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# Open Government Data Ecosystems: Linking Transparency for Innovation with Transparency for Participation and Accountability

Luigi Reggi<sup>1</sup> and Sharon Dawes<sup>2</sup>

<sup>1</sup> Rockefeller College of Public Affairs & Policy, University at Albany, USA  
luigi.reggi@gmail.com

<sup>2</sup> Rockefeller College of Public Affairs & Policy and Center for Technology in Government,  
University at Albany, USA  
sdawes@ctg.albany.edu

**Abstract.** The rhetoric of open government data (OGD) promises that data transparency will lead to multiple public benefits: economic and social innovation, civic participation, public-private collaboration, and public accountability. In reality much less has been accomplished in practice than advocates have hoped. OGD research to address this gap tends to fall into two streams – one that focuses on data publication and re-use for purposes of innovation, and one that views publication as a stimulus for civic participation and government accountability - with little attention to whether or how these two views interact. In this paper we use an ecosystem perspective to explore this question. Through an exploratory case study we show how two related cycles of influences can flow from open data publication. The first addresses transparency for innovation goals, the second addresses larger issues of data use for public engagement and greater government accountability. Together they help explain the potential and also the barriers to reaching both kinds of goals.

**Keywords:** open government data, ecosystems, transparency, innovation, participation, accountability

## 1 Introduction

The open government philosophy has stimulated a global transparency movement with goals of innovation, participation, and accountability. National and subnational governments in every part of the world are adopting open data programs with the expectation that free and open publication of government data will lead naturally to an array of economic, social, and political benefits. Yet, Yu and Robinson [1] suggest that the vagueness of the label “Open Government” does not help distinguish between openness of government data in terms of technical access and reusability for service innovation and the use of open data for civic participation and accountability purposes. Data publication and re-use by private actors can and does support innovative applications that reflect the interests and skills of technical experts. But publication by itself does not necessarily lead to greater collaboration between

government and ordinary citizens nor to greater accountability by government for policies and programs. For example, Shkabatur [2] contends that the US Open Government directive fosters “transparency without accountability”. by allowing public agencies excessive discretion over which datasets are of “high value” and thus chosen to be published. Consequently, much of the data disclosed in discretionary OGD portals such as Data.gov can be irrelevant for purposes of accountability. Lourenço [3] draws similar conclusions from a systematic analysis of seven national open data portals. Even in places where all data is required to be published, there is no guarantee that civic collaboration or greater accountability will result [4].

While the rhetoric of open government data promises that data transparency will lead simultaneously to innovation, collaboration, and accountability, most research falls into one of two streams – one that focuses on data publication and re-use for purposes of innovation, and one that looks at data publication as a stimulus for civic participation and government accountability. Few attempts have been made to understand empirically whether and how these streams interact. In this paper we begin with a recent ecosystem model that draws on the first stream of work [4] and extend it through the use of an exploratory national case study to also encompass the second. In particular our research aim is to demonstrate conceptually and empirically the crucial connections that allow these two streams of effects to be understood as a complex and integrated ecosystem with attendant barriers and enablers.

## 2 Literature review

Since the release of the Open Government directive in the United States in 2009 and the long process of revision of the European Directive on Public Sector Information concluded in 2013, public rhetoric has promised a trio of potential benefits: data-driven product and service innovation, greater public participation in policy making, and more government accountability. Researchers have generally followed two divergent paths – one group focusing on the innovation theme, the other on participation and accountability.

In the first group, authors have focused their attention on the economic benefits of re-use of OGD to foster innovation [5]. At the core of these works is the idea that the continuous release of easily accessible, machine-processable and possibly real-time government data can act “as a platform” for the creation of new applications and services [6], including “civic innovation” initiatives by NGOs and civic technology communities. To this end, Sieber and Johnson [7] identify two proactive strategies that governments can adopt to increase co-production of new services. In the *code exchange* model, governments actively support the use of OGD through app contests based on explicit public needs. In the *participatory open data* model, governments create feedback loops about data quality and structure, with the aim of initiating an “on-going co-creation of raw data between both governments and governed”. A very similar view is presented in the *open data for engagement* framework [8], where users participate in the improvement of governmental datasets by offering feedback and creating new data resources. For example, platforms for open data publication have been developed that integrate the collection of user feedback on the data released

through Web 2.0 functionalities [9]. Related work has focused on data quality and management practices, and OGD program design and operation [10, 11].

Other scholars have highlighted the potential benefits of analyzing and visualizing government information to better understand public problems and make better decisions [12]. This literature also considers the contribution of OGD to more general Open Government objectives of increased availability of government information, improved civic participation and collaboration, and greater accountability of governmental activities. Peixoto [13] considers civic participation as a key contributor to “unlocking the potential for open data to produce better government decisions and policies”. Janssen, et al. [14] list political and social benefits including not only increased transparency, but also accountability, citizen empowerment, trust in government, and improvement of the policy making process. Published data can also be a powerful tool against corruption [15] in transparency initiatives that emphasize disclosure of public budgets, agency performance, and contracts.

However, whether focused on innovation or on participation and accountability, current OGD practices suffer from substantial legal, political, social, institutional, economic, operational and technical challenges [16], leading to what have been called the “myths” of open data [13]. These include the belief that opening data leads automatically to more open and inclusive government. Political challenges include the lack of institutional motivation and political will to publish relevant datasets. Additional challenges emerge when considering the actual use of OGD. On the supply side, OGD programs are often designed not for citizens but for technical experts and intermediaries [17]. On the demand side, the lack of incentives, interpretive tools, and contextual and technical knowledge among users can prevent meaningful data use [18]. Finally, lack of institutional processes for dialogue prevents integration of public feedback into existing strategies and programs [14].

Recently researchers have begun to use an ecosystem metaphor to model the complex dynamics among these different actors and concerns [4, 19]. In particular, Dawes, et al. [4] draw from evidence in two empirical cases in different settings – New York City and St. Petersburg – to explore OGD programs as ecosystems of interconnected organizations and individuals working within a shared social context. Briefly, they identified a cycle of influences regarding the ways in which ecosystem factors shape publication, use, and feedback about the data itself. According to the model, OGD providers can influence data use by designing OGD strategies and publication practices that encourage use. In turn, the users, such as transparency advocates and civic technologists take advantage of the data by using it directly or by developing new applications that can reach a broader audience of beneficiaries, therefore acting as OGD intermediaries [17]. The resulting economic and societal benefits can influence further advocacy and interaction with providers to improve the quality of OGD data, strategies and practices.

In the next section we describe the case of OpenCoesione in which data publication is augmented by both government and intermediaries to become information usable by civic groups and individuals attempting to hold the government accountable for development projects in Italy. We then use the case data to suggest an extension of the Dawes, et al. [4] model to better integrate participation and accountability elements and discuss how the transparency inherent in OGD data publication programs can stimulate both innovation and participation and accountability.

### 3 An exploratory case study

In this section we present preliminary results of a case study of an OGD initiative in Italy from 2014 to the present that aims to improve citizen engagement and accountability, and the related ecosystem of data intermediaries and users.

The data comprise participant observations and a review of three complementary open government applications (an OGD portal and a Massive Online Open Course developed by the Italian government and a civic technology application from civil society). In order to collect data on the perspectives of governmental and non-governmental actors with different roles in the ecosystem, key stakeholders with knowledge and direct experience in these programs were identified through purposive sampling and interviewed between January and March 2016. They include practitioners with different roles in the Italian government (one project manager and three analysts), two members of the steering committee of the civil society initiative *Monithon*, one representative of a local community in Southern Italy, and two researchers at two different Italian research institutions. The semi-structured interviews were focused on their perspectives on the enablers and barriers to an effective and sustainable OGD ecosystem. Three published program reviews [20-22] served as additional sources of information. The integrated conceptual model developed from the case was sent to the respondents for comment and validation.

#### 3.1 Context

European Structural and Investment Funds (ESIFs) represent the main investment policy tool of the European Union (EU), with a total budget of €454 billion or 43% of the total EU budget. The funds co-finance a wide range of national and local development policies, from the support of new businesses to the development of infrastructures in areas such as broadband, renewable energies, and water supplies, with a strong focus on reducing disparities among European regions and countries.

The economic literature has shown mixed results in assessing the real impact of European investment funding on economic growth [23], and these programs face challenges in terms of efficiency, effectiveness and the complexity of evaluating the performance and impact of millions of different projects funded across Europe.

Furthermore, concerns have been raised about the limited opportunities for bottom-up inclusiveness and participation in the policy process, from programming to implementation to evaluation of results. A much more inclusive participatory process has been suggested as a way to improve efficiency, effectiveness and accountability of the policy, with stakeholders, civil society and final beneficiaries to be substantively involved [24, 25].

Starting in 2014, new regulations were adopted to increase transparency and participation of relevant stakeholders. First, a set of mandatory information must be disclosed in the form of OGD through development of program-specific national OGD portals, increasing the number of mandatory fields from 3 to 11, thus forcing administrations to release more detailed information on each funded project and its recipients [26]. Second, the national portals must provide “information to all operational programs in that Member State, including information about the timing of

implementation . . . and any related public consultation processes”. Third, a code of conduct on partnership encourages broader engagement of local stakeholders.

### **3.2 ESIF in Italy: OpenCoesione, Monithon and A Scuola di OpenCoesione**

Italy is the second largest recipient of ESIF among the EU countries, with an allocation of €42.7 billion for 2014-2020. The total budget for these policies is even higher – about €123 billion – thanks to national and regional co-financing and additional funds for regional development. These resources represent the main source of investments in Southern Italy, where about 80% of the funding is to be spent.

**3.2.1 OpenCoesione.** All these financial resources are tracked on the national OGD portal *OpenCoesione.gov.it*, which acts as the national transparency portal under the new regulations. OpenCoesione was created in 2012 by the Ministry of Economic Development to publish information about every project carried out in the 2007-13 period. The portal makes use of a large set of administrative data from the national monitoring system managed by the Ministry of the Economy. The system is a federated information network that interoperates with dozens of local applications collecting information from the recipients of the funding, with a complex multi-level governance organization.

In March 2016, OpenCoesione was publishing data on almost 950.000 projects with a total investment of €51.2 billion. The projects range from the construction of large infrastructures worth billions of Euros to individual grants to students. For each project, users can access a webpage with information about the amount and sources of funding, approximate location, actors involved, and implementation timeframes. They can download raw data, use the Application Program Interfaces (APIs) to analyze the data or develop an application, or browse through interactive diagrams.

OpenCoesione also launched different initiatives to stimulate the use and re-use of the datasets, including publication of articles with news, analysis and infographics; maps and interactive visualizations; webinars; a data journalism school; and workshops and seminars at numerous research institutions. Interactive tools are available on the portal to receive comments and suggestions directly from the recipients and final beneficiaries. However, having insufficient resources for directly managing citizen engagement activities, OpenCoesione representatives also participated in hackathons organized by both national and local civic technology communities to stimulate new initiatives and applications and to collect feedback both on the data released and on the results of the projects included in OpenCoesione.

**3.2.2 Monithon.** During one of these hackathons in 2013, the OpenCoesione team organized a *Monithon*, that is a “civic monitoring marathon” of local EU-funded projects. Based on the project-level OGD on OpenCoesione, a group of journalists, analysts, developers and individual citizens collected further information about five projects on the renovation of school buildings in Bologna by conducting interviews with people in charge of implementation and gathering evidence such as videos and photographs documenting progress and results. They soon realized that further investigations were needed since the OGD on the portal provided no clues about

crucial questions such as: What are the policy motives and decisions that led to finance the project? Who is responsible within each governance actor? Who are the contractors and subcontractors and how have their expenditures been tracked? Most importantly, basic narratives about the projects' objectives and activities, performance data, and output indicators were all missing.

This first experiment then evolved into a nationwide, civil society initiative named *Monithon.it*, that in two years of activity drew dozens of local communities - some formed on purpose and others based on existing associations - and more than 3,000 people into civic monitoring activities. Both national and local communities are involved, such as Action Aid Italy or the main Italian anti-mafia association Libera. However, *Monithon.it* is not a formally funded organization; it relies mainly on volunteer effort. Although the costs of developing and maintaining the technical platform are partly covered by grants received thanks to partnerships with NGOs, *Monithon.it* faces a persistent problem of economic sustainability [20]. Effective engagement and coordination of local communities depends heavily on the work of the three volunteers who comprise the central staff.

Civic monitoring is organized as a group activity in which interdisciplinary competences are employed to carry out qualitative investigations to assess project performance. These include the project history, the underlying policy motives, and the network of governance actors and implementers responsible for programming or implementation. The purpose of this activity is not only to enrich the information in the publicly available datasets and collect feedback on data quality, but also to collect feedback on the ground about project results and suggestions for improvement from the perspective of the final beneficiaries. All the new information acquired is collected through a standard methodology (questionnaire, interview guide, guidelines for data analysis and fieldwork organization), and then represented in a map on the *Monithon.it* platform [21].

In March 2014, after one year of activity, 55 "citizen monitoring reports" were published on *Monithon.it*, covering different policy areas such as transportation, cultural heritage, urban policy, education, and social inclusion [21]. By July 2015, 98 reports had been uploaded. About 40% contain basic information about the project, plus some evidence about the progress and the result, such as photographs. The remaining 60% can be characterized as in-depth investigations with detailed descriptions of project history and motives, displaying photos, videos and links to project or policy documentation.

The information collected is published on the *Monithon.it* platform as OGD and can be used by administrations and local governments, journalists, researchers and NGOs to influence the implementation of the ESIFs and the programming of future policy actions. In some cases, citizen monitoring reports received the attention of local newspapers, especially during special events such as Open Data Day, generating public debate about the use of public funding. In other cases, new collaborations were created between local communities and administrations. For example, the group *Monithon Piemonte* in Torino initiated a dialogue with the director of the Egyptian Museum to improve a renovation project funded by ESIFs. In Bari, the results of civic monitoring of social innovation projects were used by the Ministry of Research to program future actions in this field. In other instances, the lobbying activity of NGOs like Libera has helped channel feedback to the attention of policy makers. In these

cases, citizen feedback influenced the way national and local administrators made decisions, in both the monitoring and in the policy creation phases of the policy cycle.

However, in many cases the feedback is shared only within the community and fails to be addressed to or by policy makers. While OpenCoesione collects citizen feedback both on the data itself and on policy performance it does not directly bring feedback to the attention of policy makers, but instead points the users in the right direction by giving information about the agencies responsible for specific projects and programs. But, since no legal mechanisms are in place that force administrations to consider feedback from individual citizens and informal groups, the Monithon communities need to persuade local decision makers to listen and collaborate [20]. When it reaches local administrations, often it is not taken into account to make actual decisions. In addition, administrations have raised concerns about the representativeness of feedback collected.

A major challenge for sustainability, then, is creating enduring local groups with sufficient motivation and specific, interdisciplinary expertise to do this kind of work. While basic crowdsourcing activities such as collecting photos and videos documenting the progress of public works can be relatively easy to conduct, more sophisticated investigations require specific knowledge about ESIFs policy mechanisms, national and local administrative procedures, data analysis and visualization, fieldwork, data collection, and communication of findings. To this end, a partnership with Action Aid Italy was created to support local volunteers in developing new skills such as understanding financial data, via free workshops and laboratory sessions. In one case, a project financed by the European Commission will ensure three years of financial support to this kind of activity in Sibari (Calabria).

**3.2.3 A Scuola di OpenCoesione.** Partly in response to these problems, in September 2013 OpenCoesione in partnership with the Representation Office of the European Commission in Italy launched *A Scuola di OpenCoesione* (or OpenCoesione School), an educational challenge for high school students and a Massive Online Open Course (MOOC), in order to stimulate data use, civic engagement and awareness. The Ministry of Education also partnered in this initiative with the goal of increasing data literacy and ICT use among students and teachers. A Scuola di OpenCoesione uses the Monithon tools and methodology to organize civic monitoring activities. The students learn not only how to analyze policy and administrative sources and conduct field investigations, but also how to use complex datasets regarding real-life civic issues to develop and present multimedia content. In the 2015-16 edition, 120 schools and 2,800 students from all Italian regions enrolled. Each school chose a project to analyze based on OGD from OpenCoesione.

As the students organized events to disseminate their results, they created further opportunities to raise civic awareness and to strengthen the dialogue with NGOs and local representatives of the European Commission (the “Europe Direct” network) from which they received support. All of the events are public and represent a sort of “accountability forum” in which the students interact with the local community and political leaders and administrators responsible for implementing the projects, asking questions and suggesting solutions. These events produced mixed results. In some cases, they stimulated an evidence-based public debate. In others, especially when the results of the citizen monitoring were mainly negative, local politicians did not



respond to issues raised or simply did not get involved. When events were organized in municipalities where courts have appointed administrators to replace elected officials implicated in mafia crimes, public institutions did not attend at all [20].

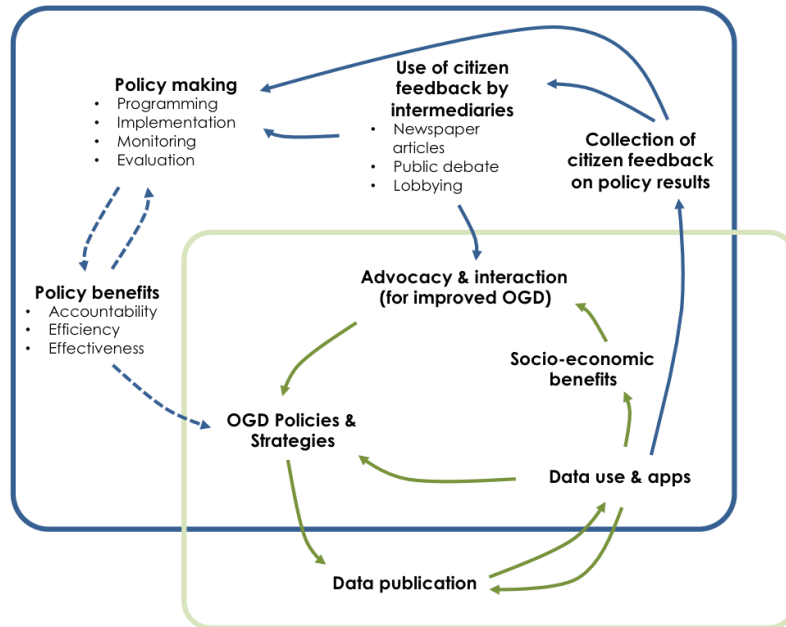
#### **4 Discussion: Toward an integrated open government ecosystem**

Drawing from the evidence in the case, we propose an extension of Dawes, et al. ecosystem model [4] to show how a related second cycle of influences can flow from open data publication. While the first cycle addresses transparency mainly for purposes of innovation, the second addresses issues of collaboration and engagement around government policies and toward greater accountability for policy performance.

As shown in Figure 1, a government's *OGD Policies and Strategies* and *Data Publication* practices, such as choices about the format and granularity of the datasets, strongly shape the realm of possible *Data Uses and Apps*. In particular, OGD use in civic applications like *Monithon.it* not only stimulates civic awareness and social capital among local communities (*Socio-economic benefits*), but also enables the systematic *Collection of citizen feedback* on government performance, spending and policy results from the perspective of the actual beneficiaries. This feedback can be directly addressed to policy makers, or can be conveyed through the work of intermediaries such as the media, NGOs or other relevant stakeholders. In the first case, feedback can be conveyed through engagement tools and channels developed by the government. In the second case, *Intermediaries* can influence policy decisions by stimulating public debate or lobbying for specific goals. Intermediaries can also press for better data increasing the level of *Advocacy and interaction* with data providers, with consequent influence on *OGD Policies and Strategies*. The realization of more participatory forms of *Policy Making* can enable evidence-based decision making with the desired effect of improving accountability, efficiency and effectiveness of the policy. These perceived benefits, in turn, can potentially lead not only to better policy making practices and choices but also to improved OGD programs. Our case shows that all these influences are possible, although the last few related to evidence-based policy making and public accountability tend to be weak and infrequent. Thus we indicate them in Figure 1 with dotted arrows.

The case shows how a combination of government and civic actions can stimulate a cycle of collaboration and accountability (the darker box in Figure 1) that is linked to the more data-oriented innovation cycle (the lighter box) proposed by Dawes, et al. [4]. According to our case, an OGD provider (*OpenCoesione*) published data with high granularity about significant European and national public investments, in ways that could prove useful for individual citizens and communities [27] for diverse uses. Civil society actors such as *Monithon.it* leveraged this data to develop civic technology tools and methodologies to foster civic engagement for systematic collection of citizen feedback on project results. The government-sponsored *A Scuola di OpenCoesione* created civic awareness, social capital and new skills for participation [28] based in public schools, while NGOs such as Action Aid Italy and Libera fostered both skills and use of the data for important public issues. These practices helped overcome some of the typical limitations of OGD programs, which

tend to offer engagement only about the data itself, and then mainly with a restricted group of technical experts and data intermediaries.



**Fig 1.** Integrated OGD ecosystem for innovation, collaboration and accountability

Feedback collected from these communities on data content – that is on how public investment projects are progressing and what results they are achieving – shows the potential to influence not only existing OGD strategies and practices, but also the policy decisions about programming and implementation. The examples from the case show that new forms of direct engagement between communities and governments can be triggered by civic monitoring activities. In addition, indirect public influence for more evidence-based public debate can be enabled the intermediation of the media and NGOs through news reporting, advocacy, and lobbying. These interactions set the stage for greater policy accountability, project efficiency and effectiveness, better policy decisions, and improved OGD strategies – although making these final connections to accountability and policy making are seldom fully achieved.

The case also highlights important enablers and barriers to substantial realization of an integrated OGD ecosystem. Enablers include at least two key elements. First, when the data content and characteristics match the interests of the user community, engagement seems more feasible and more productive. In the case, citizens and intermediaries were interested in understanding and giving feedback about specific local projects. Aggregated information about government spending, for example, would hardly be useful for meaningful analyses that could be directly used by policy makers to improve implementation or future programming of these specific public investments. The fact that OpenCoesione is dedicated to publishing data about development projects also helped the staff support efforts to collect feedback about them. All-purpose OGD portals seem too diffuse to offer this kind of support.

Second, proactive government strategies for stimulating use and re-use of OGD appear to improve both data quality and public engagement. Interaction between publishers and users stimulates interest in the content and quality of the data. In particular, involvement of communities and NGOs appears to stimulate local ecosystems of governmental and non-governmental actors working with the data. This involvement can enable new forms of collaboration, as the cases of Monithon and A Scuola di OpenCoesione demonstrate. In addition, active involvement of NGOs, associations and other stakeholders in monitoring activities is crucial to stimulate participation, especially when the realization of their own objectives also depends on the effectiveness of the public policies being monitored.

We also identified three main barriers. First, citizen feedback is greatly hampered by the absence of specific data and supplementary contextual information. For this case, information about project objectives and activities, underlying policy motives, decisions, contractors, results and output indicators – the elements of process transparency [2] - were missing. The available data did not allow users to fully understand the chain of responsibilities among these diverse actors and therefore was simply not *legible* for local communities [29]. This problem makes citizen investigations more difficult and less likely because specific skills and expertise are required not only to understand the published data, but also to retrieve additional information to put it in context. Consequently, effective civic monitoring seems to require expert support to obtain meaningful results. Without this kind of expertise, policy accountability and broad citizen participation and collaboration all suffer.

Second, the health of the ecosystem appears to depend heavily on the tenuous sustainability of civic technology initiatives and organizations acting as OGD intermediaries. In the case, intermediaries were sometimes supported by government or by NGOs created for other purposes. However, there were few such entities and their long-term economic prospects were usually dim. These *infomediaries* play a critical role in representing citizen interests or helping citizens represent themselves, therefore sustainable business models for this function, including a role for government, seem necessary [17].

Third, and perhaps most important, is the absence of real public accountability mechanisms between government and citizens. This absence is a powerful barrier to systematic integration of citizen feedback in the policy cycle. In the case, neither the ESIFs regulations nor the national legal framework provided these mechanisms. Specific internal government processes to encourage and process feedback from the bottom-up were weak, infrequent, and often completely missing. While the rest of the ecosystem may be robust, this gap at the end of the policy process may be the greatest barrier to achieving the collaboration and accountability benefits promised by OGD.

## 5 Conclusion

The objectives of OGD programs include not only fostering innovation but also encouraging greater government accountability and civic participation in policy making. In this paper we used an exploratory case study of OpenCoesione in Italy to try to understand whether and how all of these purposes can be served by open

government data programs. We presented the results in a preliminary integrated open data ecosystem model that comprises two interrelated cycles of influence that flow from OGD publication. One cycle addresses the innovation potential of OGD, the other addresses how OGD might support democratic values of participation and accountability. Our case analysis showed actors inside and outside government interacting in a complex open data ecosystem to pursue these diverse goals. The case study emphasized the importance of intermediaries who represent a crucial link between data providers and the ultimate beneficiaries of OGD products. In the case of innovation, intermediaries seek to provide information-based services to interested consumers. In the case of participation and accountability, intermediaries provide expertise in analysis and a variety of other domains that puts data in context for ordinary citizens and helps them communicate their views to policy makers and administrators. We also found that the weakest link in the ecosystem is a lack of effective mechanisms that channel citizen feedback into the policy process.

This work is only a first effort to understand the interdependencies among the multiple goals of open data initiatives. In future research, we intend a) to expand the Italian case study to include perspectives from other data intermediaries and users such as local authorities and NGOs, the media, teachers and students involved in the civic monitoring activities and b) to apply the model in additional case studies (such as different EU countries in the same policy context) to improve its usefulness and generalizability.

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