E-government success: how to account for ICT, administrative rationalization, and institutional change

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Abstract
E-government is a complex undertaking which encompasses technological, organizational, and institutional elements. Much research in the field has locked at ICT as a valid solution to make public administration more successful. This chapter offers a richer account of the role played by ICT in transforming public sector organizations discussing the effects ICTs have in the rationalization of administrative procedures and public sector institutional transformations. The notion of techno-institutional assemblages is introduced to offer a new theoretical ground to frame the notion of success in e-government projects. It is argued here that successful e-government policies are the one that deliver the outcomes which have led their initiation. Accordingly the need for new indicators of success is identified.

Introduction
Much public sector information systems literature frames the concept of e-government success by drawing on private sector benchmarks. One example of this is when different stages in the evolution of e-government are discussed (K. Layne & J. Lee, 2001; UN & ASPA, 2002) in order to measure the success of the development of e-government strategies. In this case, the similarities with private sector ICT frameworks are
These stages, which build upon the ideas proposed in Business Process Re-engineering (BPR) (Venkatraman, 1994), do in fact mainly assume that the level of technological sophistication can be an indicator of success, as it reflects a better propulsion of the organization towards more valuable business opportunities. In this context, ICT is conceived as the tool public institutions need to achieve a more efficient and rational way of working. As is common in the case of the private sector (C. U. Ciborra, 2000), the managerial perspective is chosen to discuss the role of ICT in the re-organization of work activities and to frame the notion of success in ICT-enabled public sector reforms.

Following this train of thought, ICT is perceived as the main instrument by which to achieve a successful transformation in the way public sector organizations produce and deliver their services. The challenge seems to be the identification of the right technology to lead the process of public sector transformation and to pursue the leading private sector managerial drivers, as it is in the case of New Public Management (NPM) programmes. Following this rationale, a rich literature has been produced, debating the effects of ICT adoptions at different government levels (Mehdi Asgarkhani, 2005; Denziger & Andersen, 2002; Gupta & Jana, 2003; Melitski, 2003; Moon, 2002) and benchmarking countries against indexes of ICT readiness (UN, 2001), as if a better score would lead to more effective and therefore successful e-government programmes.

These indicators suggest a direct link between ICT diffusion in government and the efficiency of government actions. Although valuable, this focus on efficiency is at least questionable as it suggests that best practices and universal strategies are available with which to successfully implement e-government programmes, ignoring the rich literature that has argued that the notion of “best practices” is limited (Wagner & Newell, 2004, 2006; Wagner, Newell, & Galliers, 2006) where ICT deployments are concerned. As a consequence, we suggest here that, when the notion of success is discussed in the context of e-government, more attention should be given to the complexity that is associated with e-government implementations, rather than the focus being on best practices and universal strategies to prescribe how to successfully implement e-government programmes in line with private sector experiences. The outcomes of e-government implementations are always associated with public sector reforms, which have an impact on social and political dimensions, and these need to be accounted for when these sorts of implementations are assessed.
In this chapter, we suggest a different approach to looking at ICT in the public sector. Building on studies that have discussed the socio-technical nature of public sector ICT adoptions (Avgerou & Walsham, 2000; Contini & Lanzara, 2008b; Denziger & Andersen, 2002; Fountain, 2001, 2007), we argue that more attention ought to be given to the public sector context, and to the characteristics of ICT when discussing the success of public sector e-government projects.

Accordingly, we venture to show that e-government policies result in techno-institutional assemblages, which emerge from the interplay between the technical and institutional elements that are intertwined within every e-government project.

Our analysis suggests that the notion of success in e-government implementations is questionable. E-government projects unfold in trajectories that are very difficult to benchmark as the value, and therefore the success, of public sector reforms can only be assessed against the transient values that society accords to the actions of the public administration (Cordella, 2012; Cordella & Willcocks, 2012).

**ICT in the public sector**

Public administration innovations mediated by ICTs (e-government) are at the centre of most contemporary public sector reforms. In public administrations, many government tasks are executed through a specific organizational structure, bureaucracy, which is designed to achieve the goals of fairness and equality (Meier & Hill, 2005). Bureaucracies are in fact very valuable solutions for standardizing processes used to coordinate procedural activities carried out to deliver expected services (Mintzberg, 1983). Over the last few decades, however, bureaucracies have failed to deliver the expected outcomes and the government has invested in programmes of reforms, often supported by ICT, aimed at providing responses to these failures. Public sector organizations have been permeated by a wave of reforms, driven by the NPM ideology, with a specific focus on improving administrative efficiency and managerial effectiveness by reducing the span of intervention of bureaucratic organizations. These reforms have been driven by the search for
objective measurements of administrative performance and cost efficiencies, rather than by the aforementioned standardization of work processes and procedures usually imposed in bureaucratic organizations to guarantee equal and homogeneous service delivery (Thomson, 2003). Most of the NPM initiatives have fostered the use of market competition, compulsory competitive tendering, Private Finance Initiatives (PFI) and privatization initiatives to overcome the bureaucratic red tape and transform the state into a slim organization oriented towards efficiency and cost saving.

In this context, the adoption of new ICTs has often been used as a key factor, if not a shortcut, in reducing the span of bureaucratic interventions and the cost of running the public administration, with the implicit intent of improving the quality of public services (M. Asgarkhani, 2005) and therefore the government success in delivering public services. Yet the impact these innovations have on the nature of public sector activities, and therefore on the services provided to citizens, is not often discussed by looking at the broader impacts that these transformations can have on the value of the services delivered to citizens (Bovens & Zouridis, 2002; Cordella, 2007). Rather, the effects of ICT on public sector organizations are largely assessed by following private sector indicators such as the efficiency, economy and effectiveness of these organizations (Margetts, 2003) in managing and organizing the processes needed to deliver public services. In addition, most of the research related to e-government success has focused primarily upon providing a set of normative solution or strategies, and less on the processes, actors’ interactions and complexities (Norris, 2001; Yildiz, 2007) that always shape the outcome of reforms associated with the introduction of ICT into public administration. As a result, current research on e-government, and the discussion of the notion of success in this context, present a window of opportunity in terms of both theory development and empirical investigation, as well as an opportunity for advising policy makers (Fountain, 2001; Heeks & Bailur, 2007). This chapter aims at providing a theoretical framework that builds on the notions of functional simplification and closure (Kallinikos, 2005; Luhmann, 2005) to better account for the role played by the technical characteristics of ICT in shaping the
complex process associated with ICT’s adoption in public sector organizations, and therefore provides a new point of reference to frame the concept of e-government success.

**Background**

Most of the existing literature on e-government and in the specific the one which looks at the notion of success in e-government has focused on the study of ICT as a tool to enable rationalization in public sector organizations. Following this approach, most research has discussed the effects of ICT on government organizations and the services they provide, by looking at what can be changed in public sector organizations by adopting different ICT solutions. Consequently, the transformation led by e-government reforms has been discussed in terms of development processes that unfold alongside the evolutionary nature of ICT (Gauld, 2009). The identification of evolutionary phases is indeed helpful for understanding the changing nature of ICTs, and the legacies, opportunities and constraints they have for future technical developments and deployments in public sector reform projects. These models, however, fail to account for the broad, political and contextual nature of reform projects in the public sector (Contini & Cordella, 2007; Peters & Pierre, 1998). E-government, as are many other public sector reform projects, is in fact often associated with the aim of changing the way in which public offices organize and deliver services, and the nature of the delivered services. These changes have political, social and contextual implications for the citizens who receive the services, which need to be accounted for when ICT-enabled public sector reforms are design and implemented, and when their success is discussed.

The link between ICT deployment, the changes in public administration organizations and the quality and nature of the services they deliver is very relevant in explaining the overall impacts ICT-enabled reforms in the public sector have on the processes undertaken to deliver these services and on the value of the delivered services (Cordella, 2012).
Most public sector ICT adoptions fail to address the complexity of this impact, as they are mostly driven by the need to reduce the costs of providing public services. The investments have either been aimed at saving resources by improving the organizational processes followed to provide the services, or by rationalizing the overall organization of these processes, as in the case of the joined-up reforms or one-stop shops (Cordella & Iannacci, 2010).

These practices follow well-established private sector strategies that have typically envisaged the success led by ICT either as the result of the rationalization of existing processes or as the result of a profound re-engineering of organizational structures (Andersen, 1999). In the context of public sector this is only the case, however, only when citizens value the efficiency of the service delivery process more than the actual benefits they receive from these digitalized procedures.

Some citizens, for example, may value one-stop shops or other online services as they make accessing these services and their delivery more efficient and effective. However, other citizens – who do not have access to ICT – will not receive as much benefit from these digitally delivered services and therefore will not value them as much as those delivered by the organizations that did not rely on ICT.

The impact of ICT on government organizations and on the services they deliver is multidimensional. Multidimensional indicators are therefore needed to account for success of the adoption of ICT in the public sector is concerned.

Approaches that only assess the impact of ICT on organizational performance do, therefore, underestimate the impact of public sector ICT-enabled reforms on the overall context of public sector service delivery (Bonina & Cordella, 2008). To be in a more effective position to deal with the complexity associated with the transformations brought about by these public sector reform projects and to discuss their success we suggest looking at the broad contextual factors that make up
the domain within which e-government projects are conceived, shaped and implemented, and not only at the organizational or procedural efficiencies associated with the delivery of public services.

E-government projects impact upon social and political dimensions and not only on organizational efficiency. In other words, the success of ICT adoptions on the public sector may be more complex and difficult to be assessed than those on private sector (business) organizations (Aberbach & Christensen, 2005; Bozeman & Bretschneider, 1986; Cordella, 2007; Frederickson, 2000; Moore, 1995). By failing to recognize these differences, e-government literature and practices have largely referred to private sector ICT experiences (ERP, CRM, e-business, knowledge management etc) and indicators of success for ICT adoption in the public sector. The result is a predominant bias towards ICT adoptions in the public sector that are driven by the basic principles of efficiency and cost rationalization, which govern private sector ICT adoptions (Andersen, 1999; Chadwick & May, 2003; Thong, Yap, & Seah, 2000).

Contrasting, alternative approaches to e-government research are found in studies that have looked at the socio, technical and institutional interplays involved in the diffusion and adoption of ICT in public sector organizations (Contini & Lanzara, 2008a; Danziger & Andersen, 2002; Fountain, 2001). These studies provide a rich set of perspectives through which to understand the implications and challenges associated with e-government programmes and help to better frame the complexity of the notion of success in ICT enabled public sector reforms.

Building on these ideas, we suggest that e-government projects should be studied as context-dependent phenomena that are shaped by both the technical and institutional factors that frame public sector organizations and the services they deliver. Accordingly, ICT-enabled public sector reforms should be considered complex, context-dependent, techno-institutional assemblages (Lanzara, 2009), wherein technology acts as a regulative regime “that participates in the constitution of social and organizational relations along predictable and recurrent paths”
(Kallinikos, 2006:32) just as much as the contextual institutional factors within which it is deployed (Barca & Cordella, 2004; Fountain, 2001). E-government projects therefore introduce new technologies that mediate socio and organizational relations that are imbricated and therefore also mediated by context-dependent factors such as cultural and institutional arrangements (Cordella & Iannacci, 2010).

The relevance of these mediations is accounted for by studies that have looked at the social, political and institutional dimensions of e-government projects (Bozeman & Bretschneider, 1986; Brewer, Neubauer, & Geiselhart, 2006; Dunleavy, Margetts, Bastow, & Tinkler, 2006; Fedorowicz, Gogan, & Williams, 2007; Fountain, 2001; Gil-Garcia & Pardo, 2005; Irani, E.D. Loveb, & Jones, 2008; Luna-Reyes, Zhang, Ramon Gil-Garcia, & Cresswell, 2005), such as the technology enactment framework (Fountain, 2001). These studies are valuable in explaining the influence of organizational structures and institutional arrangements (D. M. West, 2004; Yildiz, 2007) on ICT implementations in the public sector. These studies highlight the role public sector organizations have in shaping public sector ICT implementations (Luna-Reyes, et al., 2005). However, by making a distinction between the technical artifacts -objective technology- and their enactment into organizational practices -enacted technology- the technology enactment framework fails to address the impact specific technological characteristics can have on the deployment of ICT-enabled reforms. This shortfall is partially complemented by the work by Cordella and Iannacci (2010), which proposes the “e-government enactment framework” as a solution to account for the technical characteristics of technology as factors that shape the enactment of public sector ICT policies. Their conclusion is that technical characteristics of technology shape the enactment process as well as organizational and institutional arrangements, so that it is not technology that gets enacted but the techno-institutional arrangements that indeed constitute e-government policies. Accordingly, e-government is not only the result of social, political and institutional negotiation, as described in the
original technology enactment framework, but also of political negotiation embedded in technological stratifications.

The e-government enactment framework is one of the very few examples of e-government research where the technical characteristics of technology are not considered as the sole enablers of organizational change but rather as contextual factors that shape e-government policies.

However, even if it is useful for understanding the process within which technology shapes and is shaped by the context in which it is deployed, the framework does not provide any analytical tool with which to analyse and depict the characteristics that make technology such a relevant factor in leading the path of deployment of e-government policies and therefore in shaping the success of these policies.

To fill this gap, we propose to focus on the regulative characteristics of ICT that emerge as the result of the processes of functional simplification and closure, which represent some of the essential elements that structure the constitutive features of every ICT (Kallinikos, 2009; Luhmann, 2005).

In the following section, we articulate these concepts in detail and provide a theoretical framework which helps to better frame the role played by ICT in shaping the outcome of public sector reform and hence to offer new insights for the discussion of the notion of success in e-government.

**Technology: functional simplification and closure**

When e-government literature has looked at the technical characteristics of technology, it has mostly discussed the functionalities offered by the technology as a potential enabler for a linear transformation of public sector organizational practices and coordination structures (K. Layne & J. W. Lee, 2001; D. West, 2004). This instrumental perspective is however limited in scope as it conceives technology only as a tool to enhance the productivity processes in the organization by offering humans with better and more efficient means to deliver organization outputs (Kallinikos,
ICTs have however more complex and profound impacts on the environment and organizational practices than the one on productivity and efficiency gains. ICTs in fact encompass properties which frame the causal connection of the organizational practices, events, and processes they mediate (Kallinikos, 2005; Luhmann, 2005). ICTs do not simply offer a neutral support to better execute existing organizational activities but rather offer a new way to enframe (C. Ciborra & Hanseth, 1998) and couple in a technically pre-defined logical sequences of actions the organizational procedures and practices they mediate (Luhmann, 2005). As a result ICTs construct a new set of structured sequences and interdependences that regulate the way in which organizational procedures and processes are executed. ICTs therefore carry regulative properties that structure social and organizational orders, providing stable and standardized means of social interaction (Bovens & Zouridis, 2002; Kallinikos, 2005) shaped into the technical functionalities of the systems. Work sequences and flows are described in the technological functions, making one essential characteristic of information technologies the reduction of complexity in causal or instrumental relations. These relations are standardized and stabilized in the scripts and codes that constitute the kernels of the systems. The designs of these systems enclose relational causalities that are described in the scripts of the technology. At the same time, they exclude other possible causalities by not including relational interdependencies into the same scripts. Kallinikos (2005) argues that this is a fundamental characteristic of ICT that results from the combined effects of functional simplification and closure.

When organizational activities or practices are incorporated into ICTs they are not rationalized in holistic terms – as is assumed by the instrumental view of technology – but described and coupled so as to accommodate the logic underpinning the model of technology used in that specific context. Models of technology differ as they structure the world in different logical sequences, so that the holistic concept of technical rationalization is useless once it is recognized that different technical artifacts reduce complexity into the different logics that underpin their logical and functional
structures. Functional simplification is the process followed to reduce complexity into the logic of technology. The complexity of the world needs to be accommodated within the functional logic of technology and, therefore, described in a simplified form so as to reflect the logical sequences that constitute the operational language of technology. The complexity of the world needs to be reduced in order to define the classes and relationships that are used to design ICT. The deconstruction of the complexity of the world into these classes and relationships can be complicated in itself, but this complication is reduced by the structuring language of technology. ICTs clearly demarcate the operational boundaries within which the information system will operate, by segmenting the sequences of operations executed by the system and the domains within which these sequences will operate. By defining these boundaries, ICTs allow for a reconstruction of the classes and relations into a simplified set of causal or instrumental relations, constructed to comply with the chosen model of technology. This reconstruction, or closure, of the boundaries of the operational domain is, in essence, what every information technology offers (Kallinikos, 2005). Information technology not only creates these causal and instrumental relations but also stabilizes these relations into standardized processes that keep the relations unchangeable. Functional closure is the effect of the standardization of these relations into stable scripts: the creation of the kernel of the system (Kallinikos, 2005). As a result, ICTs become regulative regimes (Kallinikos, 2009) that structure human agencies by inscribing paths of actions, norms and rules so that the organizations adopting these technologies will be regulated in their actions by the scripts of technology.

When studying and theorizing about the adoption of ICTs in public sector organizations, these regulative properties of ICT should be placed at the centre of the analysis in order to better understand the implications of using ICTs in public sector reforms and to better frame the concept of success in e-government.

**Technology in the public sector: assemblages**
Public sector reforms are not only enabled but also shaped by ICT adoptions. ICTs not only provide organizations with better and more efficient instruments with which to execute existing tasks, but also act upon the socio-technical and institutional context within which daily organizational actions are undertaken.

The deployment of ICTs in public sector organizations unfolds in techno-institutional assemblages (Lanzara, 2009), in which the technical and institutional regulative properties are intertwined. These composite configurations (assemblages) shape organizations’ actions and outcomes. In these assemblages, ICTs translate into the scripts of different technologies, organizational procedures, and processes which, in the case of public sector originations, are originally defined in administrative regulations and the law. Rules, regulations and the law are functionally simplified and closed in the scripts of technologies that, as described by the enactment studies (Cordella & Iannacci, 2010; Fountain, 2001), are enacted in the daily organizational processes and moulded into complex techno-institutional configurations. In these configurations, the scripts of technologies and other regulatory regimes not translated into technology – institutional rules, regulations and the law – are intertwined with organizational actions and become part of a composite assemblage that it is impossible to disentangle. This process is well described by Bovens and Zouridis (2002) when they argue that functional simplification and closure are very instrumental in explaining the role information technologies can have in the context of bureaucratic rationalization. In the case of public administration, these codes and protocols are defined by law and internalized in the organizational procedures by means of standardized mechanisms of coordination, control and interaction. Information technologies allow us to better rationalize and stabilize these mechanisms because of the effects of functional simplification and closure. Hence, information technologies offer, not only new and better means of production, as argued by the instrumental perspective, but also regulative properties that structure organizations’ processes and procedures. When enacted in
the organizational practices, they produce new institutional configurations fitted into the regulative frame produced by the technology (Cordella & Iannacci, 2010).

This complex interplay that shapes the trajectory of e-government reforms can only be depicted by focusing on the interplay that occurs between ICTs, and institutional properties and organizational practices. These effects are twofold. ICT shapes institutional properties and organizational practices as they need to be translated into the scripts of technology. This translation is needed to accommodate existing practices into the rationality underpinning the logical and functional structure of technology – functional simplification. Technology also clearly demarcates the operational sequences that set the boundaries within which these structures are operationalized – functional closure. These processes are very clearly described by Bovens and Zouridis (2002) in the case of the Dutch student loan administration. In this case, ICT was initially designed to support the decision-making processes, providing better and more accurate information to enable the administration to make better decisions. Because of the formalization of the procedures into the technology – functional simplification – the organization was forced to formalize aspects of the assessment process used to determine whether or not to give a loan, in order to comply with the logical structure of the process inscribed in the technology. ICTs also closed the boundaries of the logical sequences of the processes, leading to functional closure. As Bovens and Zouridis (2002) explain, "Automation of one step in a process demands the standardization and formalization of the preceding steps. If templates were created for the layout of decisions, categories needed to be defined that could be resolved in a particular way. As a result, more and more cases could be assessed according to a standardization method. If assessment has been standardized, precisely which information is needed for the assessment is also known. Hence, the data collection phase can also be formalized and standardized."

ICT is also enacted in a given context so that the regulative properties of technology are cast upon the contextual institutional properties and organizational practices that shape the enactment of
technology in its use. The normative properties of technology are therefore intertwined with institutional and organizational factors, which indeed shape every deployment of ICT in public sector organizations into techno-institutional assemblages. Techno-institutional assemblages are therefore configurations that shape the outcomes of reform policies enacted through technological deployment. Technologies shape institutions as they translate rules, regulations, norms and the law into functionally simplified logical structures – the code of technology. Technologies are, however, enacted into organizational practices and actions so that the institutional properties inscribed into the technologies are themselves shaped into this enactment process. This explains the intertwined nature of techno-institutional assemblages. ICTs play a major role in the definition of the trajectories taken by these assemblages as they translate into their codes a specific and rigid path of action and interdependent sequences that are not objective but rather carriers of the aims and goals of the contingent reform that has initiated the project and sponsored the design of the technical artifacts (Cordella & Iannacci, 2010). Accordingly, to better understand the trajectory of e-government reforms, it is here suggested that we must consider both the technical and the institutional properties that shape these assemblages and trace their trajectories as a means to better understand the impacts of these reforms on public sector organizations, the services they deliver and the value that is generated for the citizens receiving these services.

**Techno institutional assemblages and e-government success: the need for a new approach**

Through the chapter we have shown that e-government policies are complex phenomena that cannot be studied just by looking at ICT as an enabler. The concept of techno institutional assemblages offers a new angle to frame the notion of success in e-government. Given the composite and transient nature of these assemblages it is not advisable to assess success solely against performance indicators. To better trace the trajectory of e-government reforms and the associated effects, it is here suggested that we ought to consider the specific characteristics of ICT as described by the

concepts of functional simplification and closure and to concentrate on how ICTs help achieving the goals which have informed their design. ICT ignites a process of transformation which unfolds in the trajectories taken by e-government projects. This transformation is what actually delivers the outcomes of these policies. Successful e-government policies will be the one that deliver the outcomes which have led their initiation. Accordingly, these policies – which unfolds in techno-institutional assemblages- need to be studied looking at the processes by which ICTs translate into their codes specific and rigid paths of action and interdependent sequences that are the carriers of the aims and goals of the e-government reforms. This perspective will offer better analytical instruments to examine the implications that this translation process has on administrative performances and broad political outcomes and therefore on the delivery of the goals which have driven these transformations.

While the concepts discussed in this chapters are very helpful to provide a better understanding of the how and why ICT adoptions in the public sector result into techno-institutional assemblages they do not offer a practical solution to the problem of the assessment of success in e-government policies. This chapter however aims at providing the theoretical formulation needed to prepare the ground for research that studies success in e-government acknowledging the complex process of transformation which is implicit in the concept of techno institutional assemblages.

Assessing success of e-government projects is highly relevant, although we suggest that research is needed to identify indicators valuable to link success with the transient nature of techno institutional assemblages. Indicators that can account for the policy outcomes delivered by techno institutional assemblages and not only for performance measurements are needed.

This call for a new approach to study the success of e-government is not only grounded in theoretical reflection. Indeed, many e-government projects, even if “successful” form a managerial view point have not necessarily delivered the outcomes that have driven their deployment. The
transformation which is always embedded in the techno institutional assemblages can shape the values and therefore the success of any e-government policy. Work is therefore essential to identify possible indicators for the study of the trajectories of techno institutional assemblages and to frame the different values they deliver.

References


