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The role of technology, organization and contextual factors in the development of e-Government services: An empirical analysis on Italian Local Public Administrations☆

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ABSTRACT

Using data drawn from the 2007 and 2009 Istat ICT-PA surveys on 4471 Italian municipalities, we identify the technological, organizational, and contextual factors associated with the development of e-Government services in local administrations. We find that both outsourcing and internal accumulation of ICT competencies are strongly correlated to the provision of these services. Moreover we observe that in-house ICT activities have twice as high an impact on e-Government development as compared to ICT outsourcing. The enactment of advanced e-services is less likely in the case of small municipalities, in sparsely populated areas, and in the presence of higher rates of growth of the elder component of population. By contrast it is more likely in areas characterized by more intense patenting activities, which in turn favour a dynamic and sophisticated demand for new services. Though broadly consistent with Fountain's "technology enactment framework", our findings suggest that more emphasis should be given to the internal competencies of public administrations, and to context specific factors reflecting the characteristics of end users.

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1. Introduction

The idea that innovation is not only a matter of technical change but also entails profound transformations in organizational structures and in the socio-economic environment is ancient in economic literature (Schumpeter, 1942; Nelson, 1994). In recent decades this idea has been significantly revived in connection with the debate on general purpose technologies, and on the diffusion of information and communication technology (ICT) in particular. The interplay of technical, organizational, and institutional change has been extensively explored with reference to private sectors, at both the aggregate and micro levels (Brynjolfsson and Hitt, 1998, 2000; Machin and Van Reenen, 1998; Bartel et al., 2007; Cette and Lopez, 2010), and has received limited albeit increasing attention in studies on innovation in the public sector (Caldas et al., 2005; Seri and Zanfei, 2012).

The issue is of paramount importance in the case of e-Government services.[1] In fact, the usage of ICT tools and

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[1] A classical definition of e-Government is "*utilizing the Internet and the World-Wide-Web for delivering government information and services to citizens and firms*" (UN/ASPA 2002).

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digital networks for the development of web-based services implies a number of fundamental organizational and institutional transformations, including: changes in decision making processes; upgrading competencies and skills for all actors involved; codification and transmission of information bits; coordination and enhancement of communication within and across public administrations (PAs); and substantial interactions with both vendors of technology and users of new services (Fountain, 2001; Serrano Cinca et al., 2003; Gil-Garcia, 2005; Arduini et al., 2010).

It is important to stress that these transformations do not only involve PAs, but also the general context in which they are active. Policy makers, suppliers of infrastructures and applications, intermediate and final users, including citizens, firms and other institutions, will also need to engage in the process, to increase their competencies and to adapt their behaviour. Failure to accompany technical change with appropriate organizational and contextual changes has often contributed to undermine the actual diffusion and adoption of e-Government services (Heeks, 1999, 2006; Fountain, 2005).

In this paper we shall build on the "technology enactment" framework introduced by Fountain (2001, 2005) to analyze the co-existence of technical, organizational, and contextual factors in the diffusion of e-Government, with specific reference to services provided by Italian municipalities. Consistent with this framework we shall particularly emphasize the role of both competence accumulation within PAs and outsourcing of ICT activities. This helps highlight the complexities of knowledge management in the process of new service development. On the one hand, internal training and skill upgrading are necessary for PAs to engage in e-service design and provision. On the other hand, they are needed to accumulate absorptive capacity and gain access to external competencies that are complementary and essential in the process of e-Government development and diffusion.

Moreover, we shall highlight some factors that are only marginally considered in the technology enactment scheme, that have to do with the role of users and demand factors. While Fountain (2001, 2005) does acknowledge the importance of contextual factors, her emphasis is on the supply side. As we shall see, she assigns a key role to organizational factors within PAs and to the relationships with policy makers and vendors of technology. Limited attention is given to users of ICTs and e-Government services that are external to PAs, namely citizens, firms and other institutions. In this framework, users are substantially seen as constraints to PAs' action. Indeed, they may be important constraints as civil society becomes more demanding and influences the outcomes of service provision by contributing to the definition of social and cultural objectives to be pursued. It remains, however, that users are seen as either passive adopters or as an extra-cost that PAs must take into account when delivering new services. We argue that this view is being largely overtaken by the current evolution of digital networks, which is increasingly characterized by the direct involvement of users in defining the rate and direction of e-Government development. As extensively documented in specialized literature, PAs are increasingly induced to collaborate with users in new service provision. PAs need not only interpret their actual and potential demands but also necessitate to accompany users and even follow them in their service co-production initiatives (Osimo et al., 2012). Drivers of this transformation are largely beyond the scope of the present analysis, and include: new technological opportunities offered by crowd-sourcing and web 2.0, open sourcing movements as well as the increasing political pressure and financial constraints imposed on PAs, leading them to search for new ways of organizing service provision. What is worth emphasizing here is that e-Government development can hardly be understood by looking exclusively or mainly at the internal organization of PAs. This entails that more attention should be given to the demand side, to capture those contextual factors that increasingly contribute to e-service design, implementation, and diffusion.

To illustrate the co-existence of technical, organizational, and contextual factors affecting e-Government development, we shall utilize different sets of data supplied by the Italian Bureau of Statistics (Istat). We shall particularly rely on Istat's 2007 and 2009 ICT-PA surveys on "Information and Communication Technologies in Local Public Administrations", that provide information on in-house competence accumulation and outsourcing in the fields of ICTs and on e-Government service provision by Italian PAs at the municipality level. The development of e-Government is measured by means of a composite indicator (the *Front-Office Index*) describing the availability (number of thematic areas covered) and the quality (level of interactivity) of e-Government services offered by municipalities. We shall also use data from complementary sources to capture the role played by some external factors affecting the diffusion and the provision of public e-services at the local level, with a specific focus on the characteristics of demand (age profile of population, its territorial dispersion and rate of innovativeness at the local level).

The remainder of this paper is organized as follows. Section two introduces and briefly discusses Fountain's "technology enactment" framework, which will be utilized as the main reference for the subsequent empirical analysis. Section three reviews extant empirical studies exploring the determinants of e-Government development. Section four presents data sources and methods used to construct our Front-Office Index. Section five discusses the findings of our econometric exercises on the factors associated with e-Government diffusion in Italy, including some model diagnostics to check the robustness of results. Finally, section six draws some conclusions.

2. The technology enactment framework

As defined by Fountain (2005), the "technology enactment framework" is a "structural and institutional approach" to analyze the paths of introduction and use of technology in public governance. She argues that, in order to interpret these paths, "*it is imperative to understand organizational structures, processes, cultures and organizational change*" that takes place within public administrations in the more general context of socio-economic evolution (Fountain, 2005, p. 150).

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