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The Impact of E-Government on Public Policy

Feedback from the Italian Regulatory Framework

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Abstract

E-government implementation offers great potential to improve the efficacy of public administration. Digital innovation provides instruments to overcome the simple market orientation suggested by New Public Management and to integrate the approach with a strong social component. An imperative prerequisite is rethinking public policy design by involving citizens in order to devise customised solutions and services. The mere implementation of innovative tools without public support is one of the main causes of failure of e-government projects around the world.

The existence of networks influencing the individual decisional model and the willingness of citizens to participate in policy design were often ignored. Nowadays the second generation of project design is being implemented. A reflection on the new role of managers can be useful in avoiding future false moves. The case study of Italian reform of public administration offers a good example to highlight criticalities in innovating a system of rules.

The approach to these analyses is a multi-method approach. The emerging Network Theory will provide the framework for a System Dynamics model that encloses the phenomena of implementation and adoption of e-government services.

Keywords: *e-government, public policy, Network Theory, System Dynamics*

1. Introduction

The pressing innovation in information and communications technology (ICT) generates many opportunities for creating networks and developing new businesses. Even the field of public administration (PA) sees opportunities in terms of reducing the cost of regulatory compliance for a government's constituents, improving efficiency and tax administration, and avoiding fraud and errors. Moreover, individuals and businesses can improve their problem-solving capacity when interacting with the PA.

Notwithstanding these positive effects, recent literature started recognizing that ICT innovation also implies new challenges and hindrances for each public institution with peculiar features depending on the institution's level within government and the socio-economic environment of the target population.

There are criticalities regarding the delivery of digital services both inside and outside the administration, namely in the implementation and adoption of e-services. This paper focuses on the demand side, i.e., the adoption of e-services. In particular, two adoption hindrances will be discussed. First, to assure effective collaboration and sharing of data among different institutions, each system must be "semantically interoperable". This is particularly relevant when analyzing a system at the national level as in the following case study. As a second point, each institution addresses a diverse audience with diverse education. Some users will be skilled and ready to take advantage of new service and communication channels provided by the PA. Others will be intimidated by such innovation and need additional support.

These issues involve a deeper knowledge of the community and its attitude toward online interaction with the PA, so these factors must be taken into account when designing public policies; this is why the introduction of e-government services has a remarkable impact on performance management and public policy design.

Both the PA and the citizens-users change their roles: not because of the technological innovation *per se*, but because the *model of rational behavior* has changed by evolving toward networks. According to Ormerod (2012), the impact on individuals of incentives, of the assessment of costs and benefits of different actions, has been overtaken by the effect of social interaction across networks, and "network effects require policy makers, whether in the public or corporate spheres, to change radically their view of how the world

operates". As a direct consequence, performance management must evolve and gain flexibility. In fact, governors are now called upon to involve citizens in the policy-making process by balancing performance goals with the specific needs of citizens. To include the community in the process, the system must be ready to easily interact with its citizens.

To foster a progressive cultural innovation in a given territorial community, the first action that each institution tries to implement is a redesign of the system of rules. However, as shown in the case study of Italy (paragraph three above), a simple change in that system is insufficient to ensure a project's success because e-services cannot be imposed on citizens; they must be chosen. The skills of the users are crucial to adoption.

Last but not least, ICT and e-government provide precious instruments to renew the PA and overcome the limitations of New Public Management. In fact, implementing a portal can improve efficiency and effectiveness consistently with a market orientation perspective, but at the same time a social dimension needed in the public sector can be saved. Interacting with the single citizen and achieving cost-effectiveness goals is no longer a trade-off.

This study attempts to answer two main research questions:

1. What are the institutional levers that policy makers can use to introduce e-government services and to foster online interaction with the PA?

2. What are the new challenges of managers in designing public policies?

The approach to these analyses is a *qualitative*, multi-method approach. The emerging Network Theory will provide the framework for a System Dynamics model that encloses the phenomena of implementation and adoption of e-government services.

The research method and the two methodologies adopted (Network Theory and System Dynamics) will be introduced in the next section. They will provide the tools to explain the revolution in the public's decisional behavior. The third section will be dedicated to the evolution of the system of rules and, as a consequence, the need to improve the public policy design approach. Section four contains the case-study of Italian reform of public administration and its peculiar criticalities. The fifth section summarises the conclusions.

2. A multi-method approach: Combining Network Theory and System Dynamics

As mentioned in the introduction, the present study aims to analyse the implementation and adoption of e-government services through the lens of Network Theory. But what is a *network*? And what is the function of a network in determining the decisional process of an individual: in this case, the decision to interact with the PA online and to adopt e-services?

According to Oxford Dictionaries[1], a network is a group or system of interconnected people or things. Referring to Network Theory and to the "social" function of a network, Owen-Smith (2008) defines it as a "concrete pattern of relationships among entities in a social space".

The main functions that networks may assume are:

- To provide and spread information across the community;
- To influence the individual behaviors and actions of the community components.

Accessing information is easier because of the web, but, above all, it is important to underline that people can now easily access many other people's opinions. Since the typical approach of an individual to the web consists of considering other people better informed and their choices reliable, the phenomenon of emulation becomes stronger than the rational trade-off of costs and benefits, and how the individual considers incentives.

These insights must be taken into account by PA policy designers. Intuitively, a good strategic plan cannot ignore the impact of communication to the populace; the need to assure a critical mass of people joining its initiatives is crucial. In line with these reflections, Ormerod (2012) suggests that "the trick for successful policy, for positive linking, is not which interest rate to try to manipulate, nor whether to increase taxes or cut spending. It is the subtle but elusive goal of enabling the right frame of mind to spread across the networks which connect the relevant decision makers."

[1] http://oxforddictionaries.com/definition/english/network

The assumption underlying this study is that the spreading of e-government services through an institutional web-portal is comparable to the spreading of an innovation in technology. Again, and from now on, the focus will be on the factors determining the choice of the targeted population (Internet users from ages 18 to 70) to start interacting with the PA online.

This assumption leads to the use of System Dynamics modeling. System Dynamics (SD) was developed as a method for designing policy solutions based on computer simulation of problematic endogenous feedback structures (Wheat, 2010). The founder of the theory, Jay W. Forrester, an electrical engineer, initially conceived SD as a business management tool, but SD methodology was soon applied to public sector issues (Wheat, 2010). Basically, whereas the human brain does not perceive the process of accumulation (Bianchi, 2009) and tends to recognise problems as a direct series of events, this methodology can help provide a dynamic view of all forces acting in the system concurrently.

This methodology is therefore appropriate for solving problems in complex systems characterised by the following features (Bianchi, 2009): a) a structure characterised by counterintuitive dynamics; b) levers that decision-makers can use to influence the results toward the desired objectives; c) sensitivity of the results to the effect of exogenous variables; d) a frequent opposite behavior of variables in the short term vs. the long run; and e) relevant delays of the system to the deliberated policies.

System Dynamics offers two kinds of representation: causal loop diagrams (CLD) and stock and flow diagrams (SFD). In this work, the representations will be done with the use of SFD, which better suggests the concept of accumulation. The basic elements are stocks that represent availability of resources at a given moment in time, flows (of materials or information over a period of time) and auxiliary variables that help the calculation, mainly comprising indicators, parameters and constants.

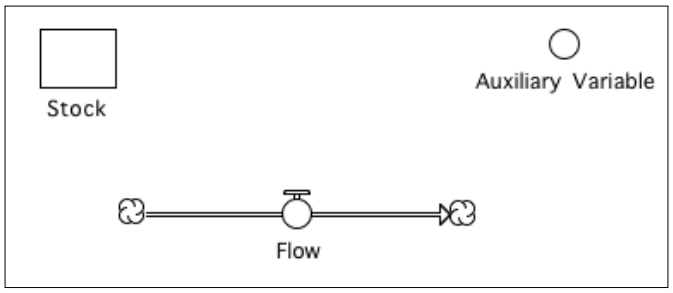

Figure 1 System Dynamics elements

The first step in building the model is reproducing the archetype of the spreading of the innovation of e-services (often organised in portals). This archetype is the Bass Diffusion Model (Bass, 1969).

The focus is on the flow Rate of Adoption of e-services. As it is possible to observe in Figure 2, the targeted population (Internet users from ages 18 to 70) is divided in two groups:

- *Potential Adopters*, a stock of people who, at a given moment *t*, use the Internet but are not interacting with the PA through digital channels; and
- *Adopters*, people who already interact with the PA online.

At the beginning of the implementation, the stock of adopters is empty.

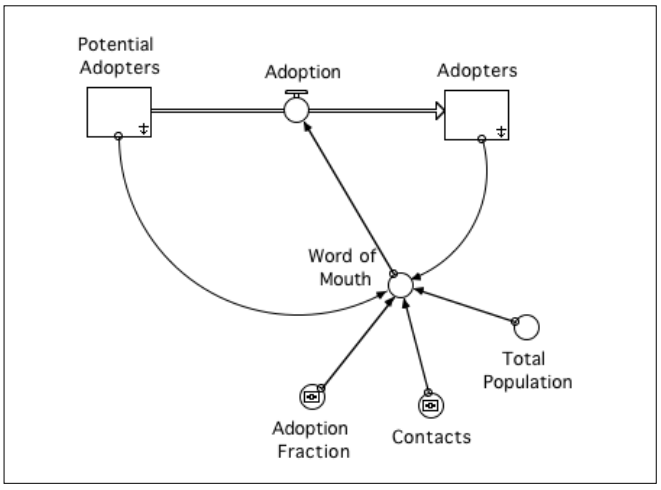

Figure 2 SFD of e-services *Adoption* (adapted from Sterman, 2000, Chapter 9)

The *Adoption*, the flow that transforms *Potential Adopters* in *Adopters*, is given by the so-called *word-of-mouth (WOM)* effect. The simple arrows represent instantaneous effects.

WOM is function of the interaction of people and is the result of the product. The variable *Contacts* expresses the possibility of contact of a *Potential Adopter* with an *Adopter*. The *Adoption Fraction* reveals how persuasive an *Adopter* is in convincing a *Potential Adopter* to interact online with the PA.

Figure 3 and Figure 4 have been elaborated on with simulation software and show two extreme scenarios that may occur when developing a web portal. The difference stands in the value of the *Adoption Fraction* (80% in the first projection, 8% in the second projection).

Assuming *Contacts* to be constant, as explained below, it is possible to observe that a certain level of *Adoption Fraction* is necessary to assure that people start interacting with the PA online, the so-called *tipping point*. But it can also happen (Figure 4) that this level is not achieved and the project fails because most of the populace continues using traditional channels such as visiting or calling offices.

The higher the *Adoption Fraction*, the faster the *Adoption* will be completed.

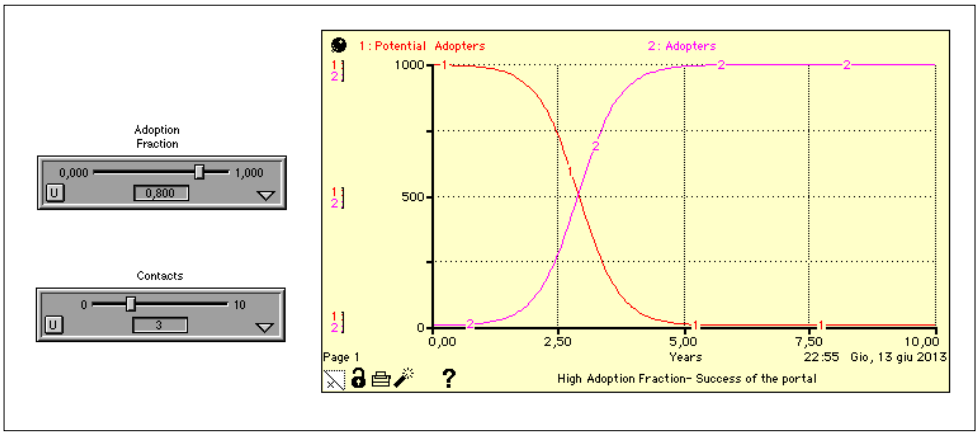

Figure 3 Scenario of success of the e-government project (iThink software)

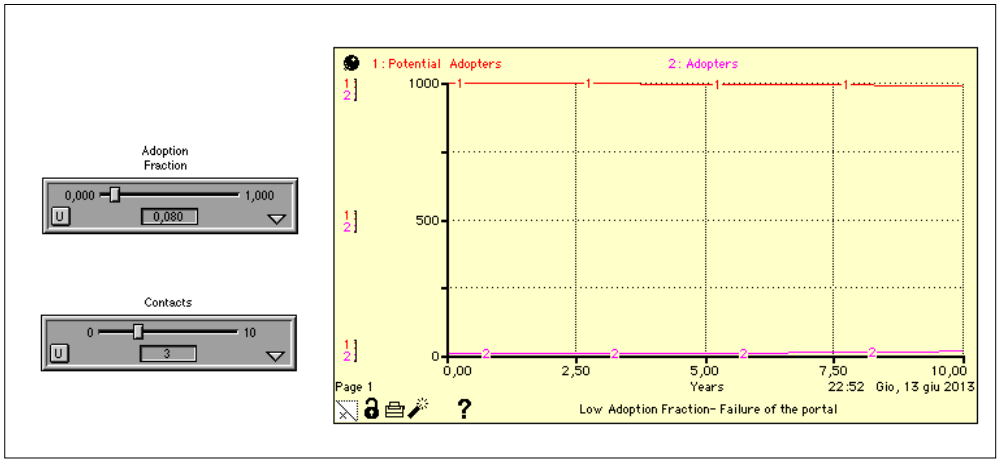

Figure 4 Scenario of failure of the e-government project (iThink software)

Contacts are usually assumed as constant because they are considered to comprise an attitude that is little influenced by the environment but by the capacity of sharing certain kinds of information among trusted individuals. The value of this variable is suggested by experts and is linked to the social opportunity of an individual to share his experience with using e-services. The variable is set considering the average family nucleus in Italy of three individuals.

On the other hand, the *Adoption Fraction* is a variable that may be influenced by institutions.

According to the vast literature on e-government adoption, but with particular reference to Carter and Weerakkody, 2008, the levers of adoption as shown in Figure 5 are:

- *Relative Advantage:* using the Internet to interact with the PA should be convenient in terms of saving time and enhancing comfort by doing it at one's home or office. If people must go to an office because they cannot complete the operation online or because they get wrong or old information, they may decide to abandon the digital channel. An indicator for measuring this value is the average need to complete a procedure at a government office.
- *Trust*: trust is the result of the sum of trust in government and in ICT.
- *Internet Accessibility* expresses the availability of Internet among the population.
- *Internet Skill* expresses the population's average skills. When such skills are low, it is necessary to educate people so they acquire the needed skill set.

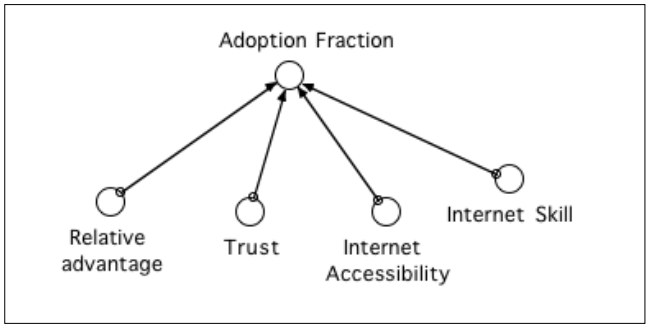

Figure 5 The levers of adoption according to the reviewed literature

To assure the development of a web portal, institutions must guarantee a certain level of these factors through adequate investment and policy. E-government can lead to money savings, but not in the short run. ICT is not self-sustaining magic; it requires investment and accurate planning.

3. Changing the system of rules: The case of Italy

Over the past decade, mainly due to regulations from the EU, the Italian regulatory framework, i.e., its system of rules, has been reviewed and integrated to achieve two main goals:

- to innovate and improve the interaction with citizens, businesses and other stakeholders;
- to increase transparency and accountability.

Although in Italy the issue of information from the PA to its constituents had been raised in the early 1990s, the Lisbon Strategy, devised by the European Council in 2000 as an EU economic development plan for the 2000-2010 period, gave new impulse to the process of improvement and development in this field.

Law n.150/2000 recognised information and communication as key tools for obtaining legitimacy in government actions. The aim of this law was to innovate the means of information and communication through the adoption of new technologies. It mandated the existence of Citizen Relation Offices (URP in Italian) to bring local authorities closer to their constituents; it also required internal Press Agencies to guarantee the constitutional right to information. The birth of URP expressed a clear intention to bring PA closer to the citizenry and to listen to their problems and suggestions.

In 2004, the Parliament enacted law n.4, better known as Stanca's Law, to break down the existing virtual barriers. Stanca's Law introduced the concept of accessibility and increased control over it. But the focus was placed on human equality (and equity) and not on the right to information. In its essence, Stanca's Law provides instructions for the design of PA websites, particularly for application of predefined rules among public managers, thus paying attention to the law's requirements more than to the underlying idea of progress and efficiency.

A complete code regulating the subject, the Code of Digital Administration (CAD in the Italian acronym), was finally issued in 2005. It is a "constitution" of the digital world that states the rights and duties of users. It includes and reorganises the entire discipline and provides the legal basis for actions. CAD was renewed for the first time in 2010 with Decree 150/2009, better known as Brunetta's Decree. It introduced the concept of transparency and performance evaluation, which led to accepting this system as a winning practice for progress in public administration. It also emphasised that transparency should be achieved through total accessibility to public documents. Unfortunately, after two years open data is not yet a reality. Despite the focus on accessibility, few rules were prescribed to ensure broad participation. The orientation to performance management (see in particular art. 3-6 D.L.150/2009) stressed the need for setting goals and cut costs. What is still missing is an effort to balance the achievement of setting objectives with the research of new solutions proposed by the citizenry.

4. Critical issues in designing public policy in a *"web-based era"*

It must be noted that the Italian regulatory framework (together with its executive documents) is the result of a top-down approach, which appears to contradict assumptions involving e-government. The listed laws prescribe a compulsory content for public websites and require implementation of ICT tools to assure the availability of online public service.

No attention is paid to determining adoption, and the rising phenomenon of networks is ignored. The focus is on the service delivered, namely on what each institution should provide. On the other hand, little attention is paid to the citizenry's actual use of that content. Most local initiatives to implement e-services have failed. Various reasons and peculiar criticalities can explain these failures, but above all, the lack of inter-institutional coordination was the primary problem.

The logic of e-government, again with reference to Gil-Garcia and Martinez Moyano (2005), suggests a partial shift of control to citizens whose feedback can contribute to improving the system and completing government actions. This control shift cannot happen unless the citizenry feels comfortable with the provided tools. Therefore we can say that after assuring accessibility, it is compulsory to work on usability. An improvement in usability should be implemented as a result of the interaction with users.

As suggested by the European Commission (2010), users should be "helped to become self-sufficient, to become a part of the solution, or even a provider of it". Moreover, they should perceive an

added value (or relative advantage) in using these tools and contribute to the adoption process by encouraging others to do the same.

Having seen how individuals (the demand side) behave in a "web-based era", the perspective shifts to the institutional side (the supply of the public service). It appears clear that an integration of the two perspectives (demand and supply) is needed.

Politicians and managers face an increase in environmental complexity. Lots of information is available to them and their actions are subject to the immediate control of many people. Citizens expect public managers to have the ability and technical expertise to provide high-level solutions to the problems identified.

As Laffin and Ormston (2012) stated, "The argument here is that the relationship between information and policy change is complex, reflects underlying power relationships and the uncertainties inherent in designing policy changes or interventions. A policy learning perspective is valuable in helping to understand those complexities and uncertainties."

Of course, at the different levels the institutional action must proceed through systems of rules. Gil Garcia and Martinez Moyano (2005) found a correlation between the redesign of the systems of rules ("probabilistic generalization of behaviour" in their definition) and the evolution of e-government with the success of e-government projects. Their "theoretical framework poses a link between how public managers decide on e-government initiatives and how citizens and other stakeholders involved in the policy process internalise those decisions and subsequently influence them over time."

The solution has to be found in a difficult equilibrium between political and managerial goals and claims for accountability by the stakeholders. Using their words, "the ideal scenario would be the one in which public managers are capable of doing exactly what they think they should be doing with respect to one specific problem (high-solution guiding concern), while the citizens they serve evaluate that precise activity as a requirement that the public managers should be fulfilling (high behaviour-constraining concern)." System Dynamics is a good methodology for pursuing this equilibrium. The model will serve to test the combined effect of the policies implemented. Of course, it will be necessary to constantly monitor the perceived level of the levers of adoption among the populace.

5. Conclusions

Changing the system of rules is crucial to foster the development of e-government, but it is not enough. What really must change is the managerial approach of public managers. The levers that they have to keep under control are the relative advantage of citizens in using e-services in place of traditional ones, the average digital competences of the populace and the level of trust in government.

What the PA should aim is for a new managerial approach focused on the achievement of an equilibrium between the set objectives and the solutions proposed by the interactive community in order to customise citizen services. By improving this social dimension, the implementation of a good e-government portal has a big potential to overcome the limitations of New Public Management.

The manager's new role is more flexible and focused on citizen perceptions and interactions. Society's new role is to actively participate and provide feedback on the administration's actions.

The multi-method approach presented in this paper combines Network Theory (as framework for the study) and System Dynamics simulation particularly recommended for designing digital policy thanks to the representation of alternative dynamic scenarios. Managers will use the model to study the combined effect of the implemented policies with regard to the completeness of digital services, the community's digital competence, and the trust in government and ICT.

Further work should investigate the potential evolution of the system of rules both at the national and local levels. Monitoring the experience of these second-generation projects could suggest additional improvements for implementing quantitative dynamic models.

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