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The Implementation Of ICT In Public Sector Organisations. Analysing Selection Criteria For eGovernment Projects

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Abstract

Taking as a starting point the recent approval of 138 co-financing proposals put forward by numerous Italian public bodies within the context of a national e-government plan, the article poses the question of whether these types of initiatives are really likely to unleash mechanisms capable of improving organisational performance. The evaluation criteria adopted in the course of the selection process are analysed on the basis of a model elaborated by Soh and Markus (1995). The aims are: to carry out a general assessment of the role attributed to information and communication technology (ICT) in the modernization of the public sector and to draw some conclusions from this progress towards the realization of e-government.

1 Introduction

The modernisation of public services on the basis of the capabilities offered by information and communication technology (ICT) has produced a new paradigm, that of “electronic government” or “e-government”. Among the technologies capable of realising the idea of modernising (or reinventing) public administration, the Internet clearly occupies a central role (Lenk and Traunmueller, 2000a).

In Italy the approval of 138 co-financing proposals put forward by regional and local bodies in the context of a plan carried out by the Ministry for Innovation and Technology (Gazzetta Ufficiale, 2002) represents an important novelty, not least on account of the large number of bodies involved (19 regions, 95 provinces, 3,574 municipalities or unions of municipalities and 218 mountain communities) and the magnitude of the pool of potential users. The plan aims at putting in place infrastructure and services – where the government has identified the greatest need - which take advantage of the potentiality offered by Internet and other technologies inspired by it.

Initiatives like this, which emerge in the context of the front-end of public bodies, i.e. at the point where the bodies feel most keenly the pressure of the demand for services, give rise to great expectations and often betray an excessive optimism. Inevitably, a question

arises: Are criteria adopted by the Ministry adequate to promote organizational performance?

This article aims to give a response to this question. Because “policies bear impressed upon themselves the indelible mark of the hypotheses that underpin them” (Regonini, 2001, pg. 194), we think that the analysis of the criteria adopted in the process of selecting the projects can throw light on the role attributed to ICT in the shaping of organisational innovation in the public sector.

Public sector organizations are only now starting to understand the enormous benefits of leveraging Internet technologies to improve through electronic government applications both internal processes and interactions with external constituencies (Chircu and Hae-Dong Lee, 2003; Lenk and Traunmueller, 2000b). Conscious that technological innovation cannot be analysed independently of organisational change (Markus and Robey, 1988; Orlikowski, 1992), we have chosen to give priority to analytical perspectives that originate in studies conducted in the information systems field. While we recognize the great importance of the influence of contextual factors (e.g. the often very distinct characteristics of the national contexts in which different bureaucracies operate) in studying ICT implementation within public organizations, these kinds of issues will not be addressed in the present article.

The paper is structured in the following way. Section 2 briefly illustrates the relationship between ICT and organisational change firstly in general terms and then in the light of a framework developed by Soh and Markus (1995). Section 3 draws attention to some factors peculiar to the relationship between technology and public administrations. Section 4 goes on to analyse the evaluation framework laid down by the Italian Ministry for Innovation and Technology, seeking to point out the implications it has in respect of the Soh and Markus model as applied to public organisations. The final section draws together some concluding considerations.

2 ICT And Organisational Change According To Soh And Markus

Investigating the relationship between ICT and organisational change means concentrating on questions like: when, how and why do investments in technology improve organisational performance.

Performance is a complex construct. Numerous studies have proposed models based on traditional financial indicators such as ROI (Return on investment), ROA (Return on asset) or the relationship between costs and revenues or between costs and benefits. Other lines of research give priority to issues of effectiveness as they relate to the use of information technology (Kohli and Sherer, 2002). For example, Damanpour *et al.* (1989, pg. 592) maintain that “organisational performance or effectiveness is the ultimate objective of all organizations”. This statement can be read in various ways depending on the interpretative perspective adopted. For example, according to the perspective that considers organisations rational entities which aim at the pursuit of predefined objectives, one performance indicator is represented by the achievement of those very objectives. Alternatively, in the context of studies that view organisations as coalitions of individuals driven by different interests and motivations, one performance parameter is the degree of satisfaction expressed by the various stakeholders as a consequence of the introduction of a given system. Finally, for those scholars for whom organisations are entities constantly involved in relationships of exchange with the external world with a view to taking possession of scarce resources, a valid indicator is the capacity to accumulate such resources so as to transform them into output.

According to Soh and Markus (1995) the concept of performance cannot be other than complex and multidimensional. Given that all the above-mentioned perspectives are not mutually exclusive but rather find concrete confirmation in reality, the authors propose grouping the various indicators under the single denomination of “organisational performance.” Moreover, it has been suggested that a research approach of a dynamic type (process) be adopted (Markus and Robey, 1988) in the belief that a logic of this type – as opposed to one of a static nature (variance) – is a more appropriate way to give an account of the (possible) effects that accompany the introduction of a particular technology in a given organizational setting. Process theory admits the presence of discontinuities as well as unexpected and unforeseeable displacements and realignments. In fact, on the one hand, it hypothesises the existence of a sequence of interconnected events which lead to a certain result while, on the other, it admits that along the way something different may happen which could change those events.

According to Soh and Markus the relationship between organisational performance and information technology is the result of the interaction of 3 “ideal” sub-processes (Figure 1).

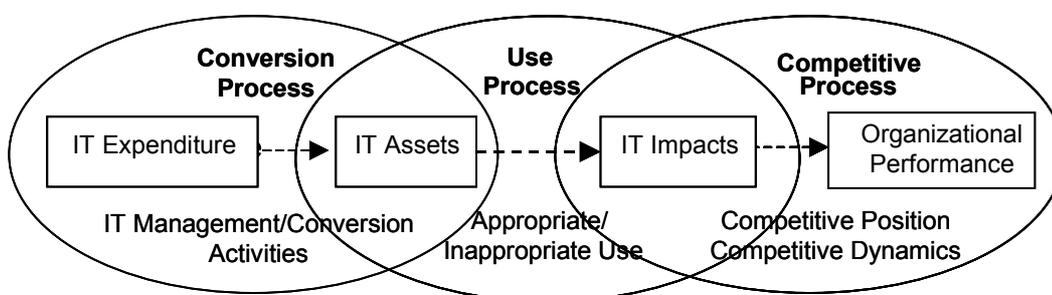


Figure 1: How IT Creates Business Value (Soh and Markus, 1995)

Proceeding backwards (or rather from right to left), we note that the first sub-process (“competitive process”) correlates the improvement in organisational performance to the impact of technology. Within the perspective of Sambamurthy and Zmud (1994) such impacts take on different meanings including the following: the implementation of new/better products and services, the redesign of business processes, greater communication efficacy and the adoption of dynamic and flexible organisational structures. Proceeding in the direction of the so-called “IT use process”, the organisational impact of IT is viewed in relation to so-called “IT assets”. This term indicates the set of infrastructures, technologies and know-how which – in conjunction with an appropriate managerial and implementation policy – form a resource with added value. Finally, the third sub-process (“conversion process”) transforms investment in technology into strategic resources.

In short, Soh and Markus describe the sequence through which IT generates (or fails to generate) organisational performance. It starts out from the assumption that the demand for hardware, software and IT services is a feature of every type of organisation and it maintains that only a part of the investment is transformed into assets. Only if accompanied by appropriate use can IT assets produce positive organisational impacts. These, in turn – in the presence of favourable environmental conditions – produce an improvement in organisational performance. Organisational change represents the connecting link between technological resources and the results achieved with them.

Soh and Markus group together in a clear manner the crucial features of phenomena that experience has shown to be anything but simple and linear. The model also takes account of the relationship and of the potential overlap of the various phases. Figure 1 indicates certain conditions that are “necessary but not sufficient” (note how the arrows show their interrelationship) in order for the organisation to be able to draw certain benefits from the appropriate use of ICT. Organisational change is highly unpredictable; the expected results may not eventuate, even in the presence of all the factors that are considered relevant.

3 ICT And Public Sector

We think that at this point it is useful to represent better the relationship between ICT and the public sector. Our objective is to understand whether the Soh and Markus framework can be applied to public organizations.

To this end we will discuss some of the most valuable contributions which have dealt with the role of ICT in the public sector. It should be considered that the relatively small amount of research dedicated to these themes has resulted in a limited number of scientific publications. A fundamental study elaborated by Bozeman and Bretschneider (1986), compares public management information systems (PMISs) with ISs in the private sector (MISs) and highlights the effects deriving from these differences on the managerial level. For example, in public administration bodies the planning process must be incremental/contingent rather than holistic/rational. Moreover, it is necessary to have longer and more profound system development and testing phases because possible anomalies could affect a much higher number of users. The theoretical framework provided by Bozeman and Bretschneider also emphasizes the role of environmental factors in shaping public information systems.

Bretschneider (1990) has investigated the main differences between public and private organizations that could affect the capacity to manage ICT resources effectively. The differences identified included, among other aspects, the following:

- PMIS managers have to contend with greater levels of interdependence across organizational boundaries than do private MIS managers;
- criteria for the evaluation of hardware and software, which ultimately lead to purchasing decisions, are different for PMIS and private MIS; and
- PMIS planning is more concerned with extra-organizational linkages, while private MIS is more concerned with internal coordination.

Virili (2001), on the basis of an analytical framework developed by Williamson (1996), interestingly notes that in the public sector some organizational choices (e.g. the introduction of ICT-based solutions) are intentionally characterised by inefficiency (“inefficiency by design”, as Williamson put it). This inefficiency stems from a trade-off between efficiency and political consensus.

A recent study by Rocheleau and Wu (2002) traces a substantial uniformity of practice in regard to information systems, independently of the sector considered (it is enough to think of the growing use of outsourcing practices, or of the development of portals and Web sites). On some fronts, however, the differences between public and private spheres are destined to continue in the future.

The first element analysed regards the role attributed to technological resources. For example, one of the most important motivations for investing in ICT in the private sector

concerns the ability to compete in the marketplace. Since competition in the public sector with other offices, with other agencies or with private operators is very limited, if not absent, it is understandable that it is the private companies that attribute greater significance to the implications of ICT on competitiveness. And, as a result, they are more inclined to make a commitment on this front. For the same reasons public administrations are less inclined to invest in solutions and projects which involve a high level of risk (Willcocks, 1994).

Another difference cited by Rocheleau and Wu concerns the use of information systems in relation to the respective pools of users. Private sector companies can decide whether or not to be present in certain segments of the market on the basis of considerations of economic convenience. Public administrations, on the contrary, have much more limited opportunity to determine their fields of action. Precluded from having the freedom to adopt policies to select users or limit the range of their supply, they are not able to withdraw from providing services even in situations where it is plainly uneconomic.

Finally, another distinguishing factor destined to remain concerns decision-making mechanisms that, in the public sector, are subject to supervision on the part of external bodies (e.g. oversight agencies). Public organizations must respond to superior government bodies, private citizens and peer agencies. From this need for transparency and accountability there derive specific functional and organisational requirements (for example, legislation requires that public administrations periodically provide superior government bodies with reports in a very specific format). These obligations, by contrast, may not be present in private organizations.

The public sector, then, reveals similarities with the private sector, but these appear more difficult to interpret as a result of the combined operation of a greater number of context-dependent variables - whether they derive from within or from without - including "...the scope of users, the type of decision that the information system supports and other factors such as time pressure and accountability (...)." (Newcomer and Caudle, 1991, pg. 378).

Nevertheless, the existence of particular elements like those just listed leaves intact the conceptual framework of the Soh and Markus model. In what follows, then, this will be used to respond to our initial question.

4 An Exemplifying Case: Selection Criteria For eGovernment Projects

The evaluation table developed by the Ministry for Innovation and Technology is a system of indicators divided into 5 principle classes, each one assigned its own relative weight (Table 1).

The structure is very similar to a scoring model and is conceived to be used both by the public bodies proposing projects and by the experts responsible for evaluating them. The choice of the projects to co-finance has been determined on the basis of a nation-wide selection process.

Table 1: Evaluation Criteria for eGov Proposals (source: Italian Ministry of Innovation and Technology)

Criteria	Score
a. Consistency with the objectives of local Territorial Plan	10
b. Quality of the proponent, in terms of: dimensions (internal staff and number of constituents); number of public bodies involved in the initiative; available IT and organizational resources; past experience and specific competencies in the field; financial commitment	35
c. Quality of the project, in terms of use of specific methods for project management and for analysis of user requirements	10
d. Overall quality of the proposed solution (compliance with specifications stated in Technical Annexes; potential impact of on-line services to be developed; level of interactivity and accessibility; kind of technology tools employed; number and variety of delivery channels; long-term financial and administrative feasibility	35
e. Possibility of replicating the same experience in other contexts (portability and scalability of the project across public administration bodies)	10

The authorities responsible for the selection gave attention to and evaluated positively the following features:

- “objective” parameters relating to the public body making the proposal (including former experience in analogous projects, the present level of computerisation, experience in the sector and the number and quality of services already realised and put into action through innovative delivery channels);
- plans based on the use of methodologies recognised as valid for the management of projects and the conduct of work programmes together with the use of instruments for the analysis of user requirements;
- adequate technological and professional resources present in the administrative body and in any private partners (if involved in the project);
- the extent of the services to be realised and their cost in relation to the extent of the pool of users; and
- references to market standards and to the use of open technologies with a view to promoting the extension of the same services to other administrations and to redeploying the experience gained.

4.1 A Rational Vision

The indicators chosen and the relative weight given to each seem to respond to 2 distinct fundamental questions (Ginzberg, 1979, Table 1) concerning selection decisions and resource allocation decisions:

- i. Does the project respect the minimum requirements expected?
- ii. Does the project represent the “best” use of resources among the available (and potential) uses?

In the first case the intention is to ensure that the contents of the proposals meet the general requirements outlined in the plan as well as those present in the accompanying technical specifications. In the second case, on the other hand, emphasis is placed on the control of the practicability of the projects with a view to facilitating the creation of services that are accepted and used in an appropriate manner. In both cases the evaluation gives weight to measurable parameters so as to facilitate a comparison across different proposals.

What emerges clearly is a rational and deterministic vision of ICT investments employed for the realisation of the e-government plans, one that is inspired by criteria of pure optimisation. There is an assumption that the choice and use of the “right” instruments (conceived in terms of the capacities offered by the hardware, software and infrastructure components used), together with the employment of adequate professional resources, will necessarily lead to the realisation of “good” solutions and, therefore, to the achievement of results that cannot be other than “positive” for the performance of the relevant administrative bodies.

A further confirmation of the causal model adopted emerges from the role attributed to open technologies and to standards. For example, the XML language and the SOAP protocol are indicated in Annex 2 as suitable technologies to design, structure and carry information via the Internet. The inclusion of these requirements is tied to a dual objective: to guarantee the exchange of data even between heterogeneous technical platforms and to facilitate interoperability. In the same documents, however, no mention is made of the organisational problems that often constitute the real obstacles to the realisation of effective interaction between local administrations. As correctly stated by Landsbergen and Wolken (2001, pg. 206), “interoperability is more than ‘digital plumbing’ (...). Fundamentally, interoperability is people talking and sharing information. Sharing information reduces the ‘paperwork burden’ on the citizen, streamlines work processes, and enriches the formulation, implementation, and evaluation of policy”.

Even in relation to a crucial principle like the need to carry over experience and knowledge into other areas of the public sector, the problem is again treated in terms of mere technological feasibility. Markus (2001, pg. 83) notes that “it takes more than information technology to document and reuse knowledge. It takes ‘organizational work’”.

The plan conceptualises the role of information technologies in terms of an “enabling instrument” for the realisation of e-government.

In this context we might briefly refer to the large quantity of scientific contributions and empirical research which, as well as put forward much more complex readings of the phenomena, has recognised and demonstrated the importance – among other things – of the social and political dimensions of ICT. Among more recent work one could refer to, for example, McLoughlin (1999), Landsbergen and Wolken (2001) and deLancer Julnes and Holzer (2001). According to another particularly interesting contribution, that of Ryan and Harrison (2000), ignoring such aspects not only demonstrates the limited importance attributed to them but, above all, deprives the administrations of the opportunity to guard against the dangers deriving from an inadequate commitment on a front as delicate as that of the management of change. Bellamy and Taylor (1996) affirm clearly that in the public sector the reasons for the failure of innovative projects in the ICT field must be sought on the political front rather than on the technical front.

Returning to the Italian plan, if the intention was to facilitate service innovation at the local level, attention should have gone beyond the moment of the selection of the projects. Instead, in the official documents the only references to the implementation and use phases concern the control of the presence (in the context of the work plan) of activity

aimed at determining the level of satisfaction of the users. Thus, the e-government projects have been regarded as “one-shot” initiatives rather than as recursive ones (“on-going”, as Kling and Lamb, 1999, put it).

The “one-shot” approach may be appropriate where the project is dealing with the substitution or up-dating of pre-existing software applications in a logic of simple replacement. Similarly, it might be appropriate in cases in which the system to implement is not very complex. However, when the object is to promote through ICT innovation destined to influence the users of services, internal work practices and the performances of public bodies, there emerges a need for the adoption of a more open and less deterministic vision which takes account of the interdependence between the various aspects. In the case in question, the integration of the grid with the indicators inspired by the socio-technical perspective (Robey and Markus, 1984; Sorrentino and Virili, 2003) and the political perspective (Bellamy and Taylor, 1996; Warne and Hart, 1996) would not have overlooked the importance of the rational approach but would have certainly contributed to placing it in a more realistic context.

Thus, we could conclude that the relative ease with which – thanks to the spread of Internet technologies – it is possible to provide new front-office services, has lead the Ministry of Innovation and Technology to undervalue the complexity inherent in processes of technological innovation.

4.2 Some Implications In Respect Of The Soh And Markus Model

At this point we can reread the Italian plan for e-government in the light of the Soh and Markus model. At the end of this exercise we count on having the knowledge necessary to respond to our initial research question.

The plan assumes a very simple causal chain between initial conditions and future consequences. Before anything else, we point out that the perspective does not go beyond the first of the 3 sub-processes, i.e., the one that “converts” technological investments into IT assets. In this regard we observe that it is also very problematic to manage to step outside a feasibility study if, in the organisational context of the agency making the proposal, investments can be transformed into value-added resources capable of unleashing cycles of positive change. Moreover, we draw attention to the fact that the process of conversion involves, in turn, various phases in which the decisive aspect does not lie so much in the type of technical solution as in the action taken by management (Markus and Soh, 1993) in terms of: 1) the formulation of IT strategies, 2) the identification of structures dedicated to the implementation of such strategies, 3) the selection of the appropriate IT projects and 4) the effective management of the projects themselves. It is evident that in none of the crucial contexts just cited can a technocratic approach be considered realistic. Finally, there is no sign of the two further necessary conditions indicated by Soh and Markus: the “IT use process” and the “competitive process”.

We can conclude, therefore, that the Italian plan for e-government has determined to evaluate *ex ante* the resources absorbed by the process of innovation, i.e. the input employed by the administrations at the moment of initiating a given project: technologies and human and financial resources. Consequently, the outcomes of any initiative can, at most, be evaluated in terms of the “documentation and measurement of outputs” with all the risks of self-reference (Regonini, 2001, pg. 164) that this implies.

5 Summary And Conclusions

From the analysis conducted it emerges that the predominant approach adopted by the Italian Ministry of Innovation and Technology is the objective/rational one in which ICT is placed at the centre of the process of change in public administration.

The perspective is partial in that it overlooks the social and political dimension of technology. Therefore, our response to the initial question is highly sceptical. Not only are we not certain that the push towards technological innovation promoted by the government plan will be translated automatically into an improvement in organisational performances at a local level but we believe that the absence of any form of *ex post* evaluation (based, in other words, on a comparison between the objectives of the program, the expected effect and those actually obtained) is highly limiting. For example, if the plan had covered the entire life cycle of the co-financed systems, it would have been possible with time to make use of a wide range of cases on a national scale. This same information base would have functioned, in turn, as a testing ground in relation to the causal relations which gave rise to the e-government plan. Let us not forget that in Italy "...experiences characterised by substantial components of innovation co-exist with situations in which progress towards innovation still encounters obstacles that are very difficult to overcome" (Formez, 2002, pg. 39).

The Soh and Markus model improves our understanding of ICT-related implications and points the way to some necessary but not sufficient conditions which need to be recognised and supported. Recognising the presence of 3 sub-processes, each characterised by its own assumptions and implications, allows us to isolate or anticipate the effects that may influence organisational performance. A further revealing contribution that the Soh and Markus framework can offer emerges in relation to the construction of future research hypotheses regarding Italian public administration in particular. For example, it could be interesting to test empirically the existence of the differences hypothesised by Rocheleau and Wu (2002).

The greatest limit of the model is that – being of general use – it does not distinguish between the different ways of conceiving of performances in the context of public policy, specifically, product (output), result (outcome) and effect (impact) (Regonini, 2001, pg. 162). If applied to the construction of systems for evaluating ICT investments in the public sector, the framework will necessarily have to take into consideration the joint influence exerted on all three key processes (IT conversion, IT use and competitive process) by a greater number of contextual elements.

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