

Policy Compass - Indicator-based Accountable Policy Analysis and Evaluation via Open Data Exploitation

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Abstract

Empowering stakeholders in assessing the governments' course of actions and contributing in transforming government structures to a more participatory and democratic form is not an easy task. New technologies and innovations help to this direction, and policy making is becoming more and more transparent, accountable and trusted if the inclusion of wide society masses in it is taken into account. What, however, society better understands as outcomes of policies is how the latter affects prosperity, as this is a visible impact on everyone's life. Policy Compass is a platform, co-funded by the EC, that capitalises on prosperity and social indicators for assessing the impact of governmental policies, utilising open data sources associated to their calculation and providing to the public the opportunity to better understand policy decisions and how these might affect their lives.

Keywords – policy analysis; policy evaluation; open data; indicators; policy compass.

1 Introduction

Citizens' active engagement in policy making is a major challenge at both the EU and international levels (Chadwick, 2009). The latest advancements in Information and Communication Technologies (ICT) and the advent of the Web 2.0 are already providing many successful interventions, currently transforming the way civil society interacts, debates and participates in policy making processes (Wilhelm, 2000). Such innovations have a leading role in making participation in policy making and political processes possible at large, as they support communication and interaction between policy makers and the public, simplifying decision making processes, demystifying complex legislation and allowing to better understand implications and dependencies through visualisations of arguments and impacts. As such, citizens

are empowered to reach informed judgement on the political decisions being taken and the way in which the latter affect their lives. The latter becomes more straightforward when policy making is linked directly to prosperity indexes, which are derived as results of mathematical functions that aim at making prosperity measurable. However, depending on the context for each case, prosperity can be conceptualised quite differently and, therefore, plenteous examples of the measurement of prosperity are available. All of these indices claim a distinct setup and have their own rationale. What all of them have in common, however, is their potential use as benchmarks for policy actions. What is missing today is a way to convey these indicators to citizens, and provide them with the power to explore them and link them with various policies, to understand better policy decisions and provide also their feedback to them, on existing debates but also on hidden aspects affecting their life in an indirect manner, that might not have been identified during the policy agenda implementation phases.

The purpose of the paper at hand is to showcase the novelty of the Policy Compass platform (available at www.policycompass.eu) that suggests an approach on how to exploit the power of open data and prosperity indexes in policy impact evaluation.

2 Current challenges for effective policy evaluation

In representative democracies, citizens elect candidates for public office on the basis of values, goals and policies put forward by these candidates during political campaigns. To hold elected officials accountable or effectively exercise their voting rights, and thereby decide on whether to re-elect an incumbent or give a candidate from some other party a chance, citizens need to evaluate, 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 promised in their campaigns. However, empowering stakeholders in assessing the governments' course of actions and contributing in transforming government structures to a more participatory and democratic form is not an easy task.

Citizens' active engagement in policy making is a major challenge at both the EU and international levels. New technologies and innovations help to this direction, and policy making is becoming more and more transparent, accountable and trusted if the inclusion of wide society masses in it is taken into account. What, however, society better understands as outcomes of policy is how the latter affects prosperity, as this is a visible impact on everyone's life. Such innovations have a leading role in making participation in policy making and political processes possible at large, as they support communication and interaction between policy makers and the public, simplifying decision making processes, demystifying complex legislation and allowing to understand better the implication and dependencies through visualisations of arguments and impacts. As such, citizens are empowered to reach informed judgement on the political decisions being taken and the way in which the latter affect their lives (Macintosh, 2006).

The prosperity indices available today claim a distinct setup and have their own rationale when it comes to explain the progress of a society and the quality of life in relation to other factors. What all of them have in common, however, is their potential use as benchmarks for policy actions. However, even if all that information is available, the relationships though between policies, their theoretical foundations and their outcomes are often difficult for citizens to understand. Although the Internet has made readily available a wealth of information, cultivating though in parallel misinformation and intentionally propagated falsehoods from questionable sources, making it increasingly difficult for citizens to come to a common understanding of facts. At the same time, the criticism received by existing metrics for measuring progress and prosperity have hindered the establishment of a suitable and comprehensive framework for that purpose. Finally, the difficulty of tracking political events, such as the election of government officials and representatives or the enactment of legislation to their practical effects has been a factor greatly preventing citizens from reaching well-informed opinions about the effectiveness of applied policies.

More effective and efficient infrastructures and mechanisms are required for critically assessing the causal models or theories underpinning policy proposals for achieving government goals in the policy analysis phase,

so as to compare alternative policy scenarios and approaches, as well for evaluating whether some implemented policy has in fact produced the promised benefits in the policy monitoring phase, so as to hold elected governments accountable and better inform voters during elections, but also in order to help policy makers to take corrective action.

The research question the Policy Compass project (platform available at www.policycompass.eu) aims to address is whether and how these ICT innovations discussed above can produce better tools for supporting policy making and decisions. This section exposes the main ingredients the envisaged approach, and aims is to render a clear the role of each ingredient in the proposed approach.

3 The Policy Compass - A Framework For Inclusive Policy Analysis

The approach taken by Policy Compass for more factual, evidence-based and accountable policy analysis and evaluation is grounded on the premise that information technology can actually help people to make more informed decisions. It aspires to take advantage of Europe's increasing amount of open public data to allow citizens learn from historical experience by looking at how prosperity metrics have developed over time and how they connect with political events or other political changes that may have influenced them, as well as to collaboratively model and discuss theories explaining these changes.

	Pillar I: Prosperity Indexes	Pillar II: Open Public Data	Pillar III: Fuzzy Cognitive Maps	Pillar IV: Argumentation	Pillar V: Deliberation Platforms & Social Media
Pillar I: Prosperity Indexes	Define higher level metrics from lower level ones	Construct metrics by operationalizing open data sources	Predict the evolution of prosperity indicators by applying causal policy models	Weigh prosperity aspects according to the opinions expressed	Define prosperity metrics collectively
Pillar II: Open Public Data	Use historical events to annotate metric visualizations	Access open data sources, Publish data sets & their metadata	Use historical data to validate causal policy models		
Pillar III: Fuzzy Cognitive Maps	Develop ideas on the correlations among policies and prosperity fluctuations	Simulate causal policy models based on open data sets	Develop and apply own causal policy models	Define the strength of correlations according to the opinions expressed	Define policy impact models collectively
Pillar IV: Argumentation	Debate on prosperity metrics		Debate on causal models underlying policies	Summarize and visualize debates in argument maps	Aggregate poll outcomes to formulate a common position
Pillar V: Deliberation Platforms & Social Media	Share own developed prosperity metrics		Share own developed causal policy models	Poll public opinion on policy issues	Ensure citizens' wide participation

Figure 1. Key connection points among the pillars of the proposed approach

To this end, it comes up with an innovative mixture of open data and prosperity indicators (Innes, 1990), Causal Models (Fuzzy Cognitive Maps (FCMs) (Axelrod, 1976)),

and argumentation technology and integrates the former with deliberation platforms and social media, so as to develop a comprehensive methodological framework and the corresponding tools, empowering citizens and policy makers to better assess government policies. Figure 1 reveals in a condensed and comprehensive way how these ingredients are combined in a pairwise fashion so as to realise the capabilities foreseen.

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Prosperity Indicators

The term 'indicator'; is one that people can easily understand. It is regularly conceived as a sort of 'statistical measure' that can adequately capture crucial aspects of a (social) phenomenon that should be monitored, in particular when a specific policy measure is enforced to affect it. Perhaps then, the simplest and most general definition is that of "a set of rules for gathering and organizing data so they can be assigned meaning" (Innes, 1990). In the policy-making arena, an indicator is conceived as a concrete tool used for justifying and optimizing resource allocation.

Prosperity indicators are used to capture the level of welfare and the quality of life in a given region or society (Bate, 2009) (Diener & Suh, 1997), being thus suitable for the provision of advice to authorities regarding policies and projects, the specification of directives for industry and entrepreneurs, the use as input for assessing different aspects of economic activity by agencies and NGOs, as well as the provision of support for identifying the key factors that drive economic growth and development. Examples of prosperity metrics abound at city, regional or country levels, indicatively including the GDP, GPI, ISEW, GINI (Gini, 1936), HDI and Legatum Prosperity indicators (Legatum, 2009) as well as a number of indicators' concepts, related to positive externalities in the social domain, such as the overall level of education, the share of women in the labour force, the level of unemployment, the share of high-skilled labour force, infant mortality, the

Having been able to define indicators and supposing that having access to the data sources needed to calculate them in a consistent way is guaranteed, it is important to look again at the fundamental problem of their usability (Wong, 2006). How are these indicators to be exploited? How are they to be linked to the decision-making process? This seems to be a hard question, as their integration in the policy lifecycle is a very difficult task. As we exhibit below, this has been achieved in an integrated way in some

application areas, e.g. sustainability and environmental planning.

Open Data and its Role in Policy Evaluation

Opening government data turns governments into more transparent and accountable organisations, providing information to everyone about where government money is spent and what the government is doing. Nevertheless transparency does not directly imply accountability. "A government can be an open government, in the sense of being transparent, even if it does not embrace new technology. And a government can provide open data on politically neutral topics even as it remains deeply opaque and unaccountable." (Robinson & Yu, 2012)

The availability of open data for public use is of great value and growing importance as opening up data can be of great importance to society, the government and the economy in general. On the Governments themselves can also improve effectiveness and efficiency of their services by seizing the opportunities offered by open data. According to the ODI the benefits of the open data to governments include "enabling external collaboration to increase data quality, efficiencies in reducing duplication of effort and savings through not having to pay the private sector for information that government holds". When data is publicly available, outside experts can have the opportunity to verify and provide suggestions on the accuracy and quality of the data itself. Combining open data from different departments within the government can help into making everything more transparent, provide strong incentives on where money should be used more effectively as well as improve in the policy making.

Fuzzy Cognitive Maps

Policy impact models are to be defined within the context of the proposed approach on the basis of fuzzy cognitive maps (FCMs). Cognitive maps (CMs), the basis of FCMs, were first introduced by Axelrod to represent social scientific knowledge (Axelrod, 1976). A CM is a network diagram depicting causes and effects and as such it is represented by a labelled, directed graph of nodes and edges (Bryson, Ackermann, Eden, & Finn, 2004). Nodes represent domain concepts and edges causal relationships between nodes. The direction of an edge represents the direction of the causal relationship, which is also called a feedback. A feedback is positive (negative) if an increase in the first variable leads to an increase (decrease) in the second variable. In order to enlarge the scope of CM applications, several variations of CMs have been introduced in the literature. A fuzzified version of the CM was first introduced by Kosko (Kosko, 1986).

The application of FCMs to policy modelling and analysis has a long history. As a matter of fact, the first generation of cognitive maps has been applied to decision making in politics when Henry A Kissinger, a US politician, applied a CM to model the political situation in Palestine. Since

then, FCMs have been applied to policy modelling and analysis in politics and public administration. Mendoza and Prabhu applied FCM for participatory modelling and analysis for sustainable forest management (Mendoza & Prabhu, 2006). The Policy Compass approach aims to leverage the causal characteristics of FCMs, in order to model the theoretical assumptions underlying public policy proposals. In this respect, it aspires to enable through the design of easy to use web-based graphical user interface a broad range of stakeholders with limited technical expertise, to develop and apply their own causal policy models. Accordingly, it targets to link FCMs with flexible mashable visualisations of prosperity indexes, so as to empower users with the capability to develop ideas about the causes of correlations among historical events and prosperity fluctuations. Moreover, it foresees the simulation of causal policy models based on open data sets, so as to enable users to investigate and analyse the impacts of policy changes.

Argumentation Technology

Argumentation Technology, and thereby argumentation support systems are computer software for helping people participate in various kinds of goal-directed dialogues in which arguments are exchanged. The idea of using argumentation support systems for e-Participation is not entirely new. Arguably it can be traced back at least to Rittel's work on Issue-Based Information Systems (Rittel & Webber, 1973), which are essentially visual maps of arguments, to help people collaborate and find solutions to what he called wicked problems, i.e. problems which have no algorithmic, scientific or objectively optimal solutions for a variety of reasons, including the lack of consensus among stakeholders about such things as utilities and values.

Argumentation contributes in making the decision and policy making process more efficient, transparent, open, fair and rational. Thereby, argumentation technology is employed within the context of the proposed approach for critically discussing prosperity indicators and causal models underlying policies. Additionally, the use of argumentation is foreseen for summarising and visualising debates in argument maps, polling public opinion on policy issues in the context of e-Participation platforms, and aggregating poll outcomes to formulate a common position in a party or interest group using delegated voting, but also for feeding back argumentation outcomes as structured open data.

Deliberation Platforms and Social Media

Deliberation platforms incarnate the result of the effort taken by Government agencies, to increase citizens' engagement in their decision and policy making processes. The first wave of deliberation platforms has witnessed extensive information on government activities, decisions, plans and policies, the proliferation of e-voting and e-

consultation spaces, along with various types of e-fora. Not surprisingly, the first generation of deliberation platforms did not meet the original expectations. The advent of Web 2.0 tools has created a more vivid environment and the popularity of the social media has set a new battlefield for the concept of e-Participation. Given that citizens' engagement in policy making is an important facet of e-Participation, an outstanding feature of the envisaged approach is the integration of the proposed solution concept into existing deliberation platforms and social networks. Such a perspective is anticipated to complement current e-Participation approaches with tools for simulating and evaluating policy theories or models, and assessing policies on the basis of progress indicators, as well as to enhance citizens' participation as a result of the capability to collaboratively develop or share customised policy models and prosperity indices and thereby to obtain the citizens' perspective on policy issues.

The approach is in fact built around the three basic axes of a) Policy Performance Evaluation, b) Causal Policy Models Construction, and c) Online Deliberation and Argument Mapping. Each of these pillars puts particular emphasis on a different aspect of the suggested framework, i.e. on the construction of own prosperity indicators for policy evaluation, the development of policy causal models for policy analysis, and the participation in online deliberations for discussing and reaching informed judgments on political developments respectively. Each of these pillars provides further the underpinning for a corresponding use case scenario. The goal of this section is to expose the three representative scenarios, emanating from the basic pillars of the Policy Compass approach, so as to illustrate at a more practical level its potential usefulness and applicability in the policy analysis and evaluation phases of the policy cycle. These axes are presented as use case scenarios to provide a better understanding on how these could be used.

3.1 Policy Monitoring and Evaluation

Motivated by their desire to check or verify whether a specific policy action, policy directive, law etc. has actually achieved or failed to meet the initially set goals, and thereby whether the relevant or accompanying Key Performance Indicators have actually reached or not the target values promised, citizens may leverage the proposed approach to confirm the understanding they have. Searching for and taking advantage of relevant metrics and open data sets is the first logical step, while exploiting existing causal policy models to verify their assumptions in

a more documented way is an enhanced option. At the same time, drawing connections between prosperity metrics (Bate, 2009; Diener & Suh, 1997) and specific policy actions and generating suitable visualisations, enhances the reasoning process and allows reaching more informed judgments on policy making. Finally, sharing the findings with a wider community is also supported.

3.2 Policy Analysis

Relevant to the former scenario, a user that is more involved in the policy making process, i.e. an expert, a policy maker etc., may not be satisfied with simply utilising existing casual policy models to verify or even analyse and predict policy outcomes. A user with the relevant background can thus build a new (or ameliorate an existing) casual model. Turning the former in a more user friendly and comprehensible form, i.e. a Fuzzy Cognitive Map (Kosko, 1986) which is illustrated as a directed network diagram depicting causes and effects, can act as a catalyst for understanding and evaluating the newly developed model. Carrying out a simulation based on the aforementioned model, in order to predict future impacts, is an additional advanced option. Accordingly, sharing outputs with other users is foreseen as well.

3.3 Online Deliberation and Argument Mapping

Online deliberation can act as a catalyst both a priori and a posteriori of the two previous scenarios: online discussions can on the one side offer valuable input to anyone looking for data and information relevant to his/her interests, before actually taking advantage of the envisaged approach for policy analysis and evaluation in the ways described within the aforementioned scenarios, while on the other side, users can be engaged in multilateral meaningful discussions for reasoning on, criticising and verifying policy analysis and evaluation results. Additionally, and since non-structured deliberation is not always of actual value, argument mapping offers an easy and effective way to quickly navigate through discussions and extract relevant conclusions that can provide input and feedback for the scenarios described above.

4 Benefits and Added Value of the Approach

The essence of the Policy Compass approach lies in simplifying the way to utilise, mash-up, visualise and interpret the increasing amount of open societal, economic and environmental data and wealth indicators, released by public and local administrations and international official organisations. By doing so, the proposed approach aims at

raising and objectifying the public discourse on how to measure growth in the economy and society, as well as on how to develop holistic prosperity and progress indicators and at exploring the opportunities and limits of growth, resource consumption and technological progress.

More precisely, by doing so, the proposed approach aims at tackling the main challenges that are currently hampering effective policy analysis and evaluation. In this respect, it aspires to offer the gateway to a large reservoir of ready-to-use, open public data from reliable sources, preventing thereby citizens from being deceived by misinformation and falsehoods spread across the internet in their effort to monitor the implementation of policies. At the same time, it targets to grant unprecedented freedom with regard to the construction, synthesis and scope of prosperity indicators, surpassing thus the limitations of existing prosperity measurement frameworks and metrics. Finally, it aims at making possible the analysis of the concepts of prosperity and progress in close relation to specific policies and political events.

The realisation of the framework described through the Policy Compass platform is in fact anticipated to offer a bouquet of benefits. Decision makers on the one side can develop custom, composite indicators that are able to justify and also keep track of policy decisions, as well as visualise their achievements, thus making them more explicit to the public and increasing the former's confidence in progress towards the societal goals, set in the context of the policies enacted. Further to that, they can extend their knowledge and expertise with regard to policies and forecast potential policy implications through the elaboration of co-created policy models that are powered by the wisdom of the crowd. This can in turn reduce the costs involved in the process of analysing and monitoring policies, while also increasing the quality of decisions taken. Citizens on the other side can in fact obtain a clearer view of the multiple dimensions that underlie policies, including their unintended side-effects, thus being able to play a more active role in shaping public policies. In parallel, they can improve the objectivity and evidential basis of their own arguments, thereby enhancing the quality of policy deliberations in which they are involved. Eventually, both parties, i.e. decision / policy makers and citizens can get involved in meaningful discussions that, instead of reproducing superfluous controversy about policies, will focus on the essential task of finding political compromises respecting the diverse interests of stakeholders.

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