly graphical interface on a laptop computer in real time. • Robustness: the model captures uncertainty around the climate outcomes associated with emissions decisions through Monte-Carlo simulations.
Motivator	Government/Policy Makers
CASE IMPLEMENTATION	
Implementation Approach - Deployment	C-ROADS has been used in strategic planning sessions for decision-makers from government, business and civil society and in interactive role-playing policy exercises. In 2009, C-ROADS made its debut in the policy world during a global-warming war game in Washington DC, where participants — including President Obama's climate and energy czar, Carol Browner, and State Department climate envoy Todd Stern — played the role of diplomats negotiating a new climate agreement among the United States, China, Russia and other nations. It has since been picked up by climate negotiators in the United States and Europe. C-ROADS was developed by Ventana Systems, Sustainability Institute, and the MIT System Dynamics Group, as part of Climate Interactive, a multi-organization effort to make climate simulations useful to decision makers, enabling effective action to stabilize the climate.

Key Stakeholders and Involvement	Policymakers and policy analysts in government, NGOs and the private sector, as well as the general public, who obtain a better understanding and intuitive feel for the broad brush, long term consequences of climate change given various GHG reduction strategies. The simulator helps them improve their understanding of the planetary system's responses to changes in greenhouse gas (GHG) emissions, including CO2 from fossil fuel use, emissions from land use practices, and changes in other greenhouse gasses.
Supportive Technologies	• Visual Analytics • Simulation
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Policy Makers
Reach (in terms of hits/opinions/etc)	N.A
Availability of Results / Impact Assessment Study	http://climateinteractive.org/simulations/C-ROADS/getting-the-model
Maturity	Hyper-Growth
OTHER INFORMATION	
Relative Keywords	Simulation, Visualisation, Climate Change, CO2 reduction
Social Media Readiness	Unknown
Social Media Interfaces	None

C5. Demos Plan – City of Hamburg

GENERAL INFORMATION	
Acronym	Demos Plan – City of Hamburg
Title	Demos Plan – City of Hamburg
Link	http://demos-plan.eu/cms/?page=Hamburg
Country/Region/City	City of Hamburg
Contact Point	Rolf Lührs TuTech Innovation GmbH, Interactive Communication, Harburger Schloßstraße 6-12, 21079 Hamburg tel.: +49 40 76629-6371 e-mail: ik@tutech.de
CASE DESCRIPTION	
Type of Case	Deployment of tool in a city
Topic	Land Planning
Sector	Urban Planning
Reach	Local
Start Date	N/A
End Date	N/A
Description Abstract	The City of Hamburg was the first to implement DEMOS-Plan and acted as its pilot user. The Internet-based public participation platform DEMOS-Plan was designed to enable the whole formal participatory process to be handled on the Internet and thus can offer optimum solutions, especially for the coordinating body. It is intuitive and simple and can be easily

	operated even by relatively inexperienced users. The software supports the coordinator throughout, from the setting up of new public consultations to the analysis and evaluation stage. Parallel processes, such as changes to several planning tiers covering an area, can also be handled clearly using one single platform. The aim of DEMOS-Plan is to encourage standardisation of the land use planning process and reduction in the amount of time and effort involved. Documents can be made generally available on a central participation platform. Those involved in the land use planning process can consult the complete documentation online as and when they require, or alternatively "collect it" electronically. In exceptional cases documents can also be ordered in printed form. Any submissions can be made electronically and can thus be further processed without media discontinuity. In addition, a direct link can be established between text-based and geographical planning components. The combination of digital submissions and WebGIS functionality aims to go beyond what has hitherto been available to public authorities. For a coordinator like the City of Hamburg, the participation platform facilitates the handling of the whole formal participatory process without any media discontinuity, from the drawing up of plans, through the evaluation stage, to tabling of the project before the decision-making body.
Status	Terminated
Languages Supported	German
Policy Making Cycle Stage	• Design • Implementation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Easy Access to Information and Knowledge Creation

Innovative policy elements of the case	• Efficient, easy and transparent handling of submissions • Combination of geographical data in policy discussions
Innovative technological elements of the case	• Integrated WebGIS with professional geographical services functions (WMS/WFS) and use of own GIS systems • Text mining • Text annotations • Text search/matching algorithms
Motivator	Public Administration
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The goal of the pilot process was to identify the requirements, wishes and expectations which all involved parties have towards an internet based participation process in land use planning. In close cooperation with the city the participation platform was developed and tested using two real world plans. 60 of 80 involved public agencies decided to use the online process, which lead to a significant reduction in printing and personal costs.
Key Stakeholders and Involvement	Citizens are the ones who are ssubmitting their applications and public administrators are handling the submissions

Supportive Technologies	• PhP • MySQL • OGC-compliant Web Map Service (WMS)
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N.A
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Land Planning, Visualisation, GIS, Geographical Data
Social Media Readiness	Unknown
Social Media Interfaces	None

C6. Enquete Beteiligung

GENERAL INFORMATION	
Acronym	Enquete Beteiligung
Title	Enquete Beteiligung
Link	https://enquetebeteiligung.de/
Country/Region/City	Germany
Contact Point	Alte Schönhauser Straße 23/24, D-10119 Berlin Tel: 030 9700 4639 E-Mail: info@liqd.net
CASE DESCRIPTION	
Type of Case	Governmental Initiative
Topic	Public Dialogue
Sector	Any
Reach	National
Start Date	2011
End Date	-
Description Abstract	The Study Commission on Internet and Digital Society of the German Bundestag is designing the future of digital society in Germany and any interested stakeholder can participate..
Status	Ongoing
Languages Supported	German
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Easy Access to Information and Knowledge Creation
	• Data-powered Collaborative Governance
	  ○ Collaborative Governance

Innovative policy elements of the case	Wide and structured public dialogue fed directly to the Government
Innovative technological	-

elements of the case	
Motivator	Government
CASE IMPLEMENTATION	
Implementation Approach - Deployment	All citizens can bring the issues that affect the digital society for discussion. The discussions, suggestions and ideas flow directly into the ongoing work of the Commission. The results of the individual project groups are summarized in an interim report. This also includes the first recommendations to the German Bundestag. The first previously submitted interim report on media literacy contains many suggestions of citizens that have been introduced over enquetebeteiligung.de. Among them are two of twelve recommendations that were adopted verbatim.
Key Stakeholders and Involvement	Citizens-Vote, discuss, propose
Supportive Technologies	• Opinion Mining • Sentiment Analysis • Deliberation Platforms
Funding Source	Governmental
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	3138 members/ 469 proposals/2318 comments/14301 votes
Availability of Results / Impact Assessment Study	https://enquetebeteiligung.de/
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Opinions, Dialogue, Collaboration, Discussion
Social Media Readiness	Unknown
Social Media Interfaces	None

C7. €CONOMIA

GENERAL INFORMATION	
Acronym	€CONOMIA
Title	€CONOMIA - The Monetary Policy Game
Link	http://www.ecb.europa.eu/ecb/educational/economia/html/index.en.html
Country/Region/City	Europe
Contact Point	European Central Bank education@ecb.europa.eu
CASE DESCRIPTION	
Type of Case	European Training Initiative
Topic	Serious Game
Sector	Finance
Reach	International
Start Date	2011
End Date	-

Description Abstract	€CONOMIA explains, in a simplified way, how monetary policy works. €CONOMIA is a serious game that gives the opportunity to citizens to understand what monetary policy is, how it is defined and/or how the key interest rate affects inflation.
Status	Ongoing
Languages Supported	EU Languages
Policy Making Cycle Stage	• Agenda Setting • Implementation
CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data Powered Collaborative Governance ○ Serious Gaming for Behavioural Change
Innovative policy elements of the case	Users can simulate and see (even from a mobile device) how their decisions on the monetary policy affect the European economy.
Innovative technological elements of the case	• Simulation and visualization mechanism • Background modeling and data
Motivator	European Central Bank
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The end-user is provided with a user-friendly interface and all necessary (simplified data) in order to achieve his/her goal which is to keep inflation low and stable at just under 2%. via the key interest rate, which constitutes the tool.
Key Stakeholders and Involvement	The European Central Bank-Serious is the game creator, and the citizens are the players which try to achieve the game's goal.
Supportive Technologies	• Simulation • Process Modeling • Data modeling
Funding Source	European Central Bank
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	EU Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	ECT, Economy, Inflation, Monetary Policy, Game
Social Media Readiness	Unknown
Social Media Interfaces	None

C8. GAINS

GENERAL INFORMATION	
Acronym	GAINS
Title	Greenhouse gas - Air pollution INteractions and Synergies
Link	http://www.iiasa.ac.at/web/home/research/researchPrograms/GAINS.en.html

Country/Region/City	Global
Contact Point	Markus Amann Mitigation Of Air Pollution and Greenhouse Gases T +43(0) 2236 807 432 amann@iiasa.ac.at
CASE DESCRIPTION	
Type of Case	Global Initiative
Topic	GreenHouse Effect, Air Pollution
Sector	Environment
Reach	Global
Start Date	2006
End Date	-
Description Abstract	The Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS)-Model provides a consistent framework for the analysis of co-benefits reduction strategies from air pollution and greenhouse gas sources. The GAINS model explores cost-effective emission control strategies that simultaneously tackle local air quality and greenhouse gases so as to maximize benefits at all scales. The GAINS Model simultaneously addresses health and ecosystem impacts of particulate pollution, acidification, eutrophication and tropospheric ozone. Simultaneously, the model considers greenhouse gas emission rates and the associated value per ton of CO2 equivalence. Historic emissions of air pollutants and GHGs are estimated for each country based on information collected by available international emission inventories and on national information supplied by individual countries. The GAINS Model assesses emissions on a medium-term time horizon, emission projections are specified in five year intervals through the year 2030. Options and costs for controlling emissions are represented by several emission reduction technologies. Atmospheric dispersion processes are often modeled exogenously and integrated into the GAINS Model framework. Critical load data and critical level data are often compiled exogenously and incorporated into the GAINS modeling framework. The model can be operated in the 'scenario analysis' mode, i.e., following the pathways of the emissions from their sources to their impacts. In this case the model provides estimates of regional costs and environmental benefits of alternative emission control strategies. The Model can also operate in the 'optimization mode' which identifies cost-optimal allocations of emission reductions in order to achieve specified deposition levels, concentration targets, or GHG emissions ceilings. The current version of the model can be used for viewing activity levels and emission control strategies, as well as calculating emissions and control costs for those strategies.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	• Design • Monitor and Evaluation
CROSSOVER Roadmap	• Policy Modelling

Research Challenge Group/Research Challenges	○ Systems of Atomized Models ○ Immersive Simulation ○ Output Analysis and Knowledge Synthesis • Data-powered Collaborative Governance ○ Visual Analytics ○ Open Government Data
Innovative policy elements of the case	The GAINS model can be operated in two ways: • In "scenario analysis" mode, it follows emission pathways from sources to impacts, providing estimates of regional costs and the environmental benefits of alternative emission control strategies. • In "optimization" mode, it identifies where emissions can be reduced most cost-effectively. The models identifies a balance of concrete measures for different pollutants, sectors, and countries/regions that achieve air quality and greenhouse gas reduction targets at least cost, considering the contributions of different pollutants to different air quality and climate problems.
Innovative technological elements of the case	N/A
Motivator	Governments/Policy Makers
CASE IMPLEMENTATION	
Implementation Approach - Deployment	GAINS estimates historic emissions of 10 air pollutants and 6 GHGs for each country based on data from international energy and industrial statistics, emission inventories and on data supplied by countries themselves. It assesses emissions on a medium-term time horizon, with projections being specified in five-year intervals through the year 2050. GAINS estimates for each country/region the potential emission reductions that are offered by about 2000 specific emission control measures and their costs. For user-specified packages of measures, GAINS calculates resulting effects on ambient air quality (fine particles, ground-level ozone, deposition of sulfur and nitrogen), and the subsequent impacts on human health and ecosystems (see figures generated by GAINS showing estimates of losses in statistical life expectancy estimates under two GHG emissions scenarios. GAINS is now implemented for the whole world, distinguishing 165 regions including 48 European countries and 46 provinces/states in China and India. This web site provide interactive access to the implementations for the following world regions: • Europe (for 48 countries) • Asia, with separate implementations for China (31 provinces and India (15 States) • For Annex I countries of the UNFCCC Convention GAINS is used for policy analyses under the Convention on Long-range Transboundary Air Pollution (CLRTAP), e.g., for the revision of the Gothenburg Protocol, and by the European Commission for the EU Thematic Strategy on Air Pollution and the air policy review. Scientists in many nations use GAINS as a tool to assess emission reduction potentials in their regions. For the negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), a special

	version of GAINS has been developed to compare greenhouse gas mitigation efforts among the Annex-I countries.
Key Stakeholders and Involvement	• Countries and Organisations provide historical data • Policy Makers are able to perform simulations
Supportive Technologies	• Visualisation
Funding Source	Own Funding/EC Co funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Policy Makers
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Greenhouse Effect, Air pollution, emissions, simulation
Social Media Readiness	Unknown
Social Media Interfaces	None

C9. GLeaM

GENERAL INFORMATION	
Acronym	GLEaM
Title	Global Epidemic And Mobility Model
Link	http://www.gleamviz.org/
Country/Region/City	Global
Contact Point	info@gleamviz.org
CASE DESCRIPTION	
Type of Case	Simulation Tool
Topic	Global Epidemic
Sector	Health
Reach	International
Start Date	2009
End Date	-
Description Abstract	As the growing worldwide population becomes more mobile and urbanized, the risks that infectious diseases epidemic and their associated threats may reach global proportions are constantly increasing. To effectively limit the social and economic damage caused by infectious diseases, the public health communities need to be in the position to anticipate the spatial and temporal evolution of epidemics and evaluate the potential impact of available containment and prevention strategies. The global epidemic and mobility model, GLEAM, combines real-world data on populations and human mobility with elaborate stochastic models of disease transmission to deliver analytic and forecasting power to address the challenges faced in developing intervention strategies that minimize the impact of potentially devastating

	epidemics.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Model Validation
	  ○ Immersive Simulation
	  ○ Output Analysis and Knowledge Synthesis

Innovative policy elements of the case	The combination of real data on population and human mobility allows realistic forecasting regarding the spread of global diseases.
Innovative technological elements of the case	The GLEAMviz Client and the Visualisations engine used tha support visualisation of simulated results.
Motivator	Private Motivation
CASE IMPLEMENTATION	
Implementation Approach - Deployment	GLEAM is based on a multidisciplinary approach that combines mathematical modeling and computational science with real-world data and sophisticated interface design. Elaborate stochastic infectious disease models to supports a wide range of epidemiological studies are used, covering different types of infections and intervention scenarios. Real-world data on population and mobility networks are used and integrate those in structured spatial epidemic models to generate data driven simulations of the worldwide spread of infectious diseases. GLEAM runs on high performance computers to create in-silico experiments that would be hardly feasible in real systems and to guide our understanding of typical non-linear behavior and tipping points of epidemic phenomena. A suite of computational tools is provided to help modeling the spread of a disease, understanding observed epidemic patterns, studying the effectiveness of different intervention strategies. The tools are available to researchers, health-care professionals and policy makers.
Key Stakeholders and Involvement	Various stakeholders are able to utilise GLEAM for forecasting the spread of epidemics
Supportive Technologies	• Simulation • Visualisation • Process Modeling • Data modeling
Funding Source	Own Funding
Commitment	One-off effort
IMPACT INFORMATION	
Target Users	Public Bodies/Health Organisations
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	

Relative Keywords	Simulation, Epidemic, Public Health
Social Media Readiness	Unknown
Social Media Interfaces	None

C10. Inflation Island

GENERAL INFORMATION	
Acronym	Inflation Island
Title	Inflation Island - How inflation affects the economy
Link	http://www.ecb.europa.eu/ecb/educational/inflationisland/html/index.en.html
Country/Region/City	Europe
Contact Point	European Central Bank education@ecb.europa.eu
CASE DESCRIPTION	
Type of Case	European Training Initiative
Topic	Serious Game
Sector	Finance
Reach	International
Start Date	2011
End Date	-
Description Abstract	The Inflation Island allows the public to explore the different areas included, see how people react to inflation and deflation, and how the scenery changes. It also allows the users to test their knowledge and try to identify the different inflation scenarios.
Status	Ongoing
Languages Supported	EU Languages
Policy Making Cycle Stage	• Agenda Setting • Implementation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Immersive Simulation
	• Data Powered Collaborative Governance
	  ○ Serious Gaming for Behavioural Change

Innovative policy elements of the case	Users can simulate and see (even from a mobile device) how their decisions on the monetary policy affect the European economy.
Innovative technological elements of the case	Simulation and visualization mechanism Background modeling and data analysis
Motivator	European Central Bank
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The “Inflation Island” is deployed as a web flash application residing in the European Central bank website, alongside with other tools and games for educational purposes. From this infrastructure the game is available to any interested party.
Key Stakeholders and Involvement	• Citizens-Serious game users • European Central Bank-Serious game creator
Supportive Technologies	• Simulation • Process Modeling • Data modeling

Funding Source	European Central Bank
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	EU Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	ECT, Economy, Inflation, Game
Social Media Readiness	Unknown
Social Media Interfaces	None

C11. In the Air

GENERAL INFORMATION	
Acronym	In the Air
Title	In the Air
Link	http://www.intheair.es/
Country/Region/City	Spain
Contact Point	info@intheair.es
CASE DESCRIPTION	
Type of Case	Private Initiative
Topic	Air Pollution
Sector	Environment
Reach	National
Start Date	N/A
End Date	N/A
Description Abstract	In the Air is a visualization project which aims to make visible the microscopic and invisible agents of Madrid´s air (gases, particles, pollen, diseases, etc), to see how they perform, react and interact with the rest of the city.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Easy Access to Information and Knowledge Creation
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance
	  ○ Visual Analytics
	  ○ Participatory Sensing

Innovative policy elements of the case	N/A
Innovative technological elements of the case	User-friendly visualization on real time data
Motivator	Private Initiative
CASE IMPLEMENTATION	

Implementation Approach - Deployment	The visualization tool is a web-based dynamic model which builds up the space the components generate, where through data crossing behavior patterns emerge. The results of these data feed a physical prototype of what we have called a "diffuse façade", a massive indicator of the air´s components through a changing cloud, blurring architecture with the atmosphere it has invaded and mediating the activity of the participants it envelops.
Key Stakeholders and Involvement	Citizens-Platform users
Supportive Technologies	Visualisation
Funding Source	Own Funding
Commitment	One-off effort
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Air pollution, Visualisation, Spain
Social Media Readiness	Unknown
Social Media Interfaces	None

C12. Lisbon City Hall - Participatory Budgeting

GENERAL INFORMATION	
Acronym	Lisbon City Hall - Participatory Budgeting
Title	Lisbon City Hall - Participatory Budgeting
Link	http://www.cm-lisboa.pt/op/
Country/Region/City	Lisbon, Portugal
Contact Point	http://www.cm-lisboa.pt/op/?idc=84
CASE DESCRIPTION	
Type of Case	Public Administration Initiative
Topic	Municipal Budgeting
Sector	Finance
Reach	Local
Start Date	01/03/2011
End Date	30/04/2012
Description Abstract	The Participatory Budgeting (PB) aims to contribute to the exercise of an intervention informed, active and responsible citizens in local governance processes, ensuring the participation of citizens in the decision on the allocation of resources to the municipal public policies and thus make the executive municipal correspond to the real needs and aspirations of the population.
Status	Terminated
Languages Supported	Portuguese
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data-powered Collaborative Governance ○ Collaborative Governance
Innovative policy elements of the case	Direct involvement of citizens in the municipal budgeting
Innovative technological elements of the case	N/A
Motivator	Municipality
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The stage of submitting proposals to the city of Lisbon, under the OP 2011, begins today, March 1, and runs until the 30th April. During these two months, citizens can make their bids online through the new portal participation Lisbon, or in person, the Shareholder Meetings which will take place almost everywhere in the city. From May 1, it is for municipal services the assessment of all proposals submitted, transforming that meet the standards for participation in projects. Later, it will be open for a period complaint and answer, before the phase of voting. Throughout the month of September, citizens are asked to vote on the project of your choice, either by voting online or through the Assemblies of voting. In October projects are announced and are top rated in the budget and business plan for the municipal year 2012.
Key Stakeholders and Involvement	Citizens making bids and proposals to the public administration regarding public spending
Supportive Technologies	• eParticipation Tools • Deliberation Platforms
Funding Source	Municipal
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	~1.100 contributions
Availability of Results / Impact Assessment Study	http://www.lisboaparticipa.pt/pages/orcamentoparticipativo.php
Maturity	Decline
OTHER INFORMATION	
Relative Keywords	Participatory Budgeting, Lisbon, Public Deliberation
Social Media Readiness	Unknown
Social Media Interfaces	None

C13. LocalEyes

GENERAL INFORMATION	
Acronym	LocalEyes
Title	LocalEyes
Link	http://www.localeyes.org/
Country/Region/City	UK

Contact Point	http://blog.vocaleyes.org/contact-us/
CASE DESCRIPTION	
Type of Case	Social Network
Topic	Any
Sector	Any
Reach	National
Start Date	07/2007
End Date	-
Description Abstract	A consultation tool that: 1) enables a dialogue between the local community, district & county councils and their residents, engaging local people in the decision making processes, 2) enables a community to be self organising, identifying areas of common interest and demand for services. Localeyes also deploys a local social network, based around our geographical community and postcode that highlights all the activity in our area, from social groups, their events, local people, their skills, interests, products, journeys.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	• Agenda Setting • Design
CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data-powered Collaborative Governance ○ Collaborative Governance
Innovative policy elements of the case	New social network of citizens of Lisbon Concept of self-organising community
Innovative technological elements of the case	N/A
Motivator	Private Initiative
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The project has a relatively small core team and is promoted on the ground by "regional coordinators" and "community builders". The latest internet technologies are provided to social groups and a taskforce of “Community Builders”, funded by local business sponsorship is build to help social groups in their capacity building journey. Local “Community Chests” are created also, again financed by local business sponsorship, that will provide seed funding for local projects where the demand has been identified by the “eVOICE”, (the LocalEyes community consultation tool).
Key Stakeholders and Involvement	• Citizens-Participate • Social Groups-Participate
Supportive Technologies	• Social media • Opinion Mining • Deliberation Platforms
Funding Source	• Own Funding • Crowdfunding
Commitment	Embedded in long term-strategy

IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	More than 10.000 interactions (ideas being suggested & rated, comments, replies (not hits))
Availability of Results / Impact Assessment Study	http://blog.vocaleyes.org/case-studies/
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Social Network, Self-organisation, Community Building, Consultation
Social Media Readiness	Own social network(s)
Social Media Interfaces	One to Three

C14. Madrid-p

GENERAL INFORMATION	
Acronym	Madrid-p
Title	Madrid Participa
Link	http://www.madridparticipa.es/
Country/Region/City	Madrid
Contact Point	Carlos GonzÃ¡lez Esteban Madrid City Council, Spain
CASE DESCRIPTION	
Type of Case	Governmental Initiative
Topic	eParticipation/eVoting
Sector	Any
Reach	Local
Start Date	01/2004
End Date	-
Description Abstract	The Madrid Participa project is a highly efficient instrument used to increase citizen participation in the decision-making process in the city of Madrid, offering a more dynamic and continuous dialogue between political representatives and citizens. When compared to traditional citizen consultations, the Madrid Participa approach of using secure eVoting technology in parallel with the paper channel enables Madrid City Council to carry out more convenient and user-friendly consultations while avoiding the costs of a traditional vote. To date, the eConsultations platform implemented has been used regularly in 22 citizen consultations involving more than 3.5 million citizens.
Status	Ongoing
Languages Supported	Spanish
Policy Making Cycle Stage	• Agenda Setting • Design • Monitor and Evaluation
CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data-powered Collaborative Governance ○ Collaborative Governance
Innovative policy	N/A

elements of the case	
Innovative technological elements of the case	N/A
Motivator	Municipality
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The main manager of Madrid Participa project is the Directorate of Citizen Participation (DCP) of the City Council of Madrid, with the technical support of the Directorate of Innovation and Technology (DIT). The DCP has been in charge of promoting internally the usage of e-participation tools among the rest of units in the Council (district boards and other directorates), managing the neighborhood associations and taking care of the sociological aspects, while the DIT has been responsible of assessing and selecting the required e-consultations tool, interact with the technological partners, and taking care of all the technological issues. Also, in each e-consultation there are one or more "political sponsors", that is, the District boards or Council directorates that detect the need to carry out an e-consultation.
Key Stakeholders and Involvement	• Citizens-Vote and discuss • Decision Makers-receive and use feedback
Supportive Technologies	• eVoting Tools • Deliberation Platforms
Funding Source	• Municipality • Donations
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	22 citizen consultations involving more than 3.5 million citizens
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	eVoting, Public Dialogue, Madrid
Social Media Readiness	Unknown
Social Media Interfaces	None

C15. Maryland Budget Map Game

GENERAL INFORMATION	
Acronym	Maryland Budget Map Game
Title	Maryland Budget Map Game
Link	http://iat.ubalt.edu/MDBudgetGame/
Country/Region/City	Maryland
Contact Point	1500 Union Ave, Suite 2500, Baltimore, MD 21211 Phone: (410) 727-6367 (x2317) E-mail: mbtpi@mdnonprofit.org
CASE DESCRIPTION	

Type of Case	Governmental Initiative
Topic	State Budget
Sector	Finance
Reach	Regional
Start Date	01/07/2010
End Date	-
Description Abstract	This game tries to resemble the policy options are that face the Administration and General Assembly of a state face and the simulation tool offered aims to explain how budgeting decisions are made. The game gives the options to make cost-cutting decisions, weight revenue options, and consider short-term and long-term budget effects — and it's all placed right in the middle of Maryland's own fiscal dilemma.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Easy Access to Information and Knowledge Creation
	• Data-powered Collaborative Governance
	  ○ Collaborative Governance
	  ○ Serious Gaming for Behavioural Change

Innovative policy elements of the case	Citizens allowed to deal with the actual budget numbers
Innovative technological elements of the case	N/A
Motivator	Government
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The user (citizen) must prepare a balanced budget for the state. There is a projected deficit of at least 1.7 billion dollars for fiscal year 2011, which begins July 1, 2010. In each policy area (like higher education, revenues, or general government) the user can choose different budget options. There are advisors he can consult for more information and factors to consider.
Key Stakeholders and Involvement	Citizens act as policy makers and decide on the budget
Supportive Technologies	Serious Gaming
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Serious Game, Simulation, Budget, Maryland
Social Media Readiness	Unknown
Social Media Interfaces	None

C16. MEL-C

GENERAL INFORMATION	
Acronym	MEL-C
Title	A Modelling Tool to Improve the Policy Response on Issues Concerning Children and Young People
Link	http://www.arts.auckland.ac.nz/uoa/a-modelling-tool-to-improve-the-policy-response-on-issues-concerning-children-and-young-people
Country/Region/City	New Zealand
Contact Point	Dr Gerry Cotterell – g.cotterell@auckland.ac.nz Dr Barry Milne – b.milne@auckland.ac.nz
CASE DESCRIPTION	
Type of Case	Project
Topic	Issues concerning children and young people
Sector	Health, Lifestyle, Labour, etc
Reach	National
Start Date	2010
End Date	-
Description Abstract	The aim of the project is to construct a computer-based simulation model as a decision-support tool for policy-making in the early life course. This entails building a model with micro-level data derived from existing longitudinal studies to quantify, for policy purposes, the underlying drivers and determinants of progress in the early life course. The application software will be available to policy makers and researchers via a desktop and/or web-based interface, and will enable end-users to ask "what if" questions across a range of social policy areas. The tool will be flexible so that it can be adapted for new data and parameter inputs. The project eveloped a model of early child development in New Zealand. Predictors of important childhood transitions are derived by analysing New Zealand child cohort studies to create a micro-simulation model of the first thirteen years of children's lives. The MEL-C model involves simulation of various aspects of children's lives from birth to age 13.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Systems of Atomized Models
	  ○ Model Validation
	  ○ Immersive Simulation

Innovative policy elements of the case	Design and deployment of the MEL-C Model Scenarios simulation
Innovative technological elements of the case	N/A
Motivator	Government
CASE IMPLEMENTATION	

Implementation Approach - Deployment	To date the project has focussed on simulation of three outcomes: health service use (general practitioner visits, hospital admissions and hospital outpatient attendances from ages 0-10), early literacy (reading ability from ages 8-13), and antisocial behaviour (conduct problems from ages 6-10). Potential predictors of these outcomes that have been modelled include: demographic characteristics (gender, ethnicity), family characteristics (family structure, family size, parental education, parental employment, parental socio-economic status, parental smoking and drinking, home ownership and type, welfare receipt, parental emotional responsiveness, parental punishment), pre- and peri-natal influences (smoking and drinking in pregnancy, birth weight, gestational age, breastfeeding), and early childcare attendance. To enable policy makers and other interested parties to easily modify and test the impact of influential factors in the life-course model, a software application has been developed that acts as a 'window' into the micro-simulation model. This application was programmed in JAVA and R with a graphical user interface called JAMSIM. Using JAMSIM for the MEL-C model, users have the ability to: (i) view parameter descriptives and distributions for 'base' scenarios (i.e., where no parameters had been changed); (ii) change parameters in flexible ways, including: (a) changing the proportion of individuals in categories of a discrete variable; (b) changing the values of a continuous variable for individuals; and (c) changing a parameter at one point in time or at many different points in time; and view the results of scenarios and to compare the results of two or more different scenarios. To ensure the usability of the MEL-C modelling software for policy makers, both the micro-simulation model and the software that supports it have been developed in collaboration with policy makers. To this end four New Zealand government ministries – Health, Education, Justice, and Social Development – have formed an end-users group for the project. This group has four main roles: (i) to provide input into the developmental work of the modelling tool to ensure, once completed, the modelling tool will meet the needs of potential end-users; (ii) to provide advice about social policies of particular interest to the government agencies represented by the policy reference group so that realistic and useful policy scenarios can be modelled; (iii) to facilitate the testing of the modelling tool within respective policy reference group members' own government agencies, to assist with optimisation and completion of the modelling tool; and (iv) champion the modelling tool's implementation and use in government agencies.
Key Stakeholders and Involvement	Decision Makers design the various models and then perform simulations and perform Simulation
Supportive Technologies	• Simulation Software • java UI Frntend
Funding Source	Ministry of Science and Innovation
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Policy Makers

Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Youth, Child Policies, Children, Simulation
Social Media Readiness	Unknown
Social Media Interfaces	None

C17. Meieraha

GENERAL INFORMATION	
Acronym	meieraha
Title	Estonian State Budget
Link	http://meieraha.eu/?lang=en&page=main
Country/Region/City	Estonia
Contact Point	Hille Hinsberg Phone: +372 56 473 193 E-mail: hille@]praxis.ee
CASE DESCRIPTION	
Type of Case	Governmental Initiative
Topic	Country Budget
Sector	Finance
Reach	National
Start Date	2011
End Date	-
Description Abstract	Annual state budget is a complicated thing. The official Budget Bill is made up of long tables that do little to explain how the taxpayers' money is spent. Meie Raha — Estonian for "Our Money" — shows major income and expenditure articles at a glance, structured by government functions.
Status	Ongoing
Languages Supported	• Estonian • English
Policy Making Cycle Stage	Implementation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	• Data-powered Collaborative Governance
	  ○ Opinion Minings and Sentiment Analysis
	  ○ Visual Analytics
	  ○ Collaborative Governance

Innovative policy elements of the case	• Available budget numbers • Relation between income and expenditure
Innovative technological elements of the case	N/A
Motivator	Government
CASE IMPLEMENTATION	

Implementation Approach - Deployment	The visualization shows two sides of the equation — income (mostly taxes) and expenditure by category. The size of bubbles is proportional to the size of budget items. This simple visual helps to compare the sums. One can click on a bubble to see cost articles within each budget heading. Or try dragging the outline of a bubble to see how manipulating different sums results in the balance of the budget. Ideally, every budget needs to be balanced, so the changes you make on the spending sides should be balanced on the income side!
Key Stakeholders and Involvement	Citizens-Make decisions on budget and see the impact
Supportive Technologies	Open Data Visualisation
Funding Source	Governmental
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Traction
OTHER INFORMATION	
Relative Keywords	Budget, Visualisation, Estonia
Social Media Readiness	Publishing policies in social media
Social Media Interfaces	One to Three

C18. OpenGov.gr

GENERAL INFORMATION	
Acronym	OpenGov.gr
Title	OpenGov.gr
Link	http://www.opengov.gr/home/
Country/Region/City	Greece
Contact Point	https://apps.gov.gr/opengov/contact/
CASE DESCRIPTION	
Type of Case	Initiative
Topic	Country Legislation
Sector	Any
Reach	National
Start Date	10/2009
End Date	-
Description Abstract	Opengov.gr has been designed to serve the principles of transparency, deliberation, collaboration and accountability and includes three initiatives: • Ïpen calls for the recruitment of public administration officials • Electronic deliberation • Labs OpenGov
Status	Ongoing

Languages Supported	Greek, English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	• Data-powered Collaborative Governance
	  ○ Open Governmental Data
	  ○ Collaborative Governance

Innovative policy elements of the case	Open dialogue on every issue regarding the Greek governmental procedures
Innovative technological elements of the case	N/A
Motivator	Government
CASE IMPLEMENTATION	
Implementation Approach - Deployment	Opengov.gr operates in three different axis: • Ïpen calls for the recruitment of public administration officials. Top level and mid-level openings in the public sector are available on the Internet. Applications are submitted on-line using a platform available on the opengov.gr website. Electronic deliberation. Almost every piece of draft legislation or even policy initiative by the government, are posted in a blog like platform prior to their submission to parliament. Citizens and organisations can post their comments, suggestions and criticisms article-by-article. Labs OpenGov. An open innovation initiative that brings together ideas and proposals from citizens, the public and the private sectors. Labs.OpenGov.gr attempts to release the power of decentralised knowledge and explore new ways to tackle modern public administration problems.
Key Stakeholders and Involvement	OpenGov.gr represents an initiative of the Greek Ministry of Administrative Reform and E-Governance, National Centre for Public Administration and Local Government. Citizens are engaged to discuss, provide comments and proposals
Supportive Technologies	• Opinion Mining • Deliberation Platforms
Funding Source	Governmental Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	239 deliberations/76.601 comments/140 calls/2.010 positions/38.866 applications
Availability of Results / Impact Assessment Study	http://www.opengov.gr/home/
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	eGovernment, Open Government, Greece
Social Media Readiness	Publishing policies in social media
Social Media Interfaces	One to Three

C19. Opinion Space 3.0

GENERAL INFORMATION	
Acronym	Opinion Space 3.0
Title	Opinion Space
Link	http://www.state.gov/opinionspace/
Country/Region/City	U.S.A.
Contact Point	U.S. Department of State, 2201 C Street NW, Washington, DC 20520 opinion.space.support@gmail.com
CASE DESCRIPTION	
Type of Case	Governmental Initiative
Topic	Various
Sector	Foreign affairs, Global policies
Reach	National
Start Date	2010
End Date	-
Description Abstract	Launched by the U.S. Department of State and hosted on State.gov, "Opinion Space" bridges the worlds of politics and social media in an interactive visualization forum, where users can engage in open dialog on foreign affairs and global policies. It is designed to move beyond the usual left-right linear spectrum to display 'constellations' of opinions. Opinion Space invites anyone from around the world to contribute to the discussion and evaluate the responses of others. The position of each participant on the map is based on similarity of opinion.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	• Agenda Setting • Design • Monitor and Evaluation

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Easy Access to Information and Knowledge Creation
	  ○ Output Analysis and Knowledge Synthesis
	• Data-powered Collaborative Governance
	  ○ Opinion Mining and Sentiment Analysis
	  ○ Visual Analytics

Innovative policy elements of the case	Opinion Space harnesses the power of connection technologies to provide a unique forum for international dialogue. It is designed to 'depolarize' discussions by including all participants on a level playing field.
Innovative technological elements of the case	"Opinion Space" is a new social media technology designed to help communities generate and exchange ideas about important issues and policies. It is a self-organizing system that uses an intuitive graphical "map" that displays patterns, trends, and insights as they emerge and employs the wisdom of crowds to identify and highlight the most insightful ideas. The system uses a game model that incorporates techniques from deliberative polling, collaborative filtering, and multidimensional visualization.

	Version 3.0 of Opinion Space has a completely redesigned and streamlined interface with improved splash page, colors, fonts, more intuitive welcome process, registration, user experience, animated point and score displays, and enhanced response reputation metrics.
Motivator	Government
CASE IMPLEMENTATION	
Implementation Approach - Deployment	Developed at UC Berkeley, a version of Opinion Space is being used by the U.S. State Department, where it has attracted thousands of participants from around the world to organize, visualize, and analyze constructive suggestions on foreign policy. It invites users to share their perspectives and ideas on U.S. foreign policy in an innovative visual "opinion map" that will illustrate which ideas result in the most discussion and which ideas are judged most insightful by the community of participants
Key Stakeholders and Involvement	Opinion Space helps policy makers: • Understand the diversity of their communities. • Solicit feedback and creative suggestions on specific topics. • Rapidly identify the most insightful ideas and suggestions. • Increase satisfaction and engagement with their communities. Opinion Space helps citizens: • Visualize their relationships to other people. • Express thoughtful ideas and suggestions about emerging issues. • Engage in friendly competition with other people. • Learn and gain insights from other people.
Supportive Technologies	• Principal Component Analysis (PCA) • Argument Visualisation • Opinion mining
Funding Source	Government
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	More than 16,200 opinions have been collected on the site in less than a month in 2010.
Availability of Results / Impact Assessment Study	http://www.state.gov/opinionspace/
Maturity	Hyper-growth
OTHER INFORMATION	
Relative Keywords	Opinion, Visualisation, Argumentation
Social Media Readiness	Unknown
Social Media Interfaces	None

C20. UrbanSim - Salt Lake City Utah

GENERAL INFORMATION	
Acronym	Salt Lake City Utah - UrbanSim
Title	Salt Lake City Utah - UrbanSim
Link	http://www.urbansim.org/Community/SaltLakeCityUtah

Country/Region/City	Utah, US
Contact Point	Scott Festin, 295 N. Jimmy Doolittle Road, Salt Lake City, UT 84116 wfrc@wfrc.org
CASE DESCRIPTION	
Type of Case	Joint project with the State of Utah Governor's Office of Planning and Budget, Mountainland Association of Governments, and Envision Utah.
Topic	Socioeconomic Issues in Transportation
Sector	Transport
Reach	Regional
Start Date	1997
End Date	-
Description Abstract	The Wasatch Front Regional Council has used UrbanSim to generate socioeconomic forecasts for the two most recent Regional Transportation Plans in 2007 and in 2011 during the Wasatch Choices 2040 Visioning effort.. UrbanSim is a large scale land use and transportation simulator that models the possible long-term effects of different policies on urban regions. The output is presented using indicators, which are variables that convey information on significant aspects of the simulation results. Currently an upgrade of the exiting UrbanSim model to a zone-level OPUS model is under execution.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Systems of Atomized Models
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance
	  ○ Big Data
	  ○ Visual Analytics

Innovative policy elements of the case	UrbanSim is designed to support metropolitan planning and policy analysis in a more scientifically rigorous manner than the land-use model previously used by the Wasatch Front Regional Council, with land-use forecasts being influenced by the proposed transportation system. By integrating UrbanSim with the regional travel models, a range of land use and transportation policy interventions can be combined into policy scenarios and the systematic effects of these scenarios can be explored on urban development outcomes and the quality of the transportation system.
Innovative technological elements of the case	Three software tools (GIS, UrbanSim, and Travel Model) are used concurrently and pass information back and forth to each other - for example, GIS layers as modified were provided to UrbanSim, which in turn could modify the layer and port it back into the GIS as a new layer depicting a specific urban scenario. This flexible technology package, while not unique to this planning effort – it actually is fairly common – allows planners the ability to model future land use patterns and populations, create a travel model for the future community, and depict the results in tables and maps. Thus, alternative solutions can be created and evaluated during the selection process.

	In particular, UrbanSim is a software-based demographic and employment modeling tool for integrated planning and analysis of urban development, incorporating the interactions between land use, transportation, environment, economy and public policy with demographic information. It simulates in a 3D environment the choices of individual households, businesses, and parcel landowners and developers, interacting in urban real estate markets and connected by a multi-modal transportation system. This approach works with individual agents as is done in agent-based modeling, and with very small cells as in the cellular automata approach, or even buildings and parcels. But it differs from these approaches by drawing together choice theory, a simulation of real estate markets, and statistical methods to estimate model parameters and to calibrate uncertainty in the model system.
Motivator	Regional Council
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The Wasatch Front Regional Council has developed and tested the UrbanSim land use modeling system for the Greater Salt Lake Region of Utah. The UrbanSim model is integrated with the regional travel models, and this integrated model system is an advanced analytical framework used to help develop long-range land use forecasts and to evaluate land-use and transportation scenarios in the Regional Transportation Planning process. It was recently applied during the Wasatch Choices 2040 Visioning effort. During the implementation, several challenges were faced: Data needs, Model estimation, Transportation accessibility feedback, and Model validation. UrbanSim has generally become a standard tool for metropolitan land use and transportation planning, and is currently used, or is in the process of implementation, for the simulation of numerous metropolitan areas in the United States and Europe; for example, in the U.S. by Detroit (MI), Durham (NC), Honolulu (HI), Houston (TX), Phoenix (AZ), Salt Lake City (UT), San Francisco (CA), Seattle (WA), and in Europe by Amsterdam, Brussels, Lyon, Paris, Rome, Tel Aviv, Turin, and Zurich. It is intended for use by Metropolitan Planning Organizations (MPOs), cities, counties, non-governmental organizations, researchers and students interested in exploring the effects of infrastructure and policy choices on community outcomes such as motorized and non-motorized accessibility, housing affordability, greenhouse gas emissions, and the protection of open space and environmentally sensitive habitats.
Key Stakeholders and Involvement	Public Organisations – Create Simulation Environment All other Stakeholders – Perform Simulations
Supportive Technologies	Simulation Engine 3D modelling Visualisation Engine
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Policy Makers

Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	There were several unique innovations used in the process: • The high amount of public involvement, led to a tremendous amount of public comments, which were individually addressed throughout the process. • The utilization of UrbanSim early in the process, was a unique feature that allowed consideration of land use principles before determination of transportation needs. • The development and use of a scoring method to prioritize projects was a unique feature of the solutions screening process. The WFRC weighted the various metrics according to regional standards which when applied to the project solutions, generated the final list of prioritized projects. • Finally, the sheer amount of data considered at this early stage of a project was a true innovation, compared to traditional planning studies. As shown in the metrics/measures section of this document, there were numerous detailed metrics for which the solutions were evaluated against. This level of detail in a regional planning effort is something unique to this process and generated solutions that were well supported with real data.
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Urban Simulation, Simulation, Visualisation
Social Media Readiness	Unknown
Social Media Interfaces	None

C21. The Icelandic Constitution Case

GENERAL INFORMATION	
Acronym	The Icelandic Constitution Case
Title	Crowdsourcing Through Social Media-The Icelandic Constitution Case
Link	http://stjornlagarad.is
Country/Region/City	Iceland
Contact Point	-
CASE DESCRIPTION	
Type of Case	Governmental Initiative
Topic	Country's Policy Formation
Sector	Legislation
Reach	National
Start Date	2009
End Date	2010
Description Abstract	After parliamentary discussions the former Minister of Social Affairs and Social Security, Jóhanna Sigurðardóttir of the Social Democratic Alliance, was chosen as the new Prime Minister. On 4 November 2009 the Prime Minister submitted a bill to the Parliament about an advisory Constitutional Assembly with the task to review the constitution. Differently from the existing constitution ratified in 1944

	without any input from the population, Iceland decided to crowd-source its new constitution to its citizens through social media. In fact, since from the beginning of the process, the Constitutional Council has made possible for the public to send messages which are published on the Council's website in order to foster a lively discussion. Thereby, every citizen had the opportunity to take part to the drafting of the constitution. The work of the Constitutional Council is also publicly available on social media such as Facebook, YouTube and Flickr.
Status	Terminated
Languages Supported	Icelandic
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Model Validation
	• Data-powered Collaborative Governance
	  ○ Collaborative Governance
	  ○ Participatory Sensing

Innovative policy elements of the case	Citizens directly engaged in the formation of the constitution
Innovative technological elements of the case	-
Motivator	Government
CASE IMPLEMENTATION	
Implementation Approach - Deployment	Interviews with delegates can be watched on YouTube and Facebook and every Thursday at 13:00 there was live broadcast from the Constitutional Council meetings on the webpage and on Facebook, so that the public could keep track of the discussion and give feedback and contributions. The new constitution has been drafted and awaits ratification by Althingi, which is the supreme legislation body of the nation. After the ratification the constitution is to be proposed to the general population for approval by the mean of a binding referendum. The new constitution will include checks and responsibilities for parliament, strict separation of powers and many other rules intended to prevent a repeat of the financial crisis, alongside changes in the election and appointment systems of ministers of parliament are elected and judges. The Constitutional Council, comprised of 25 delegates, had the task to discuss the Constitutional Committee Report and to prepare a bill for the revised constitution, building on the results of the National Forum 2010 and the former constitution. The National Forum 2010 was an assembly of 950 random participants organized in subcommisions, which presented a 700 page document providing the basis for constitutional changes. The Council, whose members were elected amongst 522 ordinary candidates (including lawyers, political science professors, journalists, and many other professions), had three to four months to decide which parts of the old constitution to amend and which new provisions or chapters to add.
Key Stakeholders and Involvement	Citizens-Directly propose ideas and solutions
Supportive Technologies	• Social media • Deliberation Platforms

Funding Source	Governmental
Commitment	One-off effort
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Direct Democracy, Iceland, Crisis, Social Media
Social Media Readiness	Gathering feedback from social media
Social Media Interfaces	One to Three

C22. 2050 Pathways Analysis

GENERAL INFORMATION	
Acronym	2050 Pathways Analysis
Title	2050 Pathways Analysis
Link	http://www.decc.gov.uk/en/content/cms/tackling/2050/2050.aspx
Country/Region/City	UK Department of Energy & Climate Change
Contact Point	2050 Team: 2050pathways@decc.gsi.gov.uk
CASE DESCRIPTION	
Type of Case	Initiative
Topic	Climate Change, Energy demand and supply, Greenhouse gas emissions for the UK
Sector	Environment
Reach	National
Start Date	2010
End Date	-
Description Abstract	The 2050 Pathways Calculator allows users to play as if they acted as the Energy and Climate Change Minister and explore the complex choices and trade-offs which UK will have to make to reach our 80 per cent emission reduction targets by 2050, while matching energy demand and supply. It is system-wide, covering all parts of the economy and all greenhouse gases emissions released in the UK. It is rooted in scientific and engineering realities, looking at what is thought to be physically and technically possible in each sector. Different ways of securing a low-carbon future for the UK can be tried out: • By creating each user's own pathway using the 2050 Web Tool. • By exploring what a low-carbon UK might look like in 2050 by playing the simplified My2050 simulation. • By taking the debate into the classroom in the schools toolkit.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design
CROSSOVER Roadmap	• Policy Modelling

Research Challenge Group/Research Challenges	○ Collaborative Modelling ○ Immersive Simulation ○ Output Analysis and Knowledge Synthesis • Data-powered Collaborative Governance ○ Serious Gaming for Behavioural Change ○ Collaborative Governance
Innovative policy elements of the case	In the 2050 Calculator, the UK has developed an interactive simple to communicate tool that allows experts and non-experts alike to develop their own combination of change in different technologies and sectors of the economy to explore different energy and emissions scenarios out to 2050. The distinguishing features of the UK 2050 Calculator are that it is: • Simple and user friendly: the tool can be used by a wide range of people, with no modelling expertise necessary. The 2050 Calculator is built in Excel, but there is a user friendly "web tool" for pathway design. The web tool includes visualisations of the implications of a pathway for energy supply, demand, landscape, a "sankey" energy flow diagram, costs, and air quality. A "My2050 simulation" was also created for use as an educational tool in schools. • User driven: the user determines the pathway by specifying how much of each technology is in place by 2050. • Comprehensive: there is huge uncertainty about future technology and behaviour. So every option in the Calculator has four effort levels, representing the minimum and maximum that experts believe possible. • Open: all assumptions, the Excel spreadsheet and documentation are published.
Innovative technological elements of the case	The 2050 Calculator has three levels of complexity: • *My 2050 simulation – for the public*: Visual internet simulation that helps young people to imagine how the energy system will evolve, and the secondary impacts this will have. Users can make decisions about levels of effort in 14 simplified sectors, including both supply and demand, to make decisions about their own version of how their country will meet the energy and emissions challenge by 2050. • *2050 Webtool – for policy makers*: Internet based scenarios model. By varying the level of ambition for change in over 44 technologies and behaviours a policy maker is able to get instant results showing information on energy output, demand and emissions out to 2050. It enables a quick comparison of the consequences and trade-offs of different scenarios. • *Excel spreadsheets - for technicians*: Detailed spreadsheets outlining all the underlying data such as emissions baselines, population and expected economic growth as well as the assumptions used to calculate costs. They are freely available to the public and experts online.
Motivator	Government
CASE IMPLEMENTATION	

Implementation Approach - Deployment	The Calculator has supported policy making in the UK - particularly through the UK Carbon Plan published in December 2011, and also received great feedback from businesses, academics and green groups in the UK. The 2050 Calculator can be readily adapted for use by other countries: China, Belgium and South Korea have already tailored the Calculator for their own use.
Key Stakeholders and Involvement	The UK Department of Energy and Climate Change (DECC) built the 2050 Calculator to help the public engage in the debate, and for Government to ensure that its short- and medium-term planning was consistent with achieving the long-term aim.
Supportive Technologies	• Policy Modelling • Serious Games • Visualisation
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	The 2050 Calculator is targeted at citizens, policy makers, senior officials and politicians as well as technical experts through different interfaces.
Reach (in terms of hits/opinions/etc)	Only between July and November 2010, the 2050 web tool has had more than 40,000 hits with users creating 392,000 possible pathways to 2050.
Availability of Results / Impact Assessment Study	http://2050-calculator-tool.decc.gov.uk/pathways/11111111111111111111111111111111111111111111111/primary_energy_chart
Maturity	Hyper-growth
OTHER INFORMATION	
Relative Keywords	Climate change, My 2025 game, Simulation, 2025 pathways, Energy supply, Energy consumption
Social Media Readiness	Publishing policies in social media
Social Media Interfaces	One to Three

C23. Urgent Evoke

GENERAL INFORMATION	
Acronym	Urgent Evoke
Title	Urgent Evoke – A Crash Course in Changing the World
Link	http://www.urgentevoke.com
Country/Region/City	Global
Contact Point	International Bank for Reconstruction and Development
CASE DESCRIPTION	
Type of Case	Serious Game
Topic	Various Topics
Sector	Various Sectors
Reach	Global
Start Date	2010

End Date	-
Description Abstract	Urgent Evoke was developed by the World Bank Institute, the learning and knowledge arm of the World Bank Group.. The goal of the social network game is to help empower people all over the world to come up with creative solutions to the most urgent social problems.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Data-powered Collaborative Governance
	  ○ Serious Gaming for Behavioural Change
	  ○ Collaborative Governance

Innovative policy elements of the case	The concept behind the game is to use serious Game Scenarios which are presented in the format of story boards and engage citizens in the game by assigning them missions where they have to utilise various Web2.0 tools to spread their opinions and ideas. In such a way, challenging issues are tackled by various people who provide solutions and ideas.
Innovative technological elements of the case	-
Motivator	Banking Institution
CASE IMPLEMENTATION	
Implementation Approach - Deployment	During the a season (until now two seasons have been completed), players were asked to dive deeper into real-world social issues and use that knowledge to create better solutions and use their creativity to envision a better future and human condition, as part of weekly game episodes. The players were encouraged, as part of the game to engage in Web2.0 and social media and share various content regarding their experience with the Evoke community.
Key Stakeholders and Involvement	Citizens elaborate on Storyboard Scenarios which are presented to them and are the ones who propose ideas and solutions towards challenging issues that need to be solved.
Supportive Technologies	• Blogs • Web2.0 tools
Funding Source	Own Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	-
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Evoke, Serious Game, Behavioural Change
Social Media Readiness	Own Social Network
Social Media Interfaces	Three to Five

C24. Vibat London

GENERAL INFORMATION	
Acronym	VIBAT London
Title	Visioning and Backcasting for Transport Policy in London
Link	http://www.vibat.org/vibat_ldn/tcsim.shtml
Country/Region/City	London, UK
Contact Point	Dr Robin Hickman Transport Research Sector, Halcrow Group, London,W6 7BY hickmanro@halcrow.com
CASE DESCRIPTION	
Type of Case	Project
Topic	Transport Policy
Sector	Transport
Reach	Local
Start Date	2007
End Date	2009
Description Abstract	The Vibat London study examines the possibilities of reducing transport emissions in London by 60 per cent to 2030 and 80 per cent to 2050 through a modified backcasting and scenario-building approach. It is a knowledge transfer project funded by UrbanBuzz. It examines a range of policy measures (technological and behavioural), and assesses how they can be effectively combined to achieve these levels of emissions reduction. The intention is to assess whether such ambitious target are feasible, identify the main problems (including the transition costs), and the main decision points over the future time horizons. The objectives of this project are to develop the backcasting approach to transport planning in London from now until 2050.
Status	Terminated
Languages Supported	English
Policy Making Cycle Stage	• Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	  ○ Immersive Simulation
	• Data-powered Collaborative Governance
	  ○ Visual Analytics
	  ○ Serious Gaming for Behavioural Change
	  ○ Collaborative Governance

Innovative policy elements of the case	Proposition of policy packages and pathways based on scenarios developed through backcasting technique
Innovative technological elements of the case	Combination of visual simulation tool, geospatial data, serious game and backcasting functions
Motivator	Policy Makers
CASE IMPLEMENTATION	
Implementation Approach - Deployment	The VIBAT start with a proposition of policy packages that aim to achieve the desired goal. Then the users can use the TC-SIM which is an interactive simulation tool that allows users to make choices about their future lifestyles in order to reduce transport carbon emissions.

	In the simulation the stakeholders are able to make decisions about the packaging of low emission vehicles, alternative fuels, pricing regimes, public transport, walking and cycling, urban planning (strategic and local urban design), ICT developments, "smarter choices" (travel planning and car sharing), ecological driving and lower speeds, freight transport logistics use, long distance travel substitution (air to rail) and air demand reduction. The objective in playing the game is to package the options in a manner that is acceptable to the user, yet reduces carbon emissions in the transport sector. TC-SIM is calibrated to the London situation using data from Transport for London (TfL) and the Greater London Authority (GLA). TC-SIM is web-based and offers an innovative, and potentially very flexible, means of decision-making. It is a non-real-time collaborative experience where several individual users can interact within the same model and establish a dialogue about the decisions being made. The simulation tool is easily adapted to different spatial locations by loading different background material and baseline information, without having to make changes to the rules set. It can be tuned or "pitched" at audiences of different ages or make up. One key outcome is an awareness of how, in particular circumstances, individual choice may lead to community negative outcome, an extreme example of which is the "tragedy of the commons".
Key Stakeholders and Involvement	Citizens or Policy makers take part in the TC-SIM game
Supportive Technologies	• Serious Game • Simulation Tool • Maps
Funding Source	Governmental
Commitment	Embedded in short term-strategy
IMPACT INFORMATION	
Target Users	• Policy Makers • Citizens
Reach (in terms of hits/opinions/etc)	N/A
Availability of Results / Impact Assessment Study	N/A
Maturity	Mature
OTHER INFORMATION	
Relative Keywords	Transport Planning, Commuting
Social Media Readiness	Unknown
Social Media Interfaces	None

C25. YourVoice - IPM

GENERAL INFORMATION	
Acronym	YourVoice - IPM
Title	Your Voice in Europe – Interactive Policy Making

Link	http://joinup.ec.europa.eu/software/ipm/home
Country/Region/City	EU
Contact Point	digit-ipm-oss@ec.europa.eu
CASE DESCRIPTION	
Type of Case	Online Consultations based on IPM Software
Topic	Any
Sector	Any
Reach	EU
Start Date	N/A
End Date	-
Description Abstract	Your Voice in Europe has been set up in the context of the Interactive Policy Making initiative. As part of the Commission's Mini-mum Standards on Consultation, it aims at improving Euro-pean gover-nance and intro-ducing Better Regulation. IPM is a multilingual online questionnaire management system that handles all steps involved in a survey life cycle: design, test, translation, launch, collection of replies, and analysis of results. It is available for free as Open Source Software to administrations, businesses and citizens within the European Union. The objective of the Interactive Policy Making (IPM) initiative is to use modern technologies, particularly the Internet, to allow both Member State administrations and EU institutions to understand the needs of citizens and enterprises better. It is intended to assist policy development by allowing more rapid and targeted responses to emerging issues and problems, improving the assessment of the impact of policies (or the absence of them) and providing greater accountability to citizens. This system has been put in place to facilitate the stakeholders' consultation process by the use of easy-to-use and straightforward online questionnaires, making it easier both for respondents to participate and for policy makers to analyse the results.
Status	Ongoing
Languages Supported	English
Policy Making Cycle Stage	• Agenda Setting • Design

CROSSOVER Roadmap Research Challenge Group/Research Challenges	• Policy Modelling
	  ○ Collaborative Modelling
	• Data-powered Collaborative Governance
	  ○ Collaborative Governance

Innovative policy elements of the case	Public consultations over the web, targeted or restricted stakeholder consultations, panel surveys, satisfaction surveys, event and conference registrations in an EU level
Innovative technological elements of the case	A customisable open-source, web-based application (online survey management system)
Motivator	EU
CASE IMPLEMENTATION	
Implementation Approach - Deployment	IPM is financed by the ISA Programme (formerly IDABC). The Directorate-General for Informatics of the European Commission is responsible for coordinating the development and the user community. The objective of the IPM OSS release is to make it an attractive tool for

	administrations, businesses or private associations that need to conduct surveys in their fields of activity.
Key Stakeholders and Involvement	Decision Makers and NGOs are the ones who design and format the surveys and citizens and other interested stakeholders engage in the consultation processes and discuss the various topics.
Supportive Technologies	• Deliberation platform
Funding Source	EU Funding
Commitment	Embedded in long term-strategy
IMPACT INFORMATION	
Target Users	Citizens/NGOs/Public Administrations/Businesses
Reach (in terms of hits/opinions/etc)	~10.000 users/~1500 news items/~500 groups
Availability of Results / Impact Assessment Study	http://joinup.ec.europa.eu/software/ipm/metrics
Maturity	Decline
OTHER INFORMATION	
Relative Keywords	communications, e-surveys, online consultations, online surveys, statistics, web, web surveys
Social Media Readiness	Unknown
Social Media Interfaces	None

The first phase of analysis has also revealed some interesting findings.

- It seems that there is a plethora of state-of-the art tools and platforms that might be able to support the different stages of the policy making cycle and assist decision makers. However, there is very little evidence of practical applications and real use cases which can prove the usability, impact and appropriateness of such tools in real-life settings.
- As Policy Making 2.0 is a very young field of research and application, many relevant tools and solutions have been developed quite recently, and therefore there is no sufficient evidence of their impact and applicability.
- Many cases retrieved in Policy Making 2.0 are based on old-fashioned eParticipation approaches (such as eVoting, ePetitions, eConsultations), which take advantage of obsolete technologies that have been developed (in the best case) at the beginning of the Web2.0 era.
- There are many research projects funded by the European Commission (under FP7, CIP or other regional, national or international instruments) which are focusing on quite specific aspects of policy making, yet their existence as "experiments" has excluded them from the analysis as their pilot operations do not guarantee sustainability or real use by policy makers.

The outcome of the first phase of the analysis has resulted in the identification of a shortlist of 25 cases, based on various criteria as mentioned in the Methodological section of this report. The following tables depict the relevance of the cases identified to the policy making cycle steps (Table C1) and to the CROSSOVER Research Challenges (Tables C2 and C3).

Stage / Cases	Agenda Setting	Design	Implementation	Monitor and Evaluation
ALERTS	X	X		
A Thousand Visions		X		
Arbeitsmarktmonitor		X		X
C-ROADS		X	X	X
Demos Plan – City of Hamburg		X	X	
Enquete Beteiligung		X		
€CONOMIA	X		X	
GAINS		X		X
155GLEAM		X		
Inflation Island	X		X	
In the Air		X		
Lisbon City Hall/Participatory Budgeting		X		
LocalEyes	X	X		
Madrid-p	X	X		X
Maryland Budget Map Game		X		
Meieraha			X	
MEL-C		X		
OpenGov.gr		X		
Opinion Space 3.0	X	X		X
Salt Lake City Utah – UrbanSim		X		
The Icelandic Constitution Case		X		
2050 Pathways Analysis		X		
Urgent Evoke		X		
Vibat London		X		
Your Voice	X	X		

Table C1 – Classification of Practices along the Stages of the Policy Making Cycle

Research Challenge / Cases	Policy Modelling					
	Systems of Atomized Models	**Collaborative Modelling**	**Easy Access to Information and Knowledge Creation**	**Model Validation**	**Immersive Simulation**	**Output Analysis and Knowledge Synthesis**
ALERTS			X		X	
A Thousand Visions						
Arbeitsmarktmonitor						
C-ROADS	X	X	X	X	X	
Demos Plan – City of Hamburg		X	X			
Enquete Beteiligung		X	X			
€CONOMIA						
GAINS	X				X	X
156GLEAM		X		X	X	X
Inflation Island					X	
In the Air			X		X	
Lisbon City Hall Participatory Budgeting						
LocalEyes						
Madrid-p						
Maryland Budget Map Game			X			
Meieraha		X				
MEL-C	X			X	X	
OpenGov.gr		X				
Opinion Space 3.0		X	X			X
Salt Lake City Utah – UrbanSim	X				X	
The Icelandic Constitution Case				X		
2050 Pathways Analysis		X			X	X
Urgent Evoke						
Vibat London		X			X	
Your Voice		X				

Table C2 - Classification of Practices along the Research Challenges under Policy Modelling

Research Challenge / Cases	Data-powered Collective Governance							
	Big Data	Opinion Mining and Sentiment Analysis	Visual Analytics	Serious Gaming for Behavioural Change	Open Government Data	Collaborative Governance	Participatory Sensing	Identity Management
ALERTS	X		X			X		
A Thousand Visions					X	X		
Arbeitsmarktmonitor			X					
C-ROADS			X					
Demos Plan – City of Hamburg								
Enquete Beteiligung						X		
€CONOMIA				X				
GAINS			X		X			
Gleam								
Inflation Island				X				
In the Air			X				X	
Lisbon City Participatory Budgeting						X		
LocalEyes						X		
Madrid-p						X		
Maryland Budget Map Game				X		X		
Meieraha			X			X		
MEL-C								
OpenGov.gr		X			X	X		
Opinion Space 3.0		X	X					
Salt Lake City Utah – UrbanSim	X		X					
The Icelandic Constitution Case						X		
2050 Pathways Analysis				X		X		
Urgent Evoke				X		X		
Vibat London			X	X		X		
Your Voice						X		

Table C3 – Classification of Practices along the Research Challenges under Data Powered Collaborative Governance

Annex D– List of Complete Set of Cases Initially Identified

The following list includes the initial cases retrieved during the first phase of the research, namely the mapping and identification of promising cases.

Title	Link	Relevance to the Study
€CONOMIA - The Monetary Policy Game	http://www.ecb.europa.eu/ecb/educational/economia/html/index.en.html	High
2050 Pathways Web Tool	http://www.decc.gov.uk/en/content/cms/tackling/2050/calculator_on/calculator_on.aspx	High
A Case Study Of Belfast	http://ulster.academia.edu/GRafferty/Papers/1163289/Collaborative_Governance_and_Conflict_A_Case_study_of_Belfast	Low
A collaborative model in local tax administration	http://www.epractice.eu/en/cases/sumaalicanteawards	Low
A Policy Framework For Investment: Public Governance	http://www.oecd.org/investment/investmentfordevelopment/35489719.pdf	Low
A systematic quantitative backcasting on low-carbon society policy in case of Kyoto city	http://www.sciencedirect.com/science/article/pii/S0040162511000059	Medium
A Thousand Visions	http://www.spokanetransportationvision.com/game1.php	High
ADAM - ADaptation And Mitigation Strategies: supporting European climate policy	http://www.tyndall.ac.uk/adamproject/about	Low
Adelaide 3D City Model	http://www.adelaidecitycouncil.com/development/3d-city-model/	Medium
African Highland Farmer – the Game	http://ypard.net/sites/ypard.net/files/Machteld.%20A.%20Schoolenberg.pdf	Medium
Agro-Ecological Zones (AEZ)	http://webarchive.iiasa.ac.at/Research/LUC/GAEZ/index.htm	Low
Airport Collaborative Decision Making	http://www.euro-cdm.org/	Low
ALERTS (Automated Land change Evaluation, Reporting, and Tracking System)	http://planetaryskin.org/rd-programs/resource-nexus/global-land-change-detection	High

Title	Link	Relevance to the Study
Alpha Daughters	http://www.alphadaughters.com/	Low
Alternative Fueling Station Locator	http://www.afdc.energy.gov/locator/stations/	Low
Alternative Fuels Data Center	http://www.afdc.energy.gov	Low
Amazon Election Heat Map 2012	http://www.amazon.com/gp/election-heatmap	Low
America 2049	http://america2049.com	Medium
Arbeitsmarktmonitor	http://www.arbeitsagentur.de/Navigation/zentral/Servicebereich/Ueber-Uns/Aufgaben/Arbeitsmarktmonitor/Arbeitsmarktmonitor-Nav.html	High
Argument Analysis Wall	http://www.arg.dundee.ac.uk/analysiswall	Low
AsktheEU.org - Make and browse access to information requests	http://www.asktheeu.org/en	Low
Atkläts	http://www.ourservices.eu/atklats.lv	Low
Awards - Osale: the Estonian eParticipation tool	http://www.epractice.eu/en/cases/osaleawards	Medium
Bay Area Alliance for Sustainable Communities	http://www.krila.re.kr/common/filedown.asp?ix=9025	Low
bePart – mobile eParticipation for urban development	http://be-part.info/	Medium
BetterLife	http://www.oecdbetterlifeindex.org	Low
BioFuels Atlas	http://maps.nrel.gov/biomass	Medium
BioPower Atlas	http://maps.nrel.gov/biopower	Medium
Birmingham civic dashboard	http://civicdashboard.org.uk/	Medium
Breda-Morgen	http://www.breda-morgen.nl/index.php	Low
Brighter Planet	http://brighterplanet.com/	Medium
British Foreign & Commonwealth Office online forum	http://www.fco.gov.uk/servlet/Front?pagename=OpenMarket/Xcelerate/ShowPage&c=Page&cid=1183544769804	Medium
Build. Measure. Learn. Lean Startup SXSW	http://www.udemy.com/lean-startup-sxsw-	Low

Title	Link	Relevance to the Study
2012.	2012-videos-and-presentations/	
Building Energy Optimization	http://beopt.nrel.gov	Low
Bürgerhaushalt Köln	http://www.partizipation.at/buergerhaushalt-koeln.html?&no_cache=1	Medium
Bürgerhaushalt Lichtenberg 2013	http://www.buergerhaushalt-lichtenberg.de	Medium
C-ROADS	http://climateinteractive.org/simulations/C-ROADS	High
Carbon Diem	http://www.carbondiem.com	Medium
Catalonia Citizen-Care-Centric approach to eGovernment	http://www.epractice.eu/en/cases/c3cat	Low
CenCell and AlertImpact	http://www.unglobalpulse.org/publicpolicyandcellphonedata	Medium
CEO2 Climate Business Game	http://knowledge.allianz.com/ceo2/en_ext.html	Low
Challenge.gov	http://challenge.gov	Low
Change.Org	http://www.change.org	Medium
CIT-PART Case Study on Xenotransplantation	http://www.cit-part.at	Low
CitiVox	http://blog.citivox.com/about	Low
Citizen Shop	http://www.epractice.eu/en/cases/citizenshop	Low
Citizen Space	http://www.citizenspace.com/info	Medium
Citizens and Public Administrations Dialogue in Emilia-Romagna	http://www.epractice.eu/en/cases/partecipaemiliaromag	Medium
City Of Portland, Oregon	http://www.portlandonline.com/oni/index.cfm?c=46442	Low
CityForward	http://cityforward.org	Medium
Climate Action Planning Tool	http://www.nrel.gov/tech_deployment/planning_tool/	Medium
Climate Change Heroes	http://www.devon.gov.uk/index/environmentplanning/climategame.htm	Low

Title	Link	Relevance to the Study
ClimateGame	http://climategame.nl	Medium
Coalition For Open Government	http://www.washingtoncog.org/	Low
COCKPIT-Project	http://www.cockpit-project.eu/	Low
Code for America	http://codeforamerica.org/about/	Low
Collaboration in local tourism policymaking	http://www.sciencedirect.com/science/article/pii/S0160738398001054	Medium
Collaboration on Flood Mitigation Plans in Northern Plains States	http://www.policyconsensus.org/casestudies/docs/Plains_flood.pdf	Low
Collaboration Testing	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=818	Low
Community Media Centers	http://www.epractice.eu/en/cases/wijkmediaateliers	Low
Community websites to involve isolated citizens	http://www.epractice.eu/en/cases/fedeviewc	Low
Connected Citizens Programme	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=425	Low
Cost of Renewable Energy Spreadsheet Tool (CREST)	https://financere.nrel.gov/finance/content/crest-cost-energy-models	Medium
Creta: Multi-channel access to administrative procedures in Spain	http://www.epractice.eu/en/cases/creta	Low
CrimeReports	https://www.crimereports.com/	Low
Crossing boundaries in Public Procurement	http://www.pianoo.nl/	Low
Crowdsourcing Through Social Media-The Icelandic Constitution Case	http://www.crossover-project.eu/Details.aspx?EntityId=438	High
Customer Care System	http://www.epractice.eu/en/cases/customercare	Low
Cyber Policy Forum	http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/54/language/en-US/Default.aspx	Low
Data.gov	http://data.gov	Medium

Title	Link	Relevance to the Study
Datamaps.eu	http://www.datamaps.eu	Low
datos.gob.es, the Spanish national Government portal for ReUse of PSI	http://www.epractice.eu/en/cases/datosgobes	Low
Dealing with PCBs in the New Bedford, MA Harbor	http://www.policyconsensus.org/casestudies/docs/MA_harbor.pdf	Low
Delta Viewer	http://www.tygron.nl/home_en/delta-s/	Medium
Demo.cratica	https://demo.cratica.org/	Low
Demoex	http://demoex.net/en/	Medium
DEMOS Plan	http://demos-plan.eu/	High
demos@work	http://www.epractice.eu/en/cases/demosatwork	Low
DIEGO - Digital Inclusive eGovernment	http://www.diego-project.eu/	Low
DIMA	http://webarchive.iiasa.ac.at/Research/GGI/docs/g4modShort.pdf	Low
Disclosed Canada	http://www.disclosed.ca/	Low
DiscoverText	http://discovertext.com	Low
DSIRE	http://www.dsireusa.org	Low
Dynaplan	http://www.dynaplan.com/	Low
e-cognocracia	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1233	Low
E-consultation Module	http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/76/language/en-US/Default.aspx	Low
e-Government Project	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=177	Low
e-Participa City Council Cadrete	https://participa.cadrete.es	Low
e-Transparency Initiative	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1298	Low
eAdmon, all the services in your hand	http://administracionelectronica.gob.es/	Low

Title	Link	Relevance to the Study
EC Generation Awake	http://www.generationawake.eu/en	Medium
Edge Ryders	http://edgeryders.ppa.coe.int	Low
eDialogos	http://www.epractice.eu/en/cases/edialogosawards	Low
eFacilitator for Social Inclusion	http://www.efacilitator.eu/wordpress/	Low
ELLECTRA-WeB	http://www.epractice.eu/en/cases/ellectraweb	Low
Enabling Access for All - KSA's National e-Government Strategy & Action Plan (2012-16)	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1306	Low
EnerCities - Stimulate energy awareness of youngsters with online serious gaming	http://www.enercities.eu/	Medium
Energie Atlas bayern	http://www.energieatlas.bayern.de	Medium
ENGAGE	http://www.engage-project.eu/	Low
Engaging Our Youth To Create The Future	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=109	Medium
Enquete-Kommission "Internet und digitale Gesellschaft"	https://enquetebeteiligung.de	High
eQUEST the QUick Energy Simulation Tool	http://www.doe2.com/eQUEST/	Medium
EUropean Forest and Agriculture Simulation and Optimization Model	http://webarchive.iiasa.ac.at/Research/GGI/docs/EUFASOM.pdf	Low
European Network for Democratic Renewal & Citizen Engagement	http://www.epractice.eu/en/cases/epartici p8	Low
European Web Site on Integration	http://ec.europa.eu/ewsi/	Medium
EuroPetition - eParticipation through Petitioning in Europe	http://europetition.eu/	Low
EveryBlock	http://www.everyblock.com/	Low
EVITA*	http://www.evita-interreg4c.eu/	Low
EVOKE	http://www.urgentevoke.com	High
eVoting System	http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/21	Low

Title	Link	Relevance to the Study
	48/CaseStudyID/142/language/en-US/Default.aspx	
Expence Visualiser Canada	http://visiblegovernment.ca/projects/expenses	Medium
Expert transcription of audio files - FoxTranscribe, transcription made simple	http://www.foxtranscribe.com	Low
ExpertNet	http://expertnet.wikispaces.com/Getting+Started	Medium
Factlink	https://factlink.com	Medium
Farm-household investment behaviour and the CAP decoupling: Methodological issues in assessing policy impacts	http://www.sciencedirect.com/science/article/pii/S0161893810000979	Medium
Fed-eView/Citizen - Listening to the citizens	http://www.epractice.eu/en/cases/fedeviewc	Low
Federated eParticipation Systems for Cross-Societal Deliberation	http://www.epractice.eu/en/cases/feed-0	Low
Finnish Democracy and Participation Web Services	http://www.epractice.eu/en/cases/fdpwp	Medium
Fix My Street Canada	http://fixmystreet.ca/	Low
Fixing Consultation	http://www.helpfultechnology.com/helpful-blog/2012/07/fixing-consultation/	Low
FORSEE - Regional ICT foresight exercise for Southeast European countries	http://forsee.eu/	Low
FUPOL - Intelligent Tools for Policy Design	http://www.fupol.eu/	Low
Future Melbourne	http://www.futuremelbourne.com.au/	Medium
GAIM (Gestione Accoglienza IMmigrati): A System Dynamics Model for Immigration "housing" Policy	http://www.systemdynamics.org/conferences/2006/proceed/papers/SEDEH115.pdf	Medium
GAINS	http://www.iiasa.ac.at/web/home/research/researchPrograms/GAINS.en.html	High
Gaming the Tibby	http://www.epractice.eu/en/cases/gamingthetibby	Medium
Genova Stakeholder Engagement Program	http://qualita.comune.genova.it/	Low

Title	Link	Relevance to the Study
GLEaM - Global Epidemic And Mobility Model	http://www.gleamviz.org	High
Global Identity Networking of Individuals - Support Action	http://www.gini-sa.eu/	Low
Global Pulse	http://www.unglobalpulse.org/	Medium
Gov Hub	http://www.govhub.org	Medium
Gov Track US	http://www.govtrack.us/	Medium
gov2.0camp 2010 Vienna	http://www.partizipation.at/gov20.html?&no_cache=1	Low
Gov2DemoSS	http://www.epractice.eu/en/cases/gov2deemoss	Low
Governance innovation in the making of a new tourism authority	http://www.visitportugal.com/	Low
Governing by the Numbers: The Promise of Data-Driven Policymaking in the Information Age	http://www.americanprogress.org/wp-content/uploads/issues/2007/04/pdf/citistat_report.pdf	Low
Government for Citizen (G4C) Civic Service Innovation System	http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/56/language/en-US/Default.aspx	Low
GovHub	http://www.govhub.org	Low
GovLoop	http://www.GovLoop.com	Low
GR Public Spending	http://publicspending.medialab.ntua.gr	Medium
Grant Program Canada	http://visiblegovernment.ca/projects/grants	Low
Green and Blue Space Adaptation for Urban Areas and Eco Towns	http://www.grabs-eu.org/	Low
Gruppo di Azione Locale Val D'Anapo - Agenzia di Sviluppo	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=173	Medium
Hauptbahnhof Wien	http://www.partizipation.at/hauptbahnhof-wien.html?&no_cache=1	Low
HOMER Model	https://analysis.nrel.gov/homer/	Low

Title	Link	Relevance to the Study
Hub Websites for Youth Participation	http://www.epractice.eu/en/cases/huwy	Low
Hypothes.is	http://www.hypothes.is	Low
I Believe In Open	http://ibelieveinopen.ca/	Medium
Ideas for Bristol	http://www.nesta.org.uk/areas_of_work/public_services_lab/reboot_britain/assets/features/ideas_for_bristol_from_adaptive_lab_and_bristol_city_council	Medium
Ideascale	http://opengov.ideascale.com	Low
igitalisÃ©r.dk	http://www.epractice.eu/en/cases/digitaliserdk	Medium
IMPACT	http://www.policy-impact.eu/	Low
Implan: Sub-national Climate Initiatives	http://implan.com/v4/index.php?option=com_docman&task=cat_view&gid=275&Itemid=60	Low
Improving Air Traffic Management Together	http://cdm.fly.faa.gov/	Low
In My Backyard	http://maps.nrel.gov/imby	Low
In the Air	http://www.intheair.es	High
Increasing Stakeholder Participation in Higher Education through Academic Program Development& Reviw	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1586	Low
Inflation Island	http://www.ecb.europa.eu/ecb/educational/inflationisland/html/index.en.html	High
Information Management Initiative	http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/ctl/StudyView/mid/2148/CaseStudyID/32/language/en-US/Default.aspx	Low
Innovation in consultation-Developing and implementing an innovative national consultation strategy	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=565	Medium
Insight Maker	http://insightmaker.com	Medium
Interactive portal for Turkish Local Governments	http://www.epractice.eu/en/cases/yerelnet	Low
Internet Voting	http://unpan3.un.org/unps/Public_Nominat	Low

Title	Link	Relevance to the Study
	ionProfile.aspx?id=165	
Introduction of a Transparent Public Policy Development System	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=307	Low
Io partecipo - The eParticipation community in the Emilia-Romagna	http://www.epractice.eu/en/cases/iopartecipoawards	Medium
IPM - Interactive Policy Making: online surveys, questionnaires	http://www.epractice.eu/en/cases/ipmsurveys	High
It's Your Parliament .eu	http://www.itsyourparliament.eu/about/	Medium
Italian Government Spending 2002-2008	http://www.visup.it/misc/ /index.htm	Medium
Jobs and Economic Development Impact (JEDI) models	http://www.nrel.gov/analysis/jedi/	Medium
Joint Action Development Forum	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=290	Low
Junar · The Open Data Platform	http://www.junar.com	Low
Keep the Web Open	http://www.keepthewebopen.com	Medium
KLISS	http://www.kslegislature.org/li/	Low
KohoVolit.eu | KohoVolit.eu	http://en.kohovolit.eu	Medium
Kommentoi Tata	http://flexi.tml.hut.fi/kt/index;jsessionid=3AD16E703FFB60D4F107FED1B74BE424 http://www.slideshare.net/troppone/designing-egovernment-services-for-collaboration-between-citizens-and-the-public-sector	Low
Kyopol	http://www.epractice.eu/en/cases/kyosei	Medium
Laboratori Territoriali per la Progettazione Integrata	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=174	Low
Lagan	http://www.kana.com/lagan/government-to-citizen-g2c-software.php	Low
LEED for Neighborhood Development Rating System	http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148	Medium
Lisbon City Hall - Participatory Budgeting	http://www.cm-lisboa.pt/op/	High
Lista Partecipata	http://www.listapartecipata.it	Low

Title	Link	Relevance to the Study
Local E-democracy National Project	http://www.unpan.org/DPADM/EGovernment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/139/language/en-US/Default.aspx	Low
LocalEyes	http://www.epractice.eu/en/cases/localeyes	High
Localocracy	http://www.localocracy.com	Medium
Madrid Participa	http://www.epractice.eu/en/cases/madridp	High
Management through measurement and knowledge	http://www.epractice.eu/en/cases/mmk	Low
Manorlabs	http://www.manorlabs.org	Medium
Many Bills	http://manybills.researchlabs.ibm.com/	Medium
Maryland Budget Game	http://iat.ubalt.edu/MDBudgetGame	High
McKinsey Global Institute Big Data Report	http://www.mckinsey.com/Insights/MGI/Research/Technology_and_Innovation/Big_data_The_next_frontier_for_innovation	Low
Mechanical Hoist Training Sim	https://play.google.com/store/apps/details?id=tw.GOSH10	Medium
Meieraha	http://meieraha.eu/?lang=en&page=main	High
MIT course on agent-based modeling for health policy with AnyLogic	http://www.xjtek.com/anylogic/resources/mit-lectures/	Low
MIT OpenCourseWare - Modeling and Assessment for Policy	http://ocw.mit.edu/courses/engineering-systems-division/esd-864-modeling-and-assessment-for-policy-spring-2011/	Low
MIT OpenCourseWare-System Dynamics for Business Policy Background	http://ocw.mit.edu/courses/sloan-school-of-management/15-874-system-dynamics-for-business-policy-fall-2003/syllabus/	Low
Mitaka City, Tokyo	http://www.city.mitaka.tokyo.jp/foreign/english/index.html http://www.japanfs.org/en/mailmagazine/newsletter/pages/027950.html	Low
Model for Energy Supply Strategy Alternatives and their General	http://webarchive.iiasa.ac.at/Research/ENE/model/message.html	Medium

Title	Link	Relevance to the Study
Environmental Impact (MESSAGE)		
Modelling the Early Life-Course	http://www.arts.auckland.ac.nz/uoa/a-modelling-tool-to-improve-the-policy-response-on-issues-concerning-children-and-young-people	High
MOMENTUM Project	http://www.epractice.eu/en/cases/momentum	Low
My Community Renewable Energy Project Development Tool	http://apps1.eere.energy.gov/deployment/communityre/project_development/index.cfm	Medium
My Street Portal (Fix my Street)	http://www.epractice.eu/en/cases/mystreetportal	Medium
My2050	http://my2050.decc.gov.uk	High
MyEnvironment	http://www.epa.gov/myenvironment/	Low
MyPage on borger.dk	http://www.borger.dk/	Low
MyPersonalData	http://www.epractice.eu/en/cases/mpd	Low
National Collaborative Research Infrastructure Strategy	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=315	Low
National Simplification Programme (Simplex Nacional)	http://www.simplex.pt/	Low
Nesta Alliance	http://www.nesta.org.uk/areas_of_work/public_services_lab/alliance_for_useful_evidence	Low
Network of European Stakeholders for Enhanced User Centricity in eGovernance	http://www.net-eucen.org/	Low
Next Stage in Open Government Data: Using Data for Transparency, Accountability and Collaboration	http://www.unpan.org/Events/Conferences/tabid/466/mctl/EventDetails/ModuleID/1508/ItemID/2228/Default.aspx	Low
NGOs e-participation portal for the EU Council Presidency	http://www.epractice.eu/en/cases/predsedovanjesi08	Medium
Nigerian Budget Made Simple	http://yourbudgit.com	Medium
NodeBox: create visual output with Python Programming code	http://nodebox.net/code/index.php/Home	Low

Title	Link	Relevance to the Study
NZ: Open Government Policy a First	http://www.unpan.org/PublicAdministrationNews/tabid/115/mctl/ArticleView/ModuleID/1467/articleId/29102/default.aspx	Low
OCOPOMO - Open COllaboration for POlicy MOdelling	http://www.ocopomo.eu/	Low
One Salford - Think	http://www.epractice.eu/en/cases/salford	Low
Open Australia	http://www.openaustralia.org/	Medium
Open Congress	http://www.opencongress.org/	Medium
Open Data Challenge	http://opendatachallenge.org/	Low
Open Data Euskadi	http://www.epractice.eu/en/cases/opendataeuskadi	Low
Open Data Impacts - Exploring the impact of opening up government data	http://www.opendataimpacts.net/	Low
Open for Questions	https://opengovdirective.pbworks.com/w/page/4864032/Open%20for%20Questions	Low
Open government	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=814	Medium
Open Government Dialogue	http://opengov.ideascale.com/	Medium
Open Government Initiative	http://expertnet.wikispaces.com/Getting+Started	Low
Open Government Lab & setuden.go.jp	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1557	Medium
Open government reboot focuses on APIs instead of data - The White House hopes for an explosion of commercial application development.	http://www.crossover-project.eu/Details.aspx?EntityId=500	Low
Open IDEO Challenge-Supporting Web Entrepreneurship	http://www.openideo.com/open/web-start-up/brief.html	Low
Open Pariament Canada	http://openparliament.ca/	Medium
Open Plans	http://openplans.org/	Low
Open311	http://open311.org/	Medium
OpenEnergyInfo	http://en.openei.org/wiki/Main_Page	Medium

Title	Link	Relevance to the Study
OpenGov.gr	http://www.opengov.gr	High
Opening up policy making	http://www.instituteforgovernment.org.uk/sites/default/files/publications/opening_up%20policy%20making_final.pdf	Medium
Openpolis	http://www.openpolis.it/eng/	Medium
Opinion Space	http://www.state.gov/opinionspace/	High
Oregon Open Data	https://data.oregon.gov/	Low
OSKAR	http://webarchive.iiasa.ac.at/Research/GGI/docs/oskar.pdf	Low
PADGETS - Policy Gadgets in Social Media	http://www.padgets.eu/	Low
Parliaments and the Budget	http://einstitute.worldbank.org/ei/course/parliaments-and-budget	Low
Parlio	http://ourservices.eu/?q=node/74	Low
Partecipazione ALlargata al COnsiglio Regionale	http://www.consiglio.regione.lombardia.it/web/crl/Approfondimenti	Low
Participación Social en Guarderías (PSG)	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1186	Low
Participatory Immigration Policy Making and Harmonization	http://www.immigrationpolicy2.eu/	Low
Participatory Land Appraisal System	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1480	Medium
Partnership for Vysocina	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=69	Low
Piemonte Telematic Municipal Notice Board	http://www.epractice.eu/en/cases/alpt	Low
Planning for Smart City Growth - Decision Theater	http://dt.asu.edu/projects/urban-growth-projects/planning-for-smart-city-growth	Medium
PloneGov: open source collaboration for the public sector	http://www.epractice.eu/en/cases/plonegov2009	Low
Policy Formulation and Validation through non-moderated Crowd Sourcing	http://www.nomad-project.eu/	Low
Polish E-Consultations	http://konsultacje.gov.pl	Medium

Title	Link	Relevance to the Study
PopTech: World Rebalancing	http://www.unglobalpulse.org/node/14533	Low
Populo	http://populo.heroku.com	Medium
PopVox	http://www.PopVox.com	Medium
Positive Spaces	http://www.positivespaces.eu/	Low
Poverty is not a Game	http://www.povertyisnotagame.com	Medium
Power of Participatory Public Policy to Save Your Life	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=800	Low
Proracunski Kalkulator	http://proracunskikalkulator.com	Low
Public eParticipation in peace making	http://www.epractice.eu/en/cases/konpondu	Low
Public Participation for water protection: U@Marenostrum	http://www.epractice.eu/en/cases/uatmarenostrum	Low
Puzzled by Policy	http://www.puzzledbypolicy.eu/	Low
Ragazzi in aula - Youth in the Law Hall	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=642	Low
RE Atlas	http://maps.nrel.gov/re_atlas	Low
Red de Municipios Digitales (RMD)/Digital Municipalities Network	http://www.epractice.eu/en/cases/rmd	Low
Red Tape Challenge	http://www.redtapechallenge.cabinetoffice.gov.uk/home/index/	Medium
Regional Energy Deployment System (ReEDS)	http://www.nrel.gov/analysis/reeds/	Medium
Regulations.gov	http://www.regulations.gov	Medium
RegulationsDotGov Exchange	https://opengovdirective.pbworks.com/w/page/4864010/RegulationsDotGov%20Exchange	Medium
Renewable Resource Data Center (RReDC)	http://www.nrel.gov/rredc/	Medium
Repara Ciudad	http://reparaciudad.com	Low
Repast	http://repast.sourceforge.net/repast_simphony.html	Low
Rural Inclusion	http://www.rural-inclusion.eu/	Low

Title	Link	Relevance to the Study
Sacramento Transportation and Air Quality Collaborative	http://www.policyconsensus.org/casestudies/docs/CA_AirQual.pdf	Low
SAKE: Semantic-enabled Agile Knowledge-based E-Government	http://www.sake-project.org	Low
Salt lake City utah - UrbanSim	http://www.urbansim.org	High
Samosdialogos: Development And Distribution Of Applications For E-Participation And E-Communication	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=745	Low
SeeClickFix	http://www.seeclickfix.com	Low
Seime.lt	http://seime.lt	Medium
Shrinking Game	http://www.tygron.com/products/shrinking-game	Low
Simgua	http://www.simgua.com	Low
Simple Economic Demographic Interaction Model	http://webarchive.iiasa.ac.at/Research/GGI/docs/sedim.pdf	Low
Simplex Idea Competition (Prémio Ideia Simplex)	http://www.epractice.eu/en/cases/simplexidea	Low
Simplification Programme for Municipalities (Simplex Autárquico)	http://www.epractice.eu/en/cases/simplexidea	Low
SimPort	http://www.simport.eu	Medium
SocialSync	http://socialsync.org	Low
Solar Prospector	http://maps.nrel.gov/prospector	Low
Spigit	http://www.spigit.com	Low
Splash: Smarter Planet Platform for Analysis and Simulation of Health	http://researcher.watson.ibm.com/researcher/view_project.php?id=3931	Medium
Spot Reporters	http://connectedbits.com/	Low
STREIT' MA UNS Z'SAMM	http://www.partizipation.at/streitmaunszsamm.html?&no_cache=1	Low
Successful Community-Government Collaborative Policy Making: A Case Study of a Workgroup to Improve Income Support Services to Victims of Intimate Violence	http://www.tandfonline.com/oi/pdf/10.1080/15588741003604276	Low

Title	Link	Relevance to the Study
SUPERHUB	http://superhub-project.eu/	Low
Synergy Alberta	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=92	Low
Sysdea	https://sysdea.com	Low
System Advisor Model (SAM)	https://sam.nrel.gov	Medium
Technology Horizon Scanning	https://www.recordedfuture.com/assets/tech-horiz-case-study.pdf	Medium
Teleia kai Pavla	http://www.teleiakaipavla.gr/	Medium
The Case Of Labrador	http://www.envision.ca/pdf/ssp/CATMUR_ALLISON_MA_THESIS.pdf	Low
The E-petitioning System	http://www.unpan.org/DPADM/oicenment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/144/language/en-US/Default.aspx	Low
The Easiest Way To Evaluate And Report Environmental Performance	http://www.amee.com/	Low
The Get Involved Website	http://www.unpan.org/DPADM/oicenment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/63/language/en-US/Default.aspx	Medium
The Nordpol.dk Website	http://www.unpan.org/DPADM/oicenment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/159/language/en-US/Default.aspx	Medium
The on-line Citizen's Forum European Debates	http://www.evropske-razprave.si/	Medium
The public and government can solve problems together	http://challenge.gov/	Low
The Social Simulator	http://www.socialsimulator.com	Medium
The Vienna City Administration's Open Government Initiative	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1215	Low

Title	Link	Relevance to the Study
They Work For You New Zealand	http://theyworkforyou.co.nz/	Medium
They Work For You UK	http://www.theyworkforyou.com/	Medium
Top-level decisions through public deliberation on the internet	http://www.epractice.eu/en/cases/comuno	Low
Tracking Processes and Open-Government-Track-Gov.	http://unpan3.un.org/unps/Public_NominationProfile.aspx?id=1420	Low
Transportation Security Administration's IdeaFactory: Social Media and Securing America	http://www.gov2expo.com/gov2expo2009/public/schedule/detail/10272	Low
Tropical forest ecosystem management under uncertainty	http://planetaryskin.org/rd-programs/forests/forest-ecosystem-management	Medium
Trusted Architecture for Securely Shared Services	http://www.tas3.eu/	Low
UbiPOL (Ubiquitous Participation Platform for Policy Making)	http://www.ubipol.eu/index.php	Low
United Nations Global Compact	http://www.unglobalcompact.org/AboutTheGC/index.html	Low
Urban EcoMap	http://urbanecomap.org/	Medium
USA TODAY/Twitter Election Meter Share to Facebook Share to Twitter	http://usatoday30.usatoday.com/news/politics/twitter-election-meter	Low
Utah Transparency Project	http://www.utahtransparencyproject.org/	Low
Vancouver Greenest City	http://vancouver.uservoice.com	Medium
Verbeter de Buurt – Improve the Neighborhood	http://www.verbeterdebuurt.nl	Medium
VIBAT London	http://www.vibat.org/vibat_ldn/index.shtml	High
Vienna Citizen's Request Management (VCRM)	http://www.unpan.org/DPADM/oicenment/KnowledgeBaseofEGovernmentPractices/tabid/828/mctl/Study_View/ModuleID/2148/CaseStudyID/149/language/en-US/Default.aspx	Low
Viva Nordeste	http://unpan3.un.org/unps/Public_Nominat	Low

Title	Link	Relevance to the Study
	ionProfile.aspx?id=188	
VOICE – Giving European People a Voice in EU Legislation	http://www.epractice.eu/en/cases/giveyourvoice	Low
Votenaweb	http://www.votenaweb.com.br	Medium
Wategame Rivers	http://www.tygron.com/products/water-game-rivers/	Low
Water sector reform policy of India: Experiences from case studies in Maharashtra	http://www.sciencedirect.com/science/article/pii/S016189381000030X	Low
WeGov: Where eGovernment meets eSociety	http://www.wegov-project.eu/	Low
Welser CITY AGENDA 21	http://www.partizipation.at/welser-innenstadtagenda.html?&no_cache=1	Medium
Where Does My Money Go?	http://www.wheredoesmymoneygo.org	Medium
White House 2	http://www.whitehouse2.org	Medium
Wikiplanning	N.A.	Medium
Wycombe Budget Simulator	http://www.wycombe.gov.uk/council-services/council-and-democracy/budgets-and-spending/budget/consultation-results.aspx	Medium
Zindex	http://zindex.cz	Low
Zonability	http://www.zonability.com	Low

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