

Organizing and Promoting Value Services in Public Sector by a New E-government Approach

Nunzio CASALINO^{a,1}, Mauro DRAOLI^b, and Marco MARTINO^c

^a *Università degli Studi Guglielmo Marconi, Dipartimento di Strategie di Impresa e Innovazione Tecnologica, Rome, Italy, n.casalino@unimarconi.it*

^b *AgID - Italian Agency for the Digitalization of Public Administration, Rome, Italy, draoli@agid.gov.it*

^c *AgID - Italian Agency for the Digitalization of Public Administration, Rome, Italy, marco.martino@agid.gov.it*

Abstract. To strengthen democracy, promote government efficiency and effectiveness, discourage wastes and misuses of government resources, public administrations have to promote a new stronger level of openness in government. The purpose of this manuscript is to describe an innovative approach for the governance of public systems and services, currently applied in the Italian public administration domain, which could be easily replicated in other countries as well. Two initiatives, to collect and provide relevant public information gathered from different and heterogeneous public organizations, to improve government processes and increase quality of services for citizens and companies, are described. The cases adopted have been validated through a case analysis approach involving the Italian Agency for the public administration digitalization to understand new e-government scenarios within the context of governmental reforms heavily influenced by the principles of Open Government Model.

Keywords. Public sector, efficiency, transparency, organizational effectiveness, knowledge management systems, open-data, e-government strategy.

Introduction

In last two decades, the public administration sector has been affected by several deep and radical changes. In this period, different approaches to the government of public life and services emerged. Openness can make a democracy stronger in several ways. Where citizens can observe the workings of government, they become more invested in what government does. Government openness empowers citizens as well, as they are more able to express their views about policy decisions that affect them. Openness makes democracy stronger also by encouraging government officials to perform better, for where government is more open, they are more likely to be held accountable for their decisions, both good and bad. Similarly, a more open government makes it easier for the media and watchdog groups to expose, and therefore deter,

¹ Corresponding Author: Nunzio Casalino, Associate Professor of Organizational Behaviour, Università degli Studi Guglielmo Marconi, Dipartimento di Strategie di Impresa e Innovazione Tecnologica, Via Plinio 44, 00193, Rome, Italy.

improper or otherwise undesirable influences on policymakers. In short, openness enhances democracy by giving citizens a greater voice in what government does, and promoting government action that advances the interests of all, not just a privileged few. Openness promotes a more efficient and effective government too. When government is more open, bad ideas more readily yield to good ideas. After all, not all expertise resides within government. These were the New Public Management [1, 2, 3], the New Public Governance [4, 5, 6] and, last but not least, the Open Government Model [7, 8, 9]. All of these approaches have contributed in different ways to manage the large complexity of the public sector. This means that public administration is constantly looking for ways to improve its performance. Inside this wave of changes, new approaches and forms of knowledge management systems are gaining predominance in the public sector scenario. Now the challenge is how to organize a proactive disclosure so that information can easily be found by users. New technological opportunities and the increasing information demand make it imperative for public authorities. The open access to public information and data can be a powerful approach to support a reorganization of public services, a real innovation and achieve well-motivated civil servants. Therefore, the easy and immediate access to public information can be a significant driver of economic growth to obtain new services and applications. The first objective of this paper is to present a model to assess the open government initiatives: Open Government Implementation Model (OGIM) [9]. The main idea of this model is to adopt a tool to organize and classify open government efforts. This model is focused on the outcomes, specifically on the open government websites and on open government development path. According to this idea, a first step to develop and evaluate Open Government could be the user's perspective, that it is a precondition for implementing the following steps. We analyse some Italian and international experiences related to central transparency web portals, to describe the benefits and complaints of open data around openness. Then the paper focus on a case study of an innovative Italian centralized government portal: Italia.gov.it. It is a tangible knowledge management system, that brings many advantages to provide relevant public information and produce inside the public administrations involved in a processes' reorganization and, in general, in better performance goal. Italia.gov.it project experience, currently a work in progress, is generating an innovative approach to developing other e-government portals, in addition to collecting and providing information gathered from a number of different, heterogeneous, independent sites in a consistent way. In fact, the mid-term goal of the project is to build a system able to automate the process of data collection and update them into a shared digital Public Administration knowledge base. This could generate, from an organizational point of view, better efficiency and a continuous scalability of on-line services' offer.

1. The Importance of Data Transparency and Accessibility

Governmental organizations manage several kinds of data during their daily activities. All these data are used by government functions but they could also be handy for citizens and other actors in society. In many countries, the public data are now being viewed not as private government property, but as public assets to be leveraged by citizens, businesses and experts' communities. Actually many of these organizations currently are reviewing and rearranging their processes, information and data to

improve policies, services, enhance legitimacy and openness toward outside parties and citizens. The development of web portals and search services to support citizens and business companies in finding information and e-services in the Public Administrations' websites is a very challenging organizational issue. Indeed, over the latest years the number of PAs digital services, mainly on the web channel, and of sources of e-government data [18] increased at an impressive rate. By merely considering Italian Public administrations, there is an estimated number of about 50.000 websites, with millions of pages. Digital public services can be defined as the view of public entities (and their services) in the virtual world (web, social networks, e-mail channels, mobile devices, etc.) and is the result of the work of thousands of autonomous (public) entities organised in a sort of *huge federated enterprise*. In this context, many countries are developing their strategic plans for Open Government initiatives launching pilot portal that manage the knowledge published over the Internet by public administration on a national scale to support stakeholders in finding the information they need within the digital public administration. The search.usa.gov site provides a notable example of this kind of portal: it provides an interface, which allows performing traditional keyword-based search queries with a simple and easy interface. Search.usa.gov integrates the web search service provided by means of a well-known public search service with other specialised search services, such as, for example, the recall search service, which makes it possible to find recall announcements (i.e. request returns of a product to the manufacturer, for necessary repairs or adjustments) published on several governmental websites. Transparency and open data can be powerful tools to stimulate and support public services' improvements, faster innovation and empower citizens' rights. The easiness and the immediate access to relevant public information, government processes and better performance can be a significant driver, with open data increasingly enabling the creation of valuable new services and applications [16, 17]. To better understand Table 1 identifies a sequence of monetary (economically quantifiable) and non-monetary (not economically quantifiable) benefits and threats not only for business and citizens users, but also for the public administration itself.

Impacts inside the public administration			
Benefits		Threats	
Monetary	Non-Monetary	Monetary	Non-Monetary
Publication of government data possible at low cost	Cultural shift to openness begins	Improved data quality: accuracy, consistency and regular updating	Cultural shift to openness
Reduced cost and time to develop new services	Foundation for performance improvement	Focus on high-value and high-impact data such as costs and performances	Cooperation agreements between government agencies
	Foundation for value-added online services	Investing in the right data analysis software	Data management responsibility
	The public is engaged through data	Integrating several data from government websites and databases to fine-tune and increase effectiveness	Data stored in government websites in compatible formats
	Increased customer satisfaction	Feedback on the data usefulness and quality	Reduced processing time
	Empowerment of the procedures	Fight to frauds by combining and analysing social and financial data	
		Proper resources committed to setting up or expanding proactive disclosure	

Table 1. An elaboration of benefits and threats of data transparency inside the P.A.

Internet enables public organizations to connect datasets to their portals and enable stakeholders (citizens, companies and communities) to have access to several data in a wide variety of ways. Broadband networks and mobile technologies are also facilitating the gathering of public data. Every government operation generates new data, which can be useful for stakeholders. The free movement of information within a digital society offers immediate, practical benefits and the promise of future opportunities that are yet unseen. In an information-driven age, the ability of government leaders to realize the opportunities presented by unlocking public data may ultimately spell the difference between success and failure.

Impacts outside the public administration			
Benefits		Threats	
Monetary	Non-Monetary	Monetary	Non-Monetary
Reduced cost and time for innovation	Increased public awareness and knowledge of data, process, and policy	Digital divide	Privacy
Public data usage by businesses for investment decisions	Increased government accountability	Time to develop new applications and services	Cultural shift to openness begins
Material resource saving (e.g. paper)	Easiness of compliance to access and manipulate data		
Improved economies	Speed		
Potential reduction of fees	Certainty of decisions		
	Empower citizens		

Table 2. An elaboration of benefits and threats of data transparency outside the P.A.

2. Open Government Implementation Model

Openness likewise discourages waste and misuse of government resources by revealing where scarce government resources are put to poor use, open government promotes the efficient reallocation of those resources. In turn, a more democratic and efficacious government improves the lives of its citizens. Information provided by government can help inform the electorate. Information from federal agencies can help the public make more informed choices about daily decisions, from the choice of consumer products to decisions affecting their health, housing, and transportation concerns. In addition, this is the true test: a more democratic and effective government is one that truly improves the well-being of those whom government is supposed to serve. By making open government a high priority, the administration has sought to improve the everyday lives of citizens more inclusively, more effectively, and more economically. Profound changes in the nature of technology, demographics, politics and the global economy are giving rise to new model of democratic government. We are entering a new age in which citizens take part in service delivery, decision making and policy making like never before. The steadily improving quality of information and communication technologies (ICT) has changed not only the daily lives of people, but also the interactions between governments and citizens. The e-government has started as a new form of public organization that supports and redefines the existing new information, communication and transaction-related interactions with stakeholders (e.g., citizens and companies) with the purpose of improving government performance and processes [10]. Today the public administration must move beyond e-government to forge governance webs capable of meeting rising expectations for openness,

accountability, effectiveness and efficiency in the public sector. The transition to “Open Government” begins with opening up formerly closed processes, embracing transparency and renovating tired rules that inhibit innovation [11, 9, 12, 13]. The “Open government initiative” of US federal government [14] is based on the implementation of three principles for a government: transparency, participation, and collaboration. Transparency promotes accountability by providing the public with information about what the Government is doing. Participation allows people to contribute ideas and expertise so that they can make policies with the benefit of information that is widely distributed. Collaboration improves the effectiveness of Government by encouraging partnerships and cooperation within different levels of government, and between the Government and private institutions. Placing the principles of Open Government within the current public administration context in which are inserted, it is useful to observe that, the open access to information and data, can transform deeply the idea of public government. In this way, functional data silos and distinction between “inside” and “outside” will disappear. “Government as a platform”, is the idea of the government data becoming feasible and accessible to citizens through information systems [7]. The general vision of Open Government Implementation Model [9] supposes that the use of information and communication technologies (ICT) can enhance efficiency, policy effectiveness, service quality, accountability and democratic value in public sector. OGIM model is a new paradigm in public administration that needs of four specific implementation stages: increasing data transparency, improving open participation, enhancing open collaboration, realizing ubiquitous engagement (figure 1). The main key point of OGIM model is that public authorities should advance their open government initiatives gradually, focusing on one implementation stage at a time. Besides data transparency [15] is a required precondition and an enabler for implementing better services in each phase.

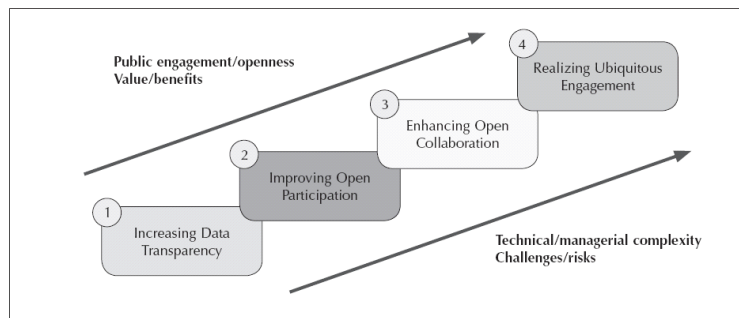


Figure 1. An open government implementation model, Lee G. and Kwak Y. H., U.T.S. Washington 2011.

3. Managing Open Government, Online Services and the Open-DAI Project

According to the Administration’s directive implementing the transparency open government plans must not preclude the legitimate protection of information whose release would threaten national security, overrun personal privacy, breach disclosure, or damage other honourably compelling interests. In the same time, managing public knowledge and extract info from tens of thousands of data sources is a challenging task. Our aim is the study of the possibility of designing an economically viable

information system able to manage the knowledge spammed in open data and over the Internet by public administrations on a national scale. The approach we are following is based on the following operating steps [19]:

- the knowledge base is built starting from the contents of centralized (institutional) sources of data;
- the institutional data are the basic to develop ad hoc solutions to discovery, analyse the unstructured contents over the web by digital administrations;
- the knowledge extracted from the unstructured contents enriches the knowledge base (e.g. with new classified entities and new relationships);
- the uncertain knowledge cannot be extracted automatically, so human operators are to be engaged to disambiguate the situation;
- the explicit and implicit feedback coming from operators is also used to improve the knowledge of the system;
- the previous steps should be continuously repeated to improve the knowledge of the system and update the contents.

A web search engine is essential to offer the best way for public organizations to find information between their big databases, partners' archives, and citizens/SMEs email and documents. The search engine used in the project is built by using open-source software tools, is highly extensible, thus allowing the integration of ad-hoc search components and making it possible to fully exploit additional information (e.g. linguistic resources such as list of acronyms, or formalized knowledge such as, organization charts, the institutional mission of PAs and their jurisdictional boundaries). These functions are designed and experimented with the contribution of DigitPA staff and researchers from several Universities, who take advantage from Italia.gov.it project to gain access to data and information, typically available only to commercial search engine providers, and from other DigitPA previous projects. Currently, the following ones are under development:

- news.italia.gov.it: a service to monitor all news related to PAs;
- faq.italia.gov.it: a question-answering system able to search answers in FAQs published on PAs web sites;
- form.italia.gov.it: a search service aiming to help citizens looking for forms published on PAs web sites;
- dati.gov.it: is the Italian National Portal of open data created after a series of government data store launched in recent years;
- spedata.digitpa.gov.it: is the portal of the open data of the Public Connectivity and Cooperation System (SPC) designed and managed to share the whole set of public data available from Public Administration.

In the PSI value chain, Open-DAI is positioned with the main role of "enabler" and the opening up of public data brokerage platform between public and potential re-user of data released by the former. Enabled functionality to the holder of public data:

- provisioning of data to enable the publication (general functions such as ETL: Extract, Transform, Load, or more specific functions, such as anonymization);
- support in selecting the right license to be affixed to the opening data;
- publication of the dataset in an open format of open-DAI portal or portals catalogue (regional, national, sectorial).

Features enabled to the user:

- access to a catalogue of datasets accessible through Open-DAI on their website or on the portals of reference (e.g. [www. Dati.gov.it](http://www.Dati.gov.it));
- publication of SOA API for generic access to datasets in Open-DAI;
- publication of ad hoc SOA API for specific application purposes.

Because of a first analysis, the elements differentiating Open-DAI compared to other similar systems are listed below:

- access to open source data in real time and is therefore suited to highly dynamic datasets;
- since it is based on Cloud, the platform is scalable to fit to large data sets;
- since it is based on Cloud, the platform is scalable with respect to the number and frequency of queries to access dataset;
- since it is based on Cloud, the platform is scalable with respect to the number of datasets; the marginal cost of managing the platform grows slowly as a function of the number of datasets published;
- the platform solves the typical risks perceived in terms of privacy and security, since the data are not stored in the Cloud;
- open-DAI can offer services such Platform As a Service and has the ability to host application components for clients.

Weaknesses:

- the platform adds a low semantic value to the open data.

We schematize three business models. If this business strategy will be actually adopted, one of the theoretical references for its definition is that of the double-sided platforms, which intermediates - as in this case - supply and demand, practicing different conditions of access and use of the platform (e.g. rates) depending on the side, in order to maximize the total revenue. Role of Open-DAI to the PA owner of data: free service aimed at the publication of data. The value is in the lead in Open-DAI as much data as possible, in order to increase the perceived value. Role of Open-DAI to re-users:

- Service broker access to data by:
 - public re-users (by formal instrument of negotiation: the convention);
 - users' undertakings (pay services with guaranteed service levels);
 - citizens (free basic services).
- Supplier of value-added services:
 - support services for application development (API ad hoc).

4. The impact of the Italian law on e-government and the Italia.gov.it platform

E-government refers to a series of technical tools commonly used for interacting with public administration, such as electronic signature, PEC, e-procurement and on-line forms. All these instruments are codified in a single act: the digital administration code (CAD). The code, approved in 2005 and reviewed in 2011, establishes a number of normative innovations, which affect administrative practices and the quality of the supplied services. Italy's programs on e-government are the result of the implementation of strategies and guidelines set by the European Union, which entails the improvement of the network bandwidth, the diffusion of digital contents, research and development activities, and the spread of digital administration services. The shift towards digital administration requires the development of a variety of well-suited solutions aimed at improving the internal organization, a comprehensive process

generally known as re-engineering. An example of supporting tool for improving digitalization is Italia.gov.it, which main task is monitoring public administration advancement in this field. Case-based research can be incredibly expensive in terms of direct cost and time expended. Nothing is more frustrating than incurring the cost of identifying information, reports or statistics only to find that they will probably provide no contribution to the research question. In our case, we had the possibilities to examine all the aspects of a project, in each phase of its timeline, and for this reason, we selected Yin's methodology [20] that was appropriate for the current level of knowledge and the state of the research problem. Italia.gov.it is a search engine and a directory of Public Administration websites designed and managed by DigitPA to facilitate the access of citizens, professionals and businesses to digital services and information for public. It is promoted by the Minister for Public Administration and Innovation, is also an "engine of change" of government online services to improve their use of digital communication technologies, thanks to several e-participation tools, the integration of the connecting channels, updates and evaluations monitoring. Italia.gov.it project started in August 2010 and will last for 5 years until 2014.



Figure 2. The project homepage www.italia.gov.it – source AgID 2013.

Most efforts during the first three years are focused to build-up the system, providing a number of highly specialized search services. The most critical activity is the organization of data and the automation of the knowledge base update process, which drive most of the costs of the project. The technical and economical results obtained so far are encouraging. The table shows the results of the system in performing the following tasks:

1. automatic discovery of the institutional web sites of the Italian Public Administration (about 10,000 administrations);
2. automatic discovery of public administrations with certified mail addresses - PEC (about 10,000 administrations with 27,000 certified mail accounts);
3. automatic discovery of web site sections devoted to legal advertising (about 8,000 administrations and 6,000 web sites sections);

4. automatic discovery of government public relations offices - URP (about 8.000 administrations and about 5,100 public relations offices addresses).
 For each of them, the table shows the completeness level (coverage with respect to the target domain) of the best institutional sources that are known and a comparison with the level of completeness automatically obtained by the italia.gov.it system.

<i>PA service</i>	<i>Level of coverage</i>	<i>Target domain</i>
Institutional web sites	84%	92%
Certified mail addresses - PEC	42%	67%
Legal advertising	69%	73%
Public relations offices - URP	78%	96%

Table 3. Level of coverage with respect to the target domain.

The quality of these results can be further and significantly improved through the involvement of human operators. After three years of activity, the italia.gov platform is managing a wide range of data, which are continuously updated. The increasing amount of data is passed from about 137.114 administrations (included UO and AOO) to 140923 in only ten days. One of the most relevant aspect of the platform is its multi-source system. The dataset consists of 15 institutional lists of different public administration (ISTAT, DFP, MEF, etc.).

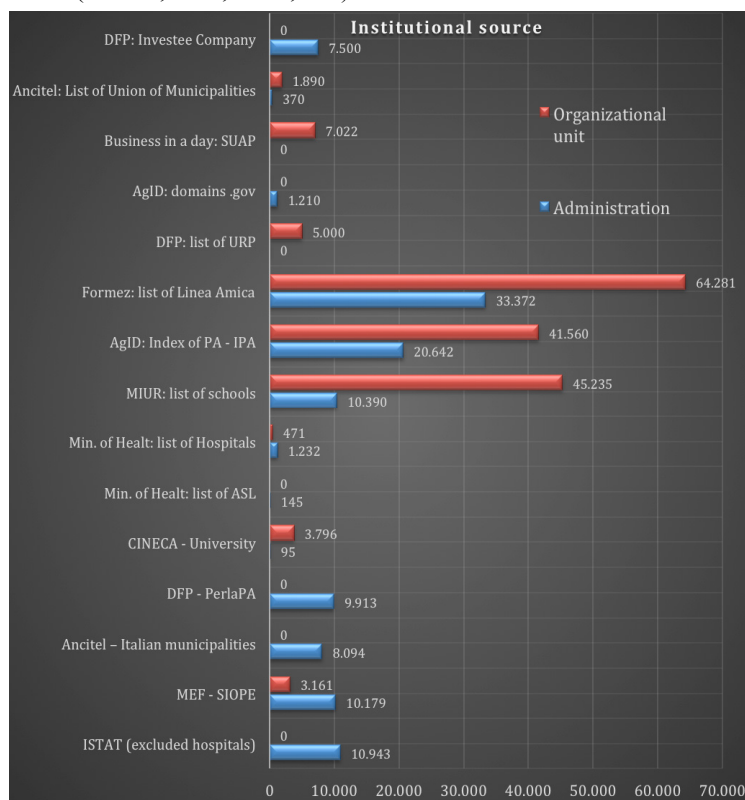


Figure 3. The institutional sources.

The system is able to cross check data, merge the ones similar and assign them an ID number. The data are categorised in 40 classes in which the Agency identifies and classifies the administrations. On the base of data owned, it is possible to generate a

series of statistics, which give us an interesting overview of the state of digitalization in Italy, by comparing territories (regions, provinces, municipalities) and different categories (Agencies, Authorities, Departments, Hospitals). For example, let us consider four indicators of digitalisations:

- subscription to the Public administration Index IPA;
- website availability;
- subscription to the Information system of e-procurement SIOPE;
- subscription to the integrated system of PA department PerlaPA.

The comparison between municipalities and hospitals shows us the different level of digitalization, marking in blue the best performing administrations which indicators are all positives and in red the least virtuous ones.

Italia.gov.it may prove a useful tool to public administrations and citizens who seek to approach and get more and more reports electronically. Italia.gov.it allows to search in detail the services online, notice boards of the PA, modules related of the digital PA, PEC address books, etc. The innovative strength of Italia.gov.it lies in providing to public decision-makers the ability to get involved effectively in the process of digitization of public administration. The system is designed in such a way as to function both for the purposes of monitoring of PA, both for the analysis of the predisposition that a certain PA has in a certain area, to become a digital administration.



Figure 4. Some new dynamic reports by Italia.gov.it - Source AgID 2013.

Being able to perform numerous analyses, we have chosen the most significant and easy to understand. We used three indicators:

- PEC: the presence of a certified e-mail box that allows direct dialogue between citizens and administration for administrative tasks;
- PA index: the propensity of governments to upload to the web master data organization. In other words, give much information as possible by the web, enabling the citizen to be able to contact easily the administration and offices connected;
- PerlaPA index: predilection of governments to publish on the web the performance of the organization, the organization of the staff, the performance of managers. The publication of information offers to citizens the opportunity to give feedback on possible malfunctions of various offices, administration and, consequently, the opportunity to improve their performance. The more this transparency index is high, the greater the trust that develops between administrations and citizens.

5. Data analysis

Italia.gov.it is a system of digital Knowledge that use open data, web content of public administration and cloud technology. The portal gets value from several open data repositories and institutional sources, such as the Index of Public Administration (IPA), the list of the National Institute for Statistics (ISTAT), the inventory of Department of Public Function and others managed by some local public administrations. It makes available to all administrations a systematic view of themselves and a complete view of distribution of their services too. Italia.gov.it aims to supervise the state of digitalization of public administration in Italy. It also contributes to monitoring the state of actualization of Italian Digital Agenda and the Code of Digital Administration (D. Lgs. n. 82/2005) thanks to the specific core logic of the search engine. It allows the access to a huge world of information of digital administrations from the list of P.A., public websites, domains “gov.it”, forms, modules and online service. According to this, Italia.gov.it has to manage a significant mass of data: about 140.000 administrations. Italia.gov.it allows analysing and comparing different types of public administrations, with the ability to break them down by geographical area. We analyse the percentage of presence of the three indices mentioned above three types of government with elected bodies, regions, provinces and municipalities, and three administrations with non-elected bodies, managers of public services, park authorities and mountain communities and calculate the percentage of the presence of the indicators represented in the figure 5. The elected administrations show a strong propensity to digitization compared to non-elective. The direct relationship that those authorities have with citizens, stimulate the supply of on-line services. The accountability to the electorate accelerates the process of transparency that is in place in recent years.

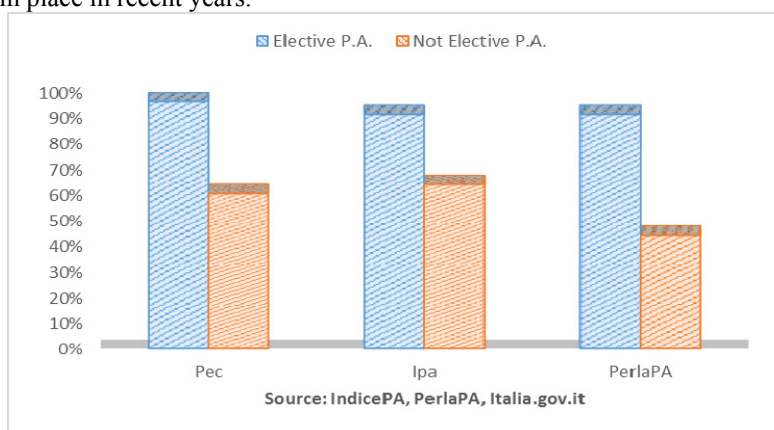


Figure 5. Elective and not elective PA reports by Italia.gov.it – source AgID 2013.

On the contrary, the entities that have not elected, if not spontaneously, have no incentive both an economic and an ethical point of showing to the public. Above all, they have a low propensity to publish the performance of his own institution. Italia.gov.it, allows us to make comparisons of the state of digitization of PA on a territorial basis. For a representative analysis, we can consider three regions respectively located in northern, central and southern Italy: Piemonte, Marche and Campania.

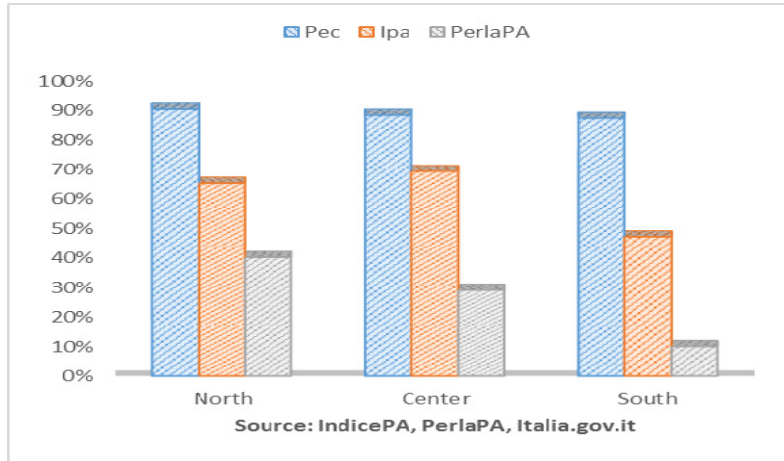


Figure 6. PEC, IPA and PerlaPA reports by Italia.gov.it – source AgID 2013.

The result shows a wide gap of the state of digitization between the north and south of the country. The PEC seems the only common element in all of Italy; although it is not very relevant because from a survey carried out by Foromez it appears that no more than 10% of citizens use the PEC as a tool for dialogue with the government. The index IPA and PerlaPA and show us how the South administrations are less likely to make available the personal data of the institution and even less to provide online services and to publish the organization's performance. Could it be a direct consequence of the cultural diversity, which brings the southern citizens, to prefer a more direct relationship with the public servants without digital intermediaries? To be verified, the fact is that in the north area there is more awareness of the use of technological means for administrative matters, which allow you to save time, avoid queues at the counters and the ability to use the service in 24h-24.

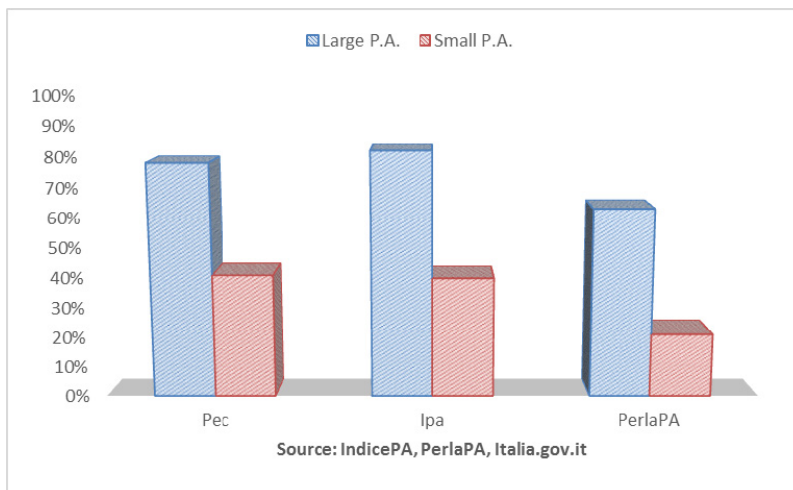


Figure 7. Large and Small P.A. - Reports by Italia.gov.it – source AgID 2013.

In this context, Italia.gov.it can be a powerful medium that provides a clear view of the legislature of the state of criticality digitization on a geographical basis, which makes it

possible to intervene more effectively (and urgency) in certain areas than other. Another point of view very interesting is the gap that the system encounters between the state of digitization of the public administrations of large and small PA. The graph shows how the smaller PAs are less likely to use the technological means to deal with the public. This may be the direct consequence of the responsibility that falls on small than large administrations. The gap is also due to the lack of availability of resources that a small administration may invest in innovation and technology. In this case, scanning, imposed by law, may represent an obstacle rather than an opportunity. Given the results of the system and the capacity not to project to the citizens as the Italian public administration able to digitize themselves, the Agency for Digital Italy, in particular the team that is being created for the development of this project, is experiencing an indicator of propensity to digitize more accurate and more complex. The indicator provides for the creation of an algorithm, which comprises the following values:

- IndiceIPA: propensity to digitization of the Registry of the organization;
- PerlaPA: propensity to digitize performance of the entity, propensity to transparency;
- PEC: effective use of certified mail as the main instrument in the conduct of administrative practices (competitions, contests, contracts, licenses, approvals, certifications, etc.) between citizens and public administration;
- On-line: number and quality of on-line services (registry office, environmental quality, taxation, etc.)
- Forms: number and quality of the forms provided on the web (enhances the quality of the module when the module as well as downloadable, it is also writable and can be sent directly online).

A first result albeit crude, shows us that the propensity to digitize PA in Italy is at 50%. The result is indicative, but always made with a prototype system for refining definitely.

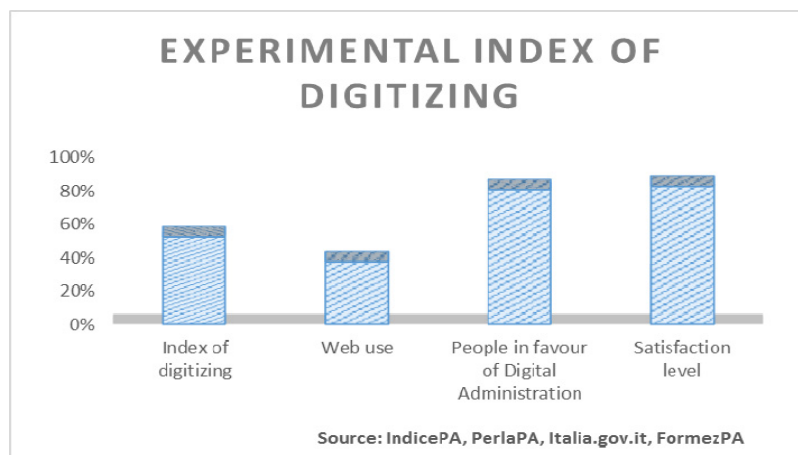


Figure 8. Experimental index of digitizing by Italia.gov.it – source AgID 2013.

The graph also includes the percentage of use of the web by people; the percentage of population that desire a digitized PA, and the percentage of the level of satisfaction on the part of the people using the web to deal with the PA. It is encouraging to note the high percentage of the last two points, because from strength to continue on the path of digitization of the PA, and pushes the Digital Agency for Italy to continue the

development of this monitoring system. It is still a prototype, because it presupposes the improvement of various aspects on which we are working:

- refinement of the rules that will make the system as accurate as possible;
- refinement of the quality of the data in the knowledge base;
- encouragement of public administrations in the release of data in open format;
- encouragement of public administrations in the actual release of data through technological support (Italia.gov.it) and institutional support (training).

Our team is working on the first two points at an ever increasing with more and more satisfactory results. With regard to the third point, in the last 5 years, the process of release of open data in our country is growing at a rate of 10% per year (source OKFN). The last point will be the task of the Agency for Digital Italy, through all of the tools that can be put in place, to support the government in the affirmation of the paradigm of open data, and support the government during the digitization process.

6. A new organizational model of interoperability

Italia.gov.it is a strategic national project of the Agency for Digital Italy. Its goal is using open data and public information to build the Knowledge base and the search engine of the Italian digital administration. Its technology engine implements powerful data correlation solutions, based on information retrieval and natural language processing solutions. Italia.gov.it improves e-government related open data with information coming external sources, like national databases and archives or web sites of the public administrations. In the value chain of PSI, Italia.gov.it has the main role of "institutional re-user" of public data and brokerage platform between public and potential re-users of data released by the former. Dati.gov.it is an institutional project with the goal of developing and managing the Italian catalogue of the open datasets published by public administrations. It is managed by the Agency in collaboration with FormezPA. The following figure drafts a model of interoperability among Open-DAI, Dati.gov.it and Italia.gov.it that foster the benefit of each initiatives in a unique system.

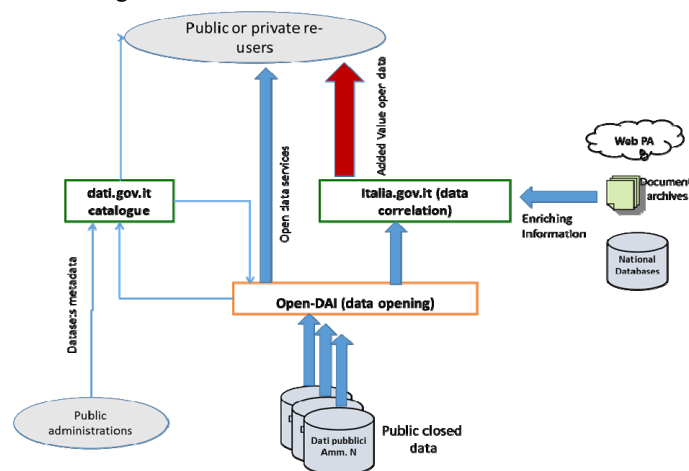


Figure 9. A model of interoperability among Open-DAI and main Italian systems for open data management.

The integration of the three initiative results in a more powerful enabling platform for open data re-users, offering the following services:

- directory services to the public datasets catalogue;
- service based access to open data;
- service based access to linked or aggregated open data.

7. Conclusions

Italia.gov.it has to represent the evolution of a system that until now based its analysis of data about historical sources, once ambiguous and not always update, so a rigid system that depends from people subjectivity who have a hold on something. Against Italian complex situation, we have to keep going the evolution of services, the evolution of technology in the hands of civil servants and the evolution of data collection, Italia.gov.it tries to transform a rigid system, which adopts several public inputs, into dynamic and automatic processes that use the output of public administrations. The “dynamic logic” means the particular creation of monitoring dashboards, constantly updated, that visualize the trends of specific digitalizing indexes, offering a complete framework based on both in type and in territory point of views. Italia.gov.it will also support decisions makers to enforce public policy, moreover it will be a benchmark for private citizens and associations that wish to take action in such initiatives or simply that they need to know the status of digitization in the own geographical region. At the moment the organizational structure of the Italia.gov system is composed by the following subsystems:

- the ICT infrastructure is the middle layer performing the “sensorial function” of the system. It also includes the technical infrastructure (processing, storage and network) of the system;
- the knowledge base performs the “cognitive function” of the system (e.g. entity extraction, classification, update, entity representation);
- the learning system extracts the implicit knowledge of the human actors (knowledge operators, professionals, citizens) from their behaviour and interaction with the system and transforms it in explicit knowledge;
- the presentation layer performs the comprehension of the user needs and presents the results derived by the system.

Our future research activities will be focused to find the proper balance between the costs of human operators and the quality of the results the system as a whole can reach. The e-participation support needs of information access to foreign speaking users and gathers feedbacks from final users about the quality of the services and the information provided. For what concerns communication channels, they allow the development of new applications on mobile systems, tablet PCs, and, possibly, digital TV widget. Apart from explicit feedback, the one gathered through an explicit interaction with the user (such as, for example, question answering), the front-end module will provide mechanisms for implicit feedback collection (for example, through user click recording). Feedback analysis will be applied with different objectives, such as auditing, user profiling, suggestion techniques implementation, service improvement, and new services identification. The front-end module interacts with the content management module by exchanging contents to be published. The content management module allows the structured organization of Italia.gov.it portal, manages all processes related

to data gathering, approval and publishing. It also manages all information relevant for end-user personalization. At the functional level, the e-participation module auto-feeds its content by interacting with the underlying knowledge management system. It is the core of Italia.gov.it and it is developed for:

- storing and managing all organizational rules, both formal and heuristic, which influence the state and the evolution of each public administration;
- maintaining, indexing and storing the knowledge base of each digital administration, as obtained from gathering content from institutional sources, from call centres reports, from public administrations web sites;
- managing and making use of user feedback, as provided by the system for the management of contents, to update the knowledge base;
- designing methods for quality assessment of the rules adopted;
- identifying some tools for the creation and the management of knowledge resources, such as dictionaries, thesauri, ontologies, white/black lists, etc.

Data gathering now is performed in a semi-automatic way: it is going to be supported by a limited number of specialized “knowledge managers”. From an organizational point of view, a knowledge management system has to be connected with other public information systems, increasing the “culture of data exchange” [21, 22]. It provides support for the management of the knowledge base and for the consistency maintenance among all data stored in the knowledge management system. These tasks will be performed by the knowledge managers, specialized in contents management and in external data identification, improvement, validation, and structuring. They will be supported by validation tools, able to acquire new rules from the analysis of human operators’ activities and choices. Finally, a monitoring module will provide all functionalities related to the continuous and orderly tracking of Italia.gov.it public data sources, including the services’ monitoring of each public administration, the knowledge base contents, feedbacks and citizens participation.

References

- [1] C. Hood, A Public Management for All Seasons, *Public Administration*. Vol. 69, pp.3-19, 1991.
- [2] C. Hood, The “New Public Management” in the 1980s: variations on a theme, *Accounting Organizations and Society*, vol. 20, no. 2/3, pp. 93-109, 1994.
- [3] D. Osborne and T. Gaebler, *Re-inventing Government. How the entrepreneurial spirit is transforming the public sector*, Reading, Mass, 1992.
- [4] W. Kickert, Complexity Governance and Dynamics: Conceptual Explorations of Public Network Management in J. Kooiman (ed.) *Modern Governance*, Sage, London, UK, 1993.
- [5] W.J.M. Kickert, E. Klijin and F. M. Koppenjan, *Managing complex networks. Strategies for the Public Sector*, Sage, London, 1997.
- [6] G. Peters and J. Pierre, Governance without Government? Rethinking Public Administration, *Journal of Public Administration – Research and Theory*. 8, 227 – 43, 1998.
- [7] T. O’Reilly, Government as a Platform, *Innovations: Technology, Governance, Globalization*, Quarterly Winter, 6, 13-40, 2011.
- [8] E. Kalampokis, E. Tambouris and K. Tarabanis, Open Government Data: A Stage Model for Electronic Government, in M. Janssen et al. (Eds.): *EGOV 2011*, LNCS 6846, pp.235-246, Springer Berlin, Heidelberg, 2011.
- [9] G. Lee and Y.H. Kwak, An Open Government Implementation Model, *Using Technology Series*, Washington, 2011.
- [10] S. Ae Chun, S. Shulman, E. Sandoval, Government 2.0: making connections between citizens, data and government, *Journal of Information Polity*, vol. 15, n. 1-2, pp.1-9, 2010.
- [11] D. Lathrop, L. Ruma, *Open Government: Collaboration, Transparency and Participation in Practice*, 1st ed., O’Reilly Media, Sebastopol (CA), pp. 363-373, 2010.

- [12] D. Tapscott, A.D. Williams, *Wikinomics 2.0. La collaborazione di massa che sta cambiando il mondo*, BUR Biblioteca, Rizzoli, 2007.
- [13] D. Tapscott, A.D. Williams, D. Herman, *Government 2.0 transforming government and governance for twenty first century*, Generan Publisher Insight, 2008.
- [14] White House, *Transparency and Open Government, Memorandum for the Heads of Executive Departments and Agencies*. The White House, USA, 2009.
- [15] C. Ciborra, *Interpreting e-government and development: efficiency, transparency or governance at a distance?*, IT & People 18 (3), pp. 260-279, 2005.
- [16] C. Hood, *What happens when transparency meets blame-avoidance?*, *Public Management Review*, 9, issue 2, pp.191-210, 2007.
- [17] H. Darbshire, *Proactive Transparency: The future of the right to information? A review of standards, challenges, and opportunities*, Washington, MA, WBI and CommGAP, pp.1-60, 2009.
- [18] M. Sorrentino, M. De Marco, *Evaluating E-Government Implementation. Opening the Interdisciplinary Door*. Hans J. Scholl, ed., *E-Government: Information, Technology and Transformation*, Vol. 17, Armonk, NY, M.E. Sharpe, pp.72-88, 2010.
- [19] A. Capriglione, N. Casalino, M. Draoli, *Relational networks for the open innovation in the Italian public administration in Information Technology and Innovation Trends in Organizations*, Physica-Verlag, Springer, Heidelberg, Germany, pp.415-424, 2010.
- [20] R.K. Yin, *Case Study Research: Design and Methods*, Sage Publications, London, UK, 2003.
- [21] N. Casalino, A. D'Atri, A. North-Samardzic, *ICT based means for automation and innovation*, Leonardo da Vinci 2009-1-BG1-LE005-01640, Neo Pub Ltd, Sofia, Bulgaria, 2011.
- [22] C. Rossignoli, *Coordinamento e cambiamento. Tecnologie e processi inter-organizzativi*, Franco Angeli, Milano, 2004.