eChallenges e-2014 Conference Proceedings
Paul Cunningham and Miriam Cunningham (Eds)
IIMC International Information Management Corporation, 2014
ISBN: 978-1-905824-46-5

Towards More Factual, Evidence-based, Transparent and Accountable Policy Evaluation and Analysis: The Policy Compass approach

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Abstract: Solving existing policy making problems such as the lack of transparency and the inability to crosscheck and assess the actual impact of implemented policies, as well as improving the empirical foundation for more factual, objective, evidence-based deliberation of governmental policies is amongst the top priorities in modern citizens' agendas. The proposed approach aims at making better use of Europe's open public data resources and empowering citizens – especially the younger generation – and policy makers to better assess government policies in the policy analysis and monitoring phases of the policy cycle. In this respect, it specifies the methodological framework and conceptual architecture of an easy to use platform, allowing citizens and public officials to create, apply, share, embed, annotate and discuss causal models, charts and graphs of historical data from open data sources.

1. Introduction

Modern citizens and voters around the globe are becoming more and more censorious towards their governments, decision making institutions and elected representatives; their judgment is also more results- and impact-oriented than ever before [11], thus being no longer based only on pre-election values, goals and policies put forward by the candidates, asking for their votes during their campaigns. Citizens nowadays try to hold policy makers accountable through assessing, on the basis of empirical facts and evidence, whether government policies are working and elected representatives have promoted the values, achieved the goals and implemented the policies initially promised. Especially in the European level, where the ongoing economic crisis acts as a catalyst towards questioning the efficiency and effectiveness of the policy makers' choices and actions (both at the international and national levels), citizens urge for methods and tools in order to become able to objectively assess their decision making institutions.

Although, the actual connections amongst the various policies, their theoretical foundations, but also the actually achieved outcomes are often difficult for citizens to assess; complex approaches engaging theories and models (e.g. complex system dynamics [5]) are trying to tackle this specific issue; though from a much more advanced point of view. However, the growth and empowerment of the Word Wide Web has made readily

available a wealth of information that citizens can easily reach during their efforts to find the necessary data in order to aid their judgement and decisions [9].

From the other hand, misinformation and (either intentionally or not) propagated falsehoods from various different sources impose an additional obstacle in the citizens' effort to support and confirm their opinions. Probably most important of all, even data and everyday life-related indicators (such as the well-known Gross Domestic Product[1]) are highly criticised for their appropriateness to measure effectiveness and efficiency of policies; there is a lack of "commonly accepted" sets of indicators that are capable of depicting prosperity in a holistic and objective way. An additional remark is that most of the proposed metrics and/or indicators do not take political and/or other important events under consideration; instead they are just based on either qualitative or quantitative data, collected in specified time intervals.

In spite of all the aforementioned problems hindering the citizens' efforts towards objectively assessing their elected policy makers, ICTs can empower citizens with easy to understand and use tools that are able to take advantage of the wealth of information available on the World Wide Web in a structured way. The paper at hand proposes an integrated methodological approach, supported by the appropriate toolkit, in order to locate and structure the necessary information, connect it to policy-related events, perform the necessary visualisations and, if needed, develop the appropriate cognitive maps for interrelating various policy aspects [1], [3].

Thus, the paper is structured as follows: Section 1 provides an introduction to the rest of the document; Section 2 presents the objectives of the approach, closely related to the objectives of the Policy Compass FP7 project; Section 3 provides a concentrated overview of the integrated methodological approach; Section 4 describes the technologies implemented in order to support the aforementioned methodology, while Sections 5 and 6 present the developments and anticipated results of the approach respectively; Section 7 exposes the expected business benefits of the approach, while Section 8 concludes the paper at hand.

2. Objectives

Following the above lines, this paper aims at presenting a new and innovative approach for improving the quality and transparency of the policy analysis and evaluation phases of the policy cycle. The approach is inspired by the Policy Compass FP7 project[2] and brings together open public data, social media, e-participation platforms, fuzzy cognitive maps [8] as a modelling technique for representing social scientific knowledge, and argumentation technology for constructing, sharing, visualizing and debating progress metrics and causal models of policies.

The proposed project work plan:

1. emphasises the need of critically assessing causal theories behind policy proposals in the analysis phase of the policy cycle,
2. brings forward the need of evaluating whether some implemented policy has in fact produced the promised benefits in the monitoring phase,
3. unveils the methodology utilised for materialising such an approach, based on the aforementioned ingredients, exposing thereby the key capabilities offered by the latter, as well as the technical solution that supports it.

The overall objective of Policy Compass is to aid better use of Europe's open public data resources and empower citizens – especially the younger generation – and policy

[1] http://en.wikipedia.org/wiki/Gross_domestic_product
[2] http://www.policycompass.eu/

makers to better assess government policies in the policy analysis and monitoring phases of the policy cycle.

3. Methodological Approach

The Policy Compass methodology aims at improving the quality and transparency of political decision-making. It rests on a scenario-oriented procedure along the phases of the policy cycle [6], [2], [10]. The Policy Compass approach establishes four scenarios along the policy cycle to reflect the different perspectives and operation schemes of policy making. The scenarios themselves rest on three pillars that deliver the necessary tools to improve the operations throughout the policy cycle.

The policy cycle begins with a "policy agenda setting" phase. In the course of this phase, societies identify the salience of problems and decide which political issues will have to be dealt with. The "policy analysis" phase thereafter deals with the pros and cons of different options of tackling the issue at hand. Policy analysis requires the participants to develop policy options and examine their potential impacts. Policy options are rarely – if ever – without alternatives. Therefore, policy analyses have to weigh intended and unintended results of different avenues in order to choose the best option. Once a policy has been adopted ("policy adoption"), the political process will have to implement it ("policy implementation"). Following adoption and implementation, a society will have to monitor politics and evaluate whether chosen policies address the originally identified problems adequately, effectively, efficiently and without unintended side effects ("policy monitoring"). The insights from this final policy phase might be used to rerun the policy cycle and improve political regulation.

The Policy Compass approach concentrates on the monitoring phase, allowing citizens to evaluate governments' performances by constructing their own measures, notice how prosperity metrics have developed over time, examine the correlation of these metrics to events and policy decisions, and model and discuss theories explaining their observations. As it will become apparent in the following sections, Policy Compass aims to engage citizens of any background, through the implementation of easy-to-use tools and providing a clear and comprehensible methodology.

Four scenarios highlight different perspectives on open data based policy evaluation: a policy monitoring scenario, a policy impact analysis scenario, a participation and debating scenario and an administration scenario. These scenarios rest on three pillars that provide the core functions for these scenarios, enabling users to evaluate the performance of politics (EPP), build causal policy models (BCPM) and employ online deliberation and argument mapping (ODAM).

In the first scenario, i.e. the policy monitoring scenario, users define their own prosperity and other policy metrics in order to monitor the success or failure of public policies. Policy Compass will provide an easy to use language for the definition of variables and functions. Success and failure are evidence-based claims. These claims need to employ data to support their statements, wherefore Policy Compass integrates open data sources. The definition of metrics and the application of metrics on data are handled by the Policy Compass pillar "evaluating performance of politics" (EPP). EPP allows users to search for appropriate open data sources, e.g. on education, employment, environment, equality, freedom, justice, health, wealth, sustainability, etc., aggregate them into variables and define their metrics on what they consider to be prosperity. EPP also enables users to construct graphs and charts on different geographical regions and for selected time periods. These graphs and charts can then be annotated with information on possibly related facts such as policy decision following elections.

The second scenario, namely the policy impact analysis scenario, concentrates on cause-effect relationships. This scenario rests on the pillar of the construction of policy

models ("building causal policy models", BCPM), which provides easy to use visual tools for the construction of Fuzzy Cognitive Maps. These maps simulate potential causal relationships between variables defined with the EPP pillar. The third scenario, i.e. the participation and debating scenario, focuses on deliberation, the technique of convincing each other with arguments. The selection of prosperity indicators, the evaluations of monitoring results and the coherence of causal models will be debated using the tools from the debating pillar (ODAM). In particular, ODAM supports the conduction of structured surveys on policy issues, the aggregation of opinions on related issues and the formulation of common positions. Finally, the fourth scenario, namely the administration scenario analyses the needs for an adequate and effective implementation – not of public policies, but of the Policy Compass approach as an instrument ("policy") for the improvement of political decision-making.

The following figure provides a visualised perspective of the interactions amongst the three main Policy Compass pillars:

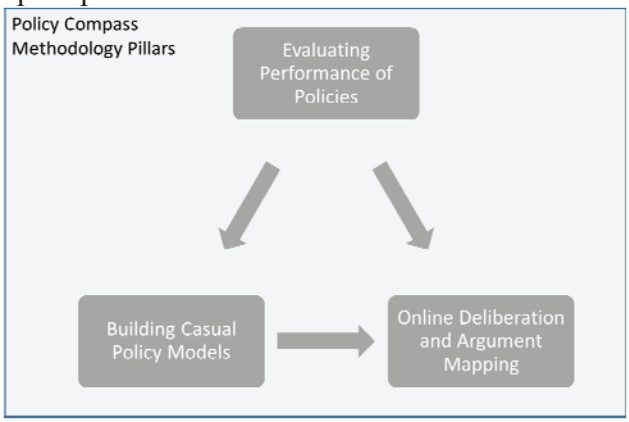

Figure 1. Policy Compass Methodology Pillars

The Policy Compass approach itself is iterative and incremental and follows an agile approach. First concepts of scenarios, tools and their interaction with each other will be refined after feedback from stakeholder groups at workshops.

4. Technical Approach

The Policy Compass solution will be realised as an online Web platform integrating the tools developed in the project. The platform will provide an open API for integrating its datastore and services into external platforms, and widgets for integrating its user interfaces into selected eParticipation platforms and social networks.

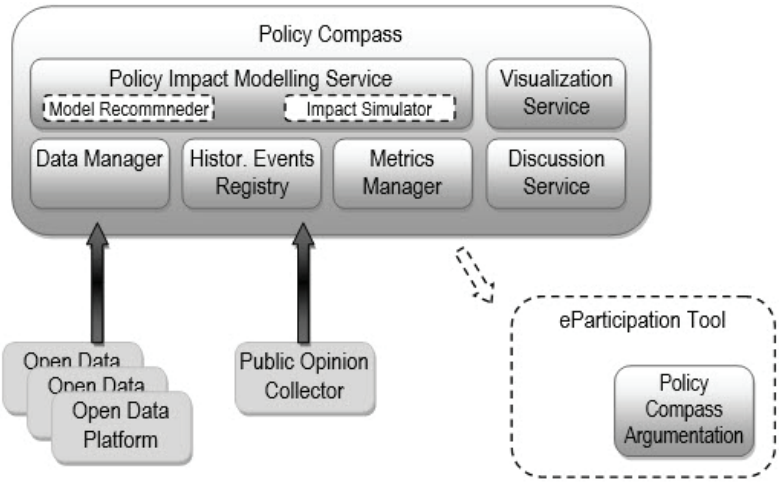

Figure 2. Policy Compass functional architecture and integration in an eParticipation Platform

The Policy Compass will rely on Open Data and openly accessible data from numerous reliable sources such as regional and national Open Data portals, the World Bank[3] and Eurostat[4] portals, national statistical portals, etc. Data stored in those portals have different structures and formats. The portals themselves are based on different, often proprietary, technologies. Before data can be used by Policy Compass it has to be converted to formats and data structures supported by the Policy Compass platform.

The Policy Compass platform will have a dedicated service - Data Manager - for accessing and managing data (and metadata) from public open data sources, which can be used to calculate predefined or user-defined prosperity metrics [4]. It will enable administrators or authorised users to upload datasets in the integrated in it data storage and describe them by providing the metadata. Apart from typical functionality of Open Data platforms the service will provide data structure validation mechanism to ensure that all uploaded data are conform to Policy Compass data model and can be used by other Policy Compass services.

The functionality of defining custom prosperity metrics will be provided by the Metrics Manager Service. This service will enable users to define metrics, describe and store them in the dedicated metrics registry, search for previously defined metrics, perform other metrics management operations and, most importantly, calculate metric values on the basis of data available in Data Manager.

Apart from collecting data for the computation of prosperity metrics, Policy Compass will provide access to a catalogue of historical events (policy changes events) potentially influenced the prosperity changes. This will be the task of the Historical Events Registry service enabling Policy Compass administrators and other privileged users to register and manage historical events in the registry. The service will be realised on the basis of the same Open Data platform as Data Manager.

The Visualisation Service of the Policy Compass platform will provide rich metrics visualisation functionalities. Among different ways of visualizing prosperity metrics it will enable users to mash in one chart the development of different metrics from different countries or regions and annotate them with labels marking relevant historical events on the time axis. Such flexible mashable visualisations of prosperity indexes will help users to develop ideas about the causes of relations among historical events (policy change events) and prosperity fluctuations.

These ideas can be formalised by the users in a form of policy impact models using the Policy Impact Modelling Service. The service will enable users collaboratively define policy impacts models, manage them and simulate the impacts of policy changes. Policy impact models will be defined using Fuzzy Cognitive Maps (FCM).

5. Technological Choices

As also mentioned earlier in this paper, the Policy Compass solution is addressing a broad category of users including users of different generations and social status, without asking for particular technology and/or ICT background. Therefore, a positive user experience with Policy Compass on various platforms is a very important requirement.

The Web Front-End of Policy Compass will be implemented using AngularJS[5]. The former is an open source Java Script framework, developed and maintained by Google and a large community. It embraces the development of Single-Page web applications (SPA), which requires traditionally the collaboration of several techniques like DOM and history

[3] http://www.worldbank.org/

[4] http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/

[5] https://angularjs.org/

manipulation, asynchronous AJAX calls and registration of callbacks. The data itself can be easily fetched from a RESTful Web service, therefore AngularJS works hand in hand with any server-side technology. It enables seamlessly separate the view and user experience from the server-side implementation. Furthermore, it heavily supports the effort to offer an API for third-party applications and the realisation of a service-oriented architecture.

The communication between the Web Front-End and the Core Services of the Policy Compass solution will be realised in the form of API calls using the REpresentational State Transfer (REST)[6] pattern. Policy Compass will implement and use a straightforward, modern RESTful API based on the HTTP protocol[7] and JSON[8] as the representation format.

The framework is very well documented. It supplies toolkits and libraries for common web development tasks, such as user management and administration. For further requirements a wide range of open source third-party libraries is provided.

The Core Services of the Policy Compass solution, such as services for metrics management and metric conversion, as well as the Historical Event Registry will be implemented on the basis of the Django framework[9]. Django is an open source web application framework written in Python and adopting the design pattern Model-View-Controller. The straightforward goal of Django is to make common Web-development tasks fast and easy. Django will provide a centralised user management, including authorisation and authentication. Due to the design of Django it will be possible to encapsulate the functionalities in distinct modules (called Apps) and in this way to support the service-oriented approach.

The data management in the Policy Compass will be implemented on the base of a PostgreSQL[10] Server. The Core Services of Policy Compass will access it, using the Django Object-Relational-Mapper, processing the data and providing it via a RESTful API.

Thus, the implementation of Policy Compass will be done according the SOA principles on the basis of modern technologies. The Core Services will be integrated with the Front-End with help of dedicated RESTful API through which the can be integrated in external social platforms or applications.

6. Pilot Application and Anticipated Results

The Policy Compass will be first applied and evaluated on the basis of two real-life trials organised in the UK and Russia.

In Cambridgeshire County Council (UK Trial), FCMs will be applied to the community learning and skill development (CLSD) funding issue. Cambridgeshire County Council has to respond to the UK Government policy on community learning (which is focused on assisting skills development within the local community) on a regular basis. For this purpose, the government allocates financial resources to the council through a Community Learning Fund which is managed by the national Skills Funding Agency (SFA). The council responds to this public policy by assigning a Community Learning Trust (CLT) Fund which is used to distribute resources to local training agencies that specialise in adult learning. The problems with the current process for CLT funding include the lack of 'learner voice' in the decision making and local Learner Advisory Panels (LAP) are being developed to address this. Also, the priority setting in local district is still conducted based on qualitative opinion of participants despite of the existence of quantitative data due to the

[6] http://en.wikipedia.org/wiki/Representational_state_transfer
[7] http://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol
[8] http://www.json.org/
[9] https://www.djangoproject.com/
[10] http://www.postgresql.org/

lack of analytic tool. Also, the evaluators of proposals are lacking tools to conduct direct impact analysis of the proposals toward the local priorities and skills strategy.

Policy Compass will provide decision makers with a user friendly graphic interface for analysing different indices in comparison with multiple regions within the district. Also, the policy model based on fuzzy cognitive map is expected to allow the proposal evaluators conduct impact analysis, which shows the actual impact a proposal can make to the local priorities and skills strategy of the council.

The Russian trial will be organised in the Leningrad region of Russia. The focus of the trial will be the Regional program "Development of the Information Society in Leningrad region in 2014-2018", which is the successor of a series of federal and regional programs devoted to the creation of e-government in 2002-2013. This choice is due to the high importance of this program and the real need to harmonize its goals and activities with the interests of citizens, as well as the presence of the rich history of legislative acts and their documented effects resulting from the implementation of previous projects and available for the analysis. In the course of the trial impact models for previously adopted in the Leningrad region policies will be defined, and will be applied also on new ones on the basis of the available historical data on the adoption of regulatory acts and technical and behavioural metrics of the economy and living conditions in the Leningrad region.

In both of the aforementioned trial cases, common anticipated results exist, that can be briefly categorised as follows:

- Improved take up of policy making tools by decision makers in public administrations, as the Policy Compass will allow policy makers to visualise their own successful achievements make them clearer to the public.
- Improved validation of the potential impacts of policies through evidence, as the Policy Compass through the combination of qualified official open data and the appropriate ICT tools will help all stakeholders assess, monitor and validate the quality of public policies.
- Stronger evidence of productivity gains and reduction of costs in the provision of public services, as a system like the Policy Compass can improve the analysis and evaluation of policies by providing tools to measure, compare and explain the effects and costs of policies.
- Increased take up of open and public data for provision of public services, as a more intensive and structured use of open data by the public through systems such as Policy Compass could act as an incentive for public administrations to keep promoting open data services.

Both of the previously described Policy Compass pilot case are expected to kick-off their implementation by the end of the current year (2014) and be at a fully operational status (i.e. engaging an active community through properly parameterised versions of the Policy Compass platform) by mid-2015.

7. Business Benefits

As also stated earlier in this paper, the Policy Compass makes better use of available open public data resources and empowers citizens to better assess government policies in the policy analysis and monitoring phases of the policy cycle. Policy Compass not only reduces cost in the process of analysing and monitoring the policy but also helps to increase the quality of the decisions taken.

The competitive advantage of Policy Compass compared to other tools already in the market is that the Policy Compass platform combines open public data, social media, e-participation platforms, fuzzy cognitive maps, argumentation technology and causal models in just one integrated framework. This has not been offered by any other Open Data

Platform before. However, taking into account the current market in terms of technology trends, the business benefits of Policy Compass rely on the following aspects:

- Open Sourced and Open Access: Policy Compass will be released under Open Source licenses. This will foster the distribution of the tool allowing other technical developers to use the software for making improvements or even creating other applications on top of the Policy Compass infrastructure. A clear business plan behind the integrated framework release, accompanied by a strategy for community involvement, will assure that the tool will have a vibrant and active community taking care of the maintenance and further development after the official project end.
- Standards: Policy Compass is being designed and implemented according to common interoperability standards allowing integration in existing e-participation platforms, social networks and argumentation tools that are already in use and fed by large and stable communities; this could guarantee the critical mass needed to keep alive the platform in the long term.
- Reuse and enrichment of Open data: Open Data constitute the main driving force behind Policy Compass. The use of already existing open data sources makes the process of decision making more effective and is an incentive for the Policy Compass potential stakeholders as data investment is not required. A more intensive use of open data by the public through systems such as Policy Compass will act as an incentive for public administration to continue developing and promoting open data services [7].
- E-participation: Policy Compass helps to translate international issues and dynamics in the national and local contexts by directly engaging citizens in the process. E-participation will help policy makers to open a bilateral communication channel in order to communicate their achievements and policies to the public in a more direct way, stimulating public debate and building confidence. In addition, citizens will feel included in the decision-making process perceiving a more transparent and democratic procedure.

Building on the business benefits envisioned, Policy Compass is expected to be brought to the market by late 2016. Fine-tuning the integrated Policy Compass platform through the evaluation of the two Policy Compass pilots, as well as defining clearly and timely the licence accompanying the integrated technological solution constitute two main milestones towards this direction.

8. Conclusions

The Policy Compass has as its main target to exploit in the best possible way Europe's open public data resources in order to empower citizens (and especially the younger generation) and all other policy making stakeholders towards better assessing governmental policies and decision.

The Policy Compass is most relevant in the monitoring phase of the policy cycle, without meaning that it cannot offer added value to the remaining policy cycle phases. In this respect, it describes in detail an integrated and innovative methodological framework, which is accompanied by a conceptual architecture of an easy to use ICT platform allowing citizens and public officials to create, apply, share, embed, annotate and discuss causal models, charts and graphs of historical data from open data sources.

State of the art technologies and tools will be engaged (described in detail in the context of Section 5) in the process of realising the Policy Compass, in order to come up with a tool that, besides being user friendly and easy to use (as also stated earlier), will allow easy integration and interoperability with the major existing social channels and deliberation platforms, in order to further aid the collection and storage of open public data.

Both the proposed methodology and supportive platform will be piloted under real-life circumstances in two different, both from the geographical span (one regional and one local) and from the geographical position (one in the UK and one in Russia) cases. Besides evaluating the concept and the tools, the two Policy Compass pilots will also act as the first validation of the important business benefits that the Policy Compass envisions to bring to life, primarily including amongst others better use and further enrichment of open public data, more objective policy assessment, and more efficient and effective citizens' participation in the policy making process.

Acknowledgments

The research leading to the results presented in this paper has been supported by the EC FP7 under the project "Policy Compass", Grant Agreement No. 612133.

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