

Chapter 2

Electronic Government Success and the Ensemble View of Information Technology

This chapter reviews some of the more comprehensive and integrative theoretical traditions from information systems (IS) and e-government research. Orlikowski and Iacono (2001) refer to these approaches as the ensemble view of information technologies and organization. This view argues that in order to understand information technologies, it is necessary to analyze not only the technological artifacts, but also the social and organizational aspects around those artifacts. After reviewing several ensemble-view approaches, this chapter develops a theoretical model based primarily on Fountain's (2001a) technology enactment framework and complemented with recent literature on e-government and IT success, ideas from the constructivist approach (including the notions of technologies-in-practice and multiple enactments), and concepts and relationships from other integrative models, particularly the process model of computing change. The chapter ends by explaining the proposed theoretical model, "enacting e-government success," and discussing its initial application to government-wide websites as instances of a much broader e-government phenomenon. Future research should apply this theory to other types of e-government initiatives in order to further assess the usefulness of the model.

2.1 The Ensemble View of Information Technology and Organizations

There are many ways to classify research about information technologies (Davenport 2008; Fulk and Gould 2009; Iivari et al. 1998; Iris et al. 2002; King and Lyytinen 2006; Markus and Robey 1988; Nevo et al. 2009; Newman and Robey 1992; Orlikowski and Baroudi 1991; Orlikowski and Iacono 2001; Robey and Boudreau 1999; Seidel et al. 2010; Somers 2010; Tilson et al. 2010; Yoo et al. 2010). Each of these approaches emphasizes different ontological, epistemological, and methodological characteristics of the research within the IS field. However, most of them agree on the existence of a theoretical approach that emphasizes the social and

complex nature of information systems. This approach proposes a better way to understand the relationships between IT and social structures. This section explains the ensemble view of information technologies and organizations (Orlikowski and Iacono 2001) and lists some of the theories that could be classified in this category.

At present, few scholars argue that technologies are directly responsible for social change (Carugati et al. 2010; Contractor et al. 2011; Fountain 2008; Orlikowski 2007, 2010b; Orlikowski and Iacono 2006; Orlikowski and Scott 2008). Instead, several recent theoretical efforts propose alternative ways to understand the relationships between information technologies and the social systems in which they are deployed (Dutta 2008; Harrison et al. 2007; Meneklis and Douligeris 2010; Pentland and Feldman 2007; Zhang and Scialdone 2010). These more holistic approaches have been called the ensemble view of technology (Orlikowski and Iacono 2001). According to this perspective, technology is only one piece of a more complex socio-technical system (Kling and Lamb 2000; Kraemer et al. 1980; Pasmore 1988). Other components can include training, budgets, policies, laws, and commitment, among others (de Bruijn and Herder 2009; Gil-Garcia and Hassan 2008; Kling and Schacchi 1982; Yaobin Lu et al. 2011; Orlikowski and Iacono 2006; Ribes and Finholt 2009; Ziegenfuss 2011). Therefore, from an ensemble view, information technologies are not only the physical artifacts, but also the social relations around those artifacts (Alter 2010; Davenport and Horton 2006; Fountain 2005; Gil-Garcia et al. 2009; Gil-Garcia and Hassan 2008; Gil-Garcia and Pardo 2006; Orlikowski and Iacono 2006; Rittgen 2008; Shin 2010). According to Orlikowski and Iacono (2001), the ensemble view refers to technology in four different ways: development project, production network, embedded system, and structure.

Some predominant examples of these comprehensive approaches are the following (Gil-Garcia and Hassan 2008): adaptive structuration theory (Robert et al. 2009; DeSanctis and Poole 1994; Miller 2008; Naik and Kim 2010; Niederman et al. 2008; Poole et al. 1998); social informatics (Berleur et al. 2006; Kling 2000; Kling et al. 1998; Stillman and Linger 2009; Strong et al. 2009); the structurational model of technology (Harrison et al. 2007; Hsu et al. 2008; Melin 2009; Meneklis and Douligeris 2010; Orlikowski 1992; Orlikowski and Robey 1991; Zackariasson et al. 2009); the socio-technical systems conceptualization (Baxter and Sommerville 2011; Bostrom and Heinen 1977; Geels 2010; Kraemer and King 1986; Mumford 2000; Walker et al. 2008); and the technology enactment framework (Antonio Cordella and Iannacci 2010; Fountain 1995, 2001a, 2005, 2008; Gil-Garcia and Luna-Reyes 2009; Luna-Reyes and Gil-Garcia 2011; Schellong 2007).

Using different but related theoretical constructions, ensemble view theories argue that there is a dynamic interaction between social structures and information technologies. ICTs have the potential to change social and organizational structures, but at the same time these structures influence the design, implementation, and use of ICTs (Fountain 2008; Gil-Garcia 2005a; Gabriel Puron Cid and Gil-Garcia 2004). In addition, research from this perspective has established the importance of different social actor enactments in understanding this bi-directional relationship (Fountain 2001a, 2005, 2008, 2009; Harrison et al. 2007; Orlikowski 2000; Orlikowski 2008, 2010c).

2.2 Ensemble-View Integrative Models

As mentioned before, several social theories recognize the interplay between social structures and IT, which have been classified as part of the ensemble view (Orlikowski and Iacono 2001). Orlikowski and Iacono (2006, p. 34) argue, “Given the kind of emergent IS phenomena we are witnessing today—open source software, electronic commerce, virtual teams, globally-distributed work, new challenges to privacy and intellectual property rights, etc.—there clearly is scope for more work to be done from an ensemble view”. This argument becomes stronger with recent IT developments such as social media, web 2.0, wikis, RSS feeds, and more. However, only a few authors have developed comprehensive and integrative theoretical models that capture the interaction mechanisms between multiple theoretical constructs. This section presents and discusses some ensemble-view integrative models, identifies similarities and differences across them, and offers some theoretical implications from this review. Two of the models were developed from empirical work in government organizations: the technology enactment framework and the process model of computing change. The other two models are more general and considered applicable to any type of organization.

It is important to emphasize that some of these models use similar terms in different ways. For example, within the ensemble view, social structures are generally anything other than the technological artifacts. They could include variables such as organizational structures, the legal framework, environmental forces, and individual behavior, as well as the interrelationships among them (Dawes 2008; Esteves and Joseph 2008; Hornnes et al. 2010; Maxwell and Dawes 2009; Shin 2010; Weigl et al. 2008). In contrast, for Giddens’ structuration theory, social structures are only the macro-social rules that we use to behave in society. They do not exist in reality, but are instantiated in social norms, interpretative schemes, and certain facilities and resources. This book uses the term “social structures” in the more general way. The purpose is to help the reader clearly differentiating them from the technological artifacts.

2.2.1 Structuration Theory and Structuring Information Technologies

Giddens identifies a non-static version of the concept of structure, different from what is found in some structuralism or strategic choice models. The author expresses this difference very clearly: “Let us regard the rules of social life, then, as techniques or generalizable procedures applied in the enactment/reproduction of social practices” (Giddens 1984, p. 21). In the structuration view, the structure is formed by what individuals use to interact with other individuals in their daily lives. Therefore, social practices are not the structure, but the result of interactions between individual actions and social structures (Feldman and Orlikowski, forthcoming; Gil-Garcia and Hassan

2008; Orlikowski 2008, 2010a, 2010b, 2010c; Shachaf and Rosenbaum 2010). This subsection explains some of the main concepts of structuration theory and describes the components and logic of two integrative models based on this approach: (1) the structurational model of technology and (2) adaptive structuration theory.

From this perspective, human actions and the broader social world are mutually constitutive (Giddens 1984). At the same time that individual actions are constrained by certain social-level rules, their practices shape or reinforce those social structures (Gerardine DeSanctis et al. 2010; Orlikowski 2008; Shachaf and Rosenbaum 2010; Whittington 2010). These social practices can refer to both relationships between individuals and relationships between individuals and technological artifacts (Gil-Garcia and Hassan 2008). “The basic domain of study of the social sciences, according to the theory of structuration, is neither the experience of the individual actor, nor the existence of any form of societal totality, but social practices ordered across space and time” (Giddens 1984, p. 2).

There is a dynamic interaction between actions and structures and, therefore, there is no clear causality between social structures and individual actions (Elliott 2010; Grgecic and Rosenkranz 2008; Whittington 2010). In fact, “one of the main propositions of structuration theory is that the rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system reproduction (the duality of structure)” (Giddens 1984, p. 19). Following this logic, information technologies can be seen as both a constitutive part of the structures and the result of the interactions between those structures and individual actors (Gil-Garcia and Hassan 2008).

It is necessary to clarify that for the structuration approach, it is important to study social and organizational structures and their relationship with information technologies, but it is more important to understand how users enact different ways to understand and use certain technology (Hunter III 2010; Orlikowski 2008; Orlikowski and Scott 2008; Prasad 2009; Scott 2010b). In relation to this idea, Walsham (1991, p. 81) agrees that “structuration theory is valuable in carrying out empirical studies of IS use and the way in which this modifies social and organizational structures and vice versa”. It is not the study of the technological artifacts by themselves, but the objective is to understand the social and technical aspects of information technologies in terms of instantiations of social structures.

According to structuration theory, technologies have the effect of *structuring* the social world in terms of defining the ways people think, options for behavior, and ranges of possible consequences (DeSanctis and Poole 1994; Hunter III 2010; Jones and Karsten 2008; Orlikowski 1992, 2010c). Structuration theory also argues that the social world simultaneously affects technologies. That, regardless of the material capabilities that technologies present, people socially constitute technologies (Fountain 2001a, 2008; Leonardi and Barley 2010; Orlikowski 2000; Orlikowski 2008; Orlikowski and Scott 2008; Shachaf and Rosenbaum 2010). Structuration theory as applied to information technology started with the view that social structures and information technologies affect each other (Orlikowski 1992). In some sense, technology is both an objective force and a socially constructed product (Gil-Garcia and Hassan 2008; Greenhalgh and Stones 2010;

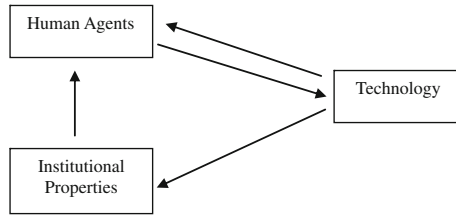


Fig. 2.1 Structurational model of technology. [Adapted with permission from Orlikowski (1992). Copyright 1992, the Institute for Operations Research and the Management Sciences, 7240 Parkway Drive, Suite 300, Hanover, Maryland 21076.]

Leonardi and Barley 2010; Prasad 2009; Shachaf and Rosenbaum 2010). Technology affects both human agents and institutional properties and, at the same time, is affected by human agents (see Fig. 2.1).

The Structurational Model of Technology highlights a duality of technology (Orlikowski 1992). In the model, technology is a product of human action, such as design, development, appropriation, and modification. Technology is also a medium of human action, facilitating and constraining it through the provision of interpretive schemes, facilities, and norms. Institutional conditions surrounding the interaction with technology influence humans in their interaction with it. The consequences of this interaction influence institutional properties of an organization by reinforcing or transforming structures of signification, domination, and legitimation. Therefore, information technologies are socially constructed by users as they select and emphasize some of their properties. In contrast, the features of the technology also affect how actors can use it and what they could use it for.

Orlikowski (1992, p. 406) explains that “technology is physically constructed by actors working in a given social context, and technology is socially constructed by actors through the different meanings they attach and the various features they emphasize and use. However, it is also the case that once developed and deployed, technology tends to become reified and institutionalized, losing its connection with the human agents that constructed it or gave it meaning, and it appears to be part of the objective, structural properties of the organization”. Therefore, according to this initial view, information technologies reach stabilization like other technologies (Pinch and Bijker 1987).

DeSanctis and Poole (1994) thought that early structuration models did not fully explain situations resulting from the implementation of advanced information technologies (AIT). There are two central concepts for adaptive structuration theory (AST): structuration and appropriation (DeSanctis and Poole 1994). These two theoretical constructs focus on the dynamic nature of technology adoption and use in organizational settings (see Fig. 2.2). For AST, structuration is the process by which social structures (whatever their source) are produced and reproduced in social life (DeSanctis and Poole 1994, p. 128). AST provides a detailed account of both the structure of advanced technologies and the unfolding of social interaction as these technologies are used. In contrast, appropriation is the immediate visible

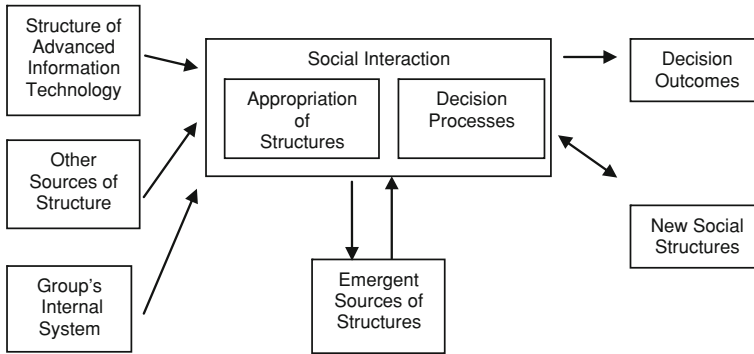


Fig. 2.2 Adaptive structuration theory. [Adapted with permission from DeSanctis and Poole (1994). Copyright 1994, the Institute for Operations Research and the Management Sciences, 7240 Parkway Drive, Suite 300, Hanover, Maryland 21076.]

actions, which are evidence of deeper structuration processes. Appropriations may be faithful or unfaithful, used instrumentally, and used with various attitudes.

AST also proposes two components of the social structures of information technologies: structural features and spirit (DeSanctis and Poole 1994). “Structural features are the specific types of rules and resources, or capabilities, offered by the system. ...The spirit is the ‘official line,’ which the technology presents to people regarding how to act when using the system, how to interpret its features, and how to fill in gaps in procedure which are not explicitly specified” (DeSanctis and Poole 1994, p. 126). Users can appropriate different structural features and adopt or change the spirit of the technologies. They generate different social structures derived from their interactions with the system and with other users, designers, and managers.

As illustrated in Fig. 2.2, the advanced information technology structure (the structural features and the spirit of the technology that outline the expected use of technology within an organization), other sources of structure (task and organizational environment), the group’s internal system (styles of interacting, knowledge and experience with structures, perceptions of others’ knowledge, and agreement on appropriation), emergent sources of structures (technology outputs, task outputs, and environment outputs), and new social structures (rules and sources) shape social interaction. Social interaction has an impact on the appropriation of structures and decision processes. It creates decision outcomes and influences new social structures (rules and resources) and emergent sources of structures.

2.2.2 Socio-Technical Systems Theory and the Process Model of Computing Change

Socio-technical systems theory recognizes the complexity of the relationship between technologies and social change (Coakes 2011; Dawson and Daniel 2010; Eason 2009; Kling 2000; Kling and Lamb 2000; Luna-Reyes et al. 2005). Not all

Table 2.1 Standard versus socio-technical models

Standard (tool) models	Socio-technical models
IT is a tool	IT is a socio-technical network
Business model is sufficient	Ecological view is needed
One-shot implementation	Implementation is an ongoing social process
Technological effects are direct and immediate	Technological effects are indirect and involve different time scales
Incentives to change are unproblematic	Incentives may require restructuring and may be in conflict with other organizational activities
Politics are bad or irrelevant	Politics are central and even enabling
IT infrastructures are fully supportive. Systems have become user-friendly, people have become “computer-literate,” and these changes are accelerating with the “net-generation”	Articulation work is often needed to make IT work, and socio-technical support is critical for effective IT use
Social relationships are easily reformed to take advantage of new conveniences, efficiencies, and business value	Relationships are complex, negotiated, multivalent; the nature of the relationship with the customer makes a difference in what can become digital—including trust
Social effects of IT are large, but isolated and benign	Potentially enormous social repercussions from IT—not just quality of working life, but overall quality of life
Contexts are simple (described by a few key terms or demographics)	Contexts are complex (matrices of businesses, services, people, technology, history, location, etc.)
Knowledge and expertise are easily made explicit	Knowledge and expertise are inherently tacit/implicit

Kling and Lamb (2000), figure Standard versus socio-technical models. © 2000 Massachusetts Institute of Technology, by permission of The MIT Press

socio-technical models developed by different scholars have exactly the same features, but they share many of the characteristics presented here (Bostrom and Heinen 1977; Dawes 2009; Esteves and Joseph 2008; Kraemer et al. 1989; Lyytinen and Newman 2008; Maxwell and Dawes 2009; Pasmore 1988; Sittig and Singh 2010). This subsection explains the main concepts and theoretical foundations of the socio-technical approach and describes the components and logic of the Process Model of Computing Change, which is an integrative model based on this approach.

Following Kling and Lamb (2000), Table 2.1 shows some of the important differences between the socio-technical view and the tool view of technology. In the socio-technical perspective, information technologies are conceived as socio-technical networks that require an ecological view. Implementation is an ongoing social process rather than a one-shot activity. From a socio-technical view, the effects of technology are not immediate and direct. Incentives may be in conflict with other organizational actions. Politics are not always a barrier; they are central and can be enabling. Usability is important, but it is not enough for successful

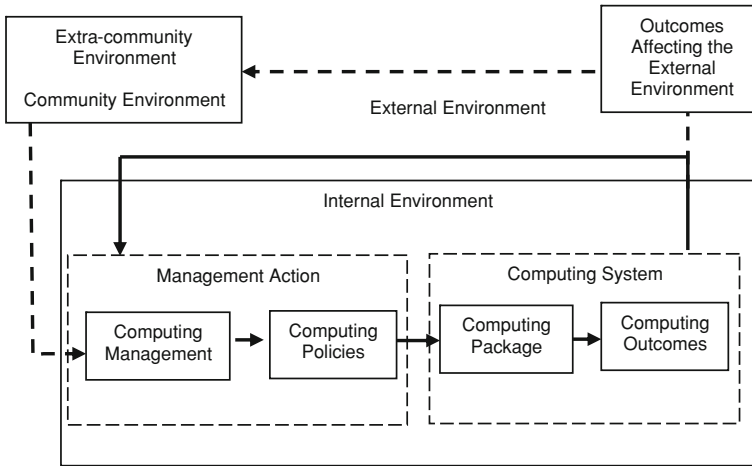


Fig. 2.3 Process model of computing change. [Kraemer et al. (1989). Reprinted with permission of John Wiley and Sons, Inc.]

implementation. IT projects need socio-technical support in addition to IT infrastructures. Social relationships cannot be easily changed according to IT specific requirements; they are complex and have to be negotiated. IT potentially has enormous impacts (positive and negative) on organizations and individuals. Contexts cannot be adequately described by a few key demographics. Finally, it is difficult to make knowledge and expertise explicit, because they are considered inherently tacit and implicit.

Kraemer et al. (1989) propose a model based on this socio-technical perspective, which is called the process model of computing change (see Fig. 2.3). They recognize that both environmental determinism and managerial voluntarism offer partial explanations for the use of IT in organizations. With respect to managerial voluntarism, they state, “After extensive empirical study, we were forced to conclude that the role of managers in computing change in organizations was much less clear than expected. Something other than management policy was playing a major role” (Kraemer et al. 1989, p. 2). Therefore, their model acknowledges the important role of managers, but also the influence of internal and external environmental variables.

The process model of computing change, based on research on local governments, takes many factors into consideration as well as their interrelationships. One of the important concepts in this model is the “computing package.” Kraemer et al. (1989, p. 53) use this term to refer to “the system of people, equipment, and techniques involved with computing within an organization.” This concept is very similar to that of the socio-technical network that includes and surrounds the technological artifacts. All environmental factors have an impact on the computing package and subsequently on its outcomes. However, this relationship is not direct, but mediated by the actions of managers. Therefore, “the environmental factors

first encounter and become altered by computing management” (Kraemer et al. 1989, p. 54).

For Kraemer et al. (1989), environmental effects can be divided into external and internal factors. Examples of external factors are (1) technological availability, (2) vendor marketing practices, (3) funding opportunities, (4) economic conditions, and (5) operational mandates. Complementary, internal factors include (1) competence and continuity of information systems management, (2) structure of the information systems staff, (3) structure of the information systems organization, (4) sophistication of hardware and systems software, (5) pattern of computer applications, (6) organizational structure, and (7) management attributes.

There are two main components of the external environment: the extra-community environment and the community environment. The extra-community environment comprises organizational and technological factors outside the jurisdiction of the local government (Kraemer et al. 1989). Similarly, the community environment includes factors that are present in the community that the government serves. These external factors have an indirect effect on the computing system by means of creating opportunities and constraints to computing management (Kraemer et al. 1989).

Beyond environmental conditions, management objectives and interests are also important to understand the complex relationship between information technology and organization. That becomes evident when we see situations in which managers “initiate action for personal and professional motives, sometimes irrespective of environmental conditions. Often, in fact, when computer managers initiate action on non-environmental grounds, environmental conditions enter into action only as a means of rationalizing and legitimating it” (Kraemer et al. 1989, p. 98). The process model of computing change distinguishes among the environment, management action, and computing conditions (Kraemer et al. 1989). First, as mentioned before, the environment is divided into external and internal components and is hypothesized to have an impact on management action. Environmental conditions also have an indirect influence on the computing package. Second, computing management and computing policies represent management action. Management action has a direct effect on the computing package. Finally, both the computing package and computing outcomes form the computing conditions or computing system.

The main role of managers in this model is to transform environmental opportunities and constraints into computing policies. “Computing policies address both the organizational context and the technological infrastructure of computerization” (Kraemer et al. 1989, p. 105). They constitute both formal and informal rules about computerization and are policies that can be created by top management, the IS department, or other actors within the organization. Their implementation generates the organizational computing package (Kraemer et al. 1989).

As noted above, the technical, resource, and experiential aspects of computing within an organization constitute the computing package (Kraemer et al. 1989). Two of its main elements are its technological sophistication and sociotechnical interface. Both technological sophistication and sociotechnical interface are

positively related to computing outcomes (Kraemer et al. 1989). “Computing outcomes are the results of computing package operations that affect the computing system” (Kraemer et al. 1989, p. 106). There are objective and subjective computing outcomes. Objective outcomes are the observed results of the computing package and subjective outcomes are the perceptions and interpretations of those results by different groups within the organization (Kraemer et al. 1989).

Both objective and subjective consequences of computing outcomes can affect the broader organization, the community environment, and the extra-community environment (Kraemer et al. 1989). In addition, computing outcomes and computer management are linked. There are two main feedback mechanisms from outcomes to computer management and they are related to whether the outcomes are considered positive or negative. Positive outcomes generate the desire for more applications for both current users and new areas within the organization. Negative outcomes demand changes to rectify the problems generated by the computing package (Kraemer et al. 1989).

This process model of computing change involves a series of complex and recursive causal relationships. In the words of the authors, “The model of computing change presented above describes a cyclical flow of effects. The environment presents opportunities and constraints, which are filtered by the actions of computing management through its policies, which affect the activities of the computer package and produce outcomes. The consequences of these outcomes, in turn, are fed back to computing management in the form of the needs of the computing package and user demands to support development and mitigate problems” (Kraemer et al., 1989, p. 109). Cordella and Iannacci (2010) found similar dynamics in terms of the relationship between e-government policies and information systems choice and design. The logics embedded in the design of a new technology affect the extant social values inscribed in e-government policies, and vice versa.

2.2.3 Institutional Theory and the Technology Enactment Framework

Institutional theory has been useful in understanding organizational settings (Amenta and Ramsey 2010; Currie 2009; Luna-Reyes et al. 2007b; Mundkur and Venkatesh 2009; Powell and DiMaggio 1991; Scott 2010a; Suddaby 2010). More broadly, institutional frameworks have been developed to study diverse social phenomena in different disciplines such as political science (Amenta and Ramsey 2010; Clegg 2010; Fletcher et al. 1992; March and Olsen 1989; Peters 2001), sociology (Brinton and Nee 1998), economics (North 1999; Rutherford 1999), and more. Institutions can be seen as guidelines for action, but also constraints on those actions (Dover and Lawrence 2010; Scott 2010b; Willmott 2011). Regarding IT initiatives, it is acknowledged they comprise an inscrutable set of interactions and decisions (Hassan and Gil-Garcia 2008). These interactions are constrained by

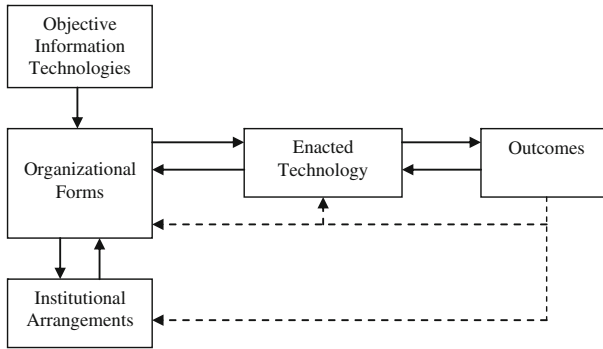


Fig. 2.4 Technology enactment framework [Fountain (2001a), Reprinted with permission of the publisher]

institutional arrangements, but at the same time institutions “frame how those constraints operate” (Fountain 2001a p. 92). Therefore, institutions also influence the specific constraining mechanisms. This subsection provides a brief review of institutional theory and explains the technology enactment framework.

Based on the institutional tradition, the technology enactment framework attempts to understand the influence of institutional arrangements and organizational forms on the selection, design, implementation, and use of information technologies in government agencies (Antonio Cordella and Iannacci 2010; Hassan and Gil-Garcia 2008). According to Fountain (1995, 2001a, 2008), the technology enactment framework pays attention to the relations among information technology, organizations, embeddedness, and institutions (see Fig. 2.4). Institutional theory “offers students of technology a less constrained vantage point from which to examine the role of macrosocial forces” (Barley 1990, p. 62). Institutionalism has the potential not only to identify power structures and their alignment to technological systems, but also to suggest some modifications to the institutional environment that might influence both organizational structures and technological features (Battilana et al. 2009; Yuan Lu et al. 2008; Scott 2010b; Wry et al. 2010). Institutional theory can help explain how information technologies influence organizational and institutional arrangements, as well as how these arrangements affect the way information technologies are selected, designed, implemented, and used (Currie 2009; Fountain 2001a; Jayatilaka and Hirschheim 2009; Phang et al. 2008).

According to the technology enactment framework, objective information technologies are in some way modified by organizational and inter-organizational factors to become enacted technologies (Antonio Cordella and Iannacci 2010; Feldman and Horan forthcoming; Gil-Garcia 2006; Herrera and Gil-Garcia 2010; Lee et al. 2009; Luna-Reyes and Gil-Garcia 2011; Tsai et al. 2009; Yildiz 2007). Fountain (2001a) contends that enacted technology can be understood as the perception, design, and use of objective technologies, such as the Internet and different pieces of hardware and software. Objective technology also includes all

other features that could potentially be selected as part of the enacted technology, but for some reason are not included in the information technologies actually in use (Gil-Garcia and Luna-Reyes 2009; Gabriel et al. 2004). Therefore, two elements could represent the enacted technology: the technological features of the current system and the way in which different users take advantage of the technology's characteristics (Fountain 2001a; Hassan and Gil-Garcia 2008). In other words, "the embeddedness of government actors in cognitive, cultural, social, and institutional structures influences the design, perceptions, and uses of the Internet and related IT" (Fountain 2001a, p. 88).

Organizational forms include structural characteristics, such as centralization, formalization, and communication channels. According to Fountain (1995), several bureaucratic characteristics of the organizations that design, implement, or use the technology are contained in this construct. Organizational and organizational network factors have a direct effect on the enacted technology. In contrast, institutional arrangements, represented by laws, regulations, and other cognitive, cultural, or socio-structural constraints found in government contexts, have an indirect effect. According to the technology enactment theory, institutional arrangements influence organizational forms and thereby indirectly impact the enacted technology (Antonio Cordella and Iannacci 2010; Chen and Hsieh 2009; Gil-Garcia 2005b, 2006; Luna-Reyes and Gil-Garcia 2011). Recent research has demonstrated that a direct effect may also exist (Luna-Reyes et al. 2008).

Further, the resulting enacted technology produces certain organizational outcomes. These outcomes (good or bad) produce modifications to the technology itself, but may ultimately lead to transformations in the organizational forms or even the institutional arrangements in the long run (Fountain 2001a, 2008; Gil-Garcia 2005b, 2006; Gil-Garcia and Luna-Reyes 2009). Thus, the technology enactment framework recognizes the complex relations between information technology and social structures, including organizational characteristics, institutional arrangements, and other external forces (Antonio Cordella and Iannacci 2010; Chen and Hsieh 2009; Feldman and Horan forthcoming; Gil-Garcia 2006; Gil-Garcia and Luna-Reyes 2009; Herrera and Gil-Garcia 2010).

Some weaknesses of the framework have been previously suggested and discussed. First, the framework has been considered too abstract and general to be used for prediction and hypothesis testing (Bretschneider 2003; Danziger 2004). Second, Fountain's original piece (*Building a Virtual State*) that introduced the framework makes connections between a case and a set of main arguments in a somewhat too ambitious way—without enough evidence, using examples in limited contexts (only from the US federal government) (Bretschneider 2003) (Garson 2003b; Norris 2003). The original framework does not consider other government contexts such as regional or local; therefore, some potentially important variables could be left out (Yildiz 2007). Third, the framework works better for explaining organizational politics rather than information technology and institutional change. Fourth, the framework's adoption of neo-institutional theory fails to explain how agents overcome institutional barriers (Yang 2003, p. 432), while a more nuanced discussion of institutional theory could be useful (Danziger

2004, p. 109). Finally, in the initial presentation of her framework, Fountain (2001a) ignores previous integrative theories such as the socio-technical approach, which already proposed to study both the technology and the social and organizational relationships around it (Bretschneider 2003; Danziger 2004; Schellong 2007). In this sense, according to some authors, the original technology enactment framework has some important limitations.

In contrast, researchers have also argued that the technology enactment framework has important advantages in comparison with previous research. For example, Bretschneider (2003) says that Fountain's framework is valuable because it attempts to explain the interrelationships between technology, organizations, and institutions. Few previous studies incorporated institutions as an important variable. Similarly, Dawes (2002) explains that the technology enactment framework is important because it uses institutional theory to explain the use of information technology in government, in contrast with studying the government as a regulator of the use of information technologies by other social actors. This author also highlights the relevance of studying practical cases for long periods of time, given the huge investments in information technologies, particularly the Internet. Finally, for some scholars the technology enactment framework is potentially useful in practical terms because it could help public managers to plan, design, and implement e-government initiatives (Danziger 2004; Garson 2003b).

2.3 Social Construction of Information Technology

This section briefly explains the social constructivism approach, describes some of its applications in information systems research, and introduces the concept of multiple enactments as a way to understand the perspectives of different social actors and social groups. Pfeffer (1982) states that social constructionist views are more interactive in their explanations of individual actions; that is, they acknowledge mutual causality and multiple determinations of outcomes (Holstein and Gubrium 2008; Irwin 2011; Lock and Strong 2010). He identifies two main perspectives within this theoretical tradition (Pfeffer 1982, p. 209): (1) an interactionist approach, growing out of either the symbolic interactionists (Blumer 1962; Denzin 2008; Manning and Smith 2010; Mead 1938; Stryker 2008) or the ethnomethodological tradition (Cicourel 1964, 1974; Cunliffe 2010; Garfinkel 1967; Mitev 2009; Ross and Chiasson 2005; Schutz 1967) and (2) a structuralist approach (Berger and Luckmann 1966; Dickerson 2010; Goffman 1961, 1974; Holtzner and Marx 1979; Lock and Strong 2010).

The interactionist approach recognizes that individuals derive meaning through social interaction with others and that meaning is interpreted differently by each individual. In contrast, the structuralist approach sees reality as existing on its own account independently of the way in which it is perceived and reaffirmed by people in everyday activities. A pure structuralist position weighs in on the side of social structure and is commonly associated with gestalt theories. As should be clear for

the reader, these two perspectives focus on particular and different aspects of the relationship between individual interactions and social structures. They could be seen as complementary approaches.

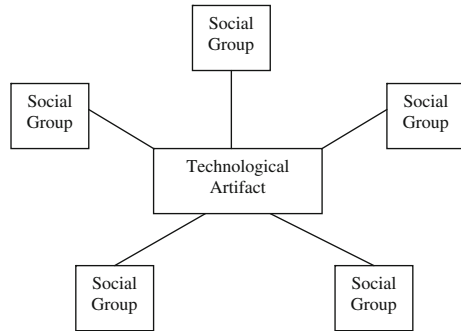
2.3.1 Technology and the Social Construction of Reality

According to Berger and Luckmann (1966), what people experience as objective reality is actually socially constructed. Individuals and groups interacting together in a social system form concepts of each other's actions, and these concepts eventually become habituated into reciprocal roles the actors play in relation to each other. When these roles are made available to other members of society to enter into and play out, the reciprocal interactions are said to be institutionalized. In the process of this institutionalization, people's conceptions and beliefs of what reality is become embedded in the institutional fabric of society. Social reality is therefore said to be socially constructed (Berger and Luckmann 1966). Following this logic, the interpretation of social reality depends on individuals' backgrounds and positions within the social setting (Schutz 1967). Intersubjectivity is a very important concept for some constructivist approaches (Dimaggio and Markus 2010; Harklau 2011; Miranda and Saunders 2003). It is through intersubjectivity that "meaning derives from interactive interpretation by multiple persons, not simply from the cognition of a single individual" (Miranda and Saunders 2003, p. 88). Therefore, individuals have different perceptions of social reality, but through their interactions they could build collective meanings and have more similar understandings (Harrison et al. 2007).

Sociologists of technology have adopted a social constructivist approach to understand how technologies are adopted in complex social and organizational systems (Bijker et al. 1987; Bijker and Law 2000; Collins 1987; Johnson and Wetmore 2009; Sismondo 2009; Tatnall 2010). They contend that linear models are not capable of accounting for complex social relationships. Pinch and Bijker (1987) argue that a multidirectional view is necessary for a social constructivist understanding of technological systems (see Fig. 2.5). The first step is to identify the relevant social groups. These are the groups that are concerned with the technological artifact and their interpretations will be relevant for the analysis: "The key requirement is that all members of a certain social group share the same set of meanings, attached to a specific artifact" (Pinch and Bijker 1987, p. 30). The members of each social group have certain common characteristics (background, position in the organization, formal education, experience, etc.) that make them perceive the social reality, including the technological artifact, in a very similar way.

A second step is to identify problems that each group has with respect to certain artifacts. It is also necessary to discover the solutions available for each problem. At this point, it should be evident that conflicts exist between technical requirements and potential solutions for the different social groups (Pinch and Bijker 1987). Complex interactions between problems and solutions of the different social groups

Fig. 2.5 Relationship between technological artifact and relevant social groups (Bijker et al. 1987, © 1987 Massachusetts Institute of Technology, by permission of The MIT Press)



take place and certain artifacts become *stabilized*. Stabilization means that by the end of a certain period of time, certain characteristics of the technical artifacts can be taken for granted. All the relevant groups share the meaning of certain artifacts and their implicit characteristics (Pinch and Bijker 1987). However, the meanings are also shaped by some of the social actors interacting with the technological artifact: “Because IT artifacts are designed, constructed, and used by people, they are shaped by the interests, values, and assumptions of a wide variety of communities of developers, investors, users, etc.” (Orlikowski and Iacono 2006, p. 36). In fact, in the case of information technologies, some authors argue that their characteristics continue to be dynamic and emergent as the users interact with the technologies; implying that there is no stabilization for them (Contractor et al. 2011; Leonardi 2009a; Leonardi and Barley 2010; Orlikowski 2000; Orlikowski 2010b; Prasad 2009). Recent studies consider the sociomateriality of organizational life in interacting with technology, thereby accounting for the multiple and dynamic ways in which the social and the material are constitutively entangled in everyday life (Contractor et al. 2011; Orlikowski 2010a; Orlikowski and Scott 2008).

2.3.2 *The Social Construction of Reality in Information Systems*

According to Orlikowski (1992, p. 401), the social constructivist perspective in information systems research can help to understand “how shared interpretations around a certain technology arise and affect the development of and interaction with that technology”. In fact, one of the main advantages of a social constructivist approach is that it takes into consideration the perspectives of different social groups for the analysis (Bartis and Mitev 2008; Howcroft and Light 2010; Stahl 2008). This corpus of research is based mostly on interpretative approaches (Boland 1985; Klein and Hirschheim 1983; Leonardi and Barley 2010; Pinch and Bijker 1987). In contrast to positivism, interpretative approaches represent a philosophical tradition based on the interpretative nature of knowledge. What we know does not exist independently of consciousness, but rather knowledge is a

culturally bound social construction (Heshusius and Ballard 1996; Mölder 2010; Packer 2011, pp. 123-166; Riccucci 2010, p. 66).

Doing this kind of analysis requires some specific considerations. Klein and Hirschheim (1983) propose three steps to follow in doing research, using what they call “a consequentialist perspective.” First, it is necessary to establish that in principle it is possible to identify the actual consequences (in this case, of an information system). Second, the researcher has to select certain consequences that in principle are predictable. Finally, the predicted and perceived consequences have to be evaluated according to certain criteria. They argue that this process leads to more valuable lessons than a factor approach: “Instead of ending up with a list of technological applications and their possible consequences spelled out in detail, the hermeneutic procedure came up with a better understanding of the conflict-laden nature of changing office technology—a qualitatively totally different kind of knowledge, but one that nevertheless is highly pertinent to the issue at hand” (Klein and Hirschheim, 1983, p. 39).

Information systems have gained much attention from social constructionist approaches. The approaches suggest that interpretation of different social groups shape the characteristics and features of information systems (Howcroft and Light 2010; Huang and Galliers 2011; Iivari et al. 2009; Leonardi and Barley 2010; Vannoy and Salam 2010). However, social constructivist approaches are not necessarily in opposition to positivistic approaches (Friedman and Rogers 2009; Heshusius and Ballard 1996; Shay 2008). Both approaches can contribute to a more comprehensive understanding of the relationships between information technologies and social structures, because they highlight different aspects of social phenomena (Bartis and Mitev 2008; Jackson and Klobas 2008; Mukherjee 2008; Orlikowski and Baroudi 1991; Orlikowski and Iacono 2001). Together, they have the potential to offer a richer and more complete explanation of social phenomena.

In an attempt to conciliate objective and subjective realities, Sarker (2000) developed a model that considers culture, sub-cultures, and frames as social filters through which different social groups subjectively experience the objective reality (see Fig. 2.6). His work is mainly based on Leavitt’s (1965) diamond model (Bostrom and Heinen 1977; Markus 1983; Robey 1987) and the work of Berger and Luckmann (1966). Unlike most previous views, this socio-technical model recognizes the importance of multiple elements in a technological system such as structure, tasks, people, and technology.

However, according to Sarker (2000) this socio-technical view offers limited understanding of organizational politics (Alter 2010; Bellamy 2000; Garson 2000a; Leonardi and Barley 2010; Mansell and Silverstone 1996; Newman and Rosenberg 1985; Zanko et al. 2008); and institutional realities (Butler 2003; Gil-Garcia 2006; Hirschheim and Newman 1991; Luna-Reyes et al. 2005, 2007; Orlikowski and Gash 1994; Prasad 1993; Wiredu 2010). In order to account for these factors, it is necessary to take into consideration the subjective experiences of different actors. Sarker (2000) argues that “prior conceptualizations of organizations have recognized only ‘objective realities,’ which has led to an

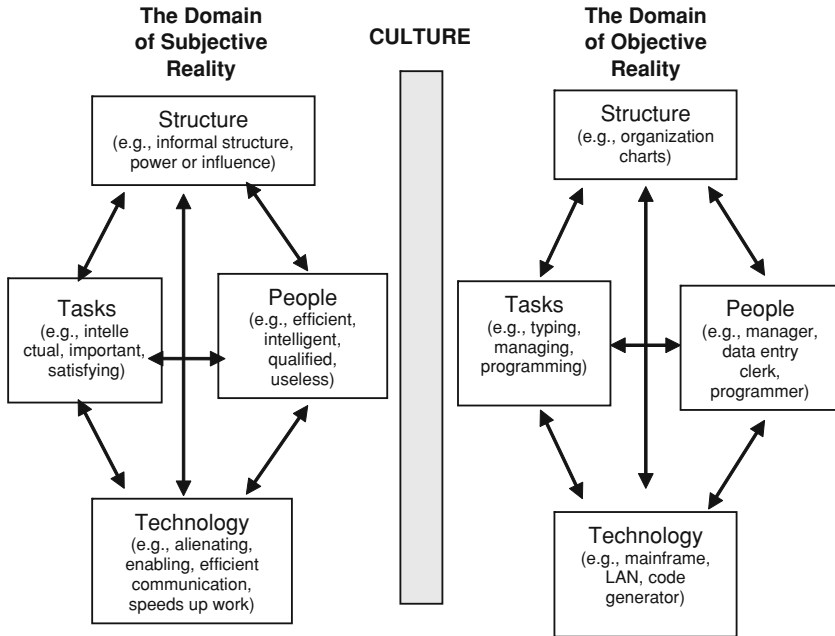


Fig. 2.6 Sarker's organizational model. [Sarker (2000). Reprinted with permission of the publisher]

incomplete understanding of implementation; by including the analysis of 'subjective realities' in the organization, a better understanding of political and institutional forces and of organizational resistance arising from them may be gained" (p. 197). In Sarker's model, organizations are socially constructed, but there are "objective real" and "subjective real" aspects to them.

According to Sarker (2000), objective realities are socially constructed, but their degree of institutionalization makes social actors take them for granted as if they were part of the natural world. In this model, tasks, structures, technologies, and individuals are experienced as objective realities. In contrast, subjective realities are affected by an individual's background, position, culture, and role in the organization. They refer to how individuals give differentiated meanings to what may appear to be the same objective reality. Thus, "individuals socialized into different occupations and roles, and belonging to cultural and interest groups tend to experience the *same* 'objective reality' as *different* 'subjective realities'" (Sarker 2000, p. 199).

Sarker's model is similar to and different from Orlikowski's conceptualization of sociomateriality (Orlikowski 2010b). Subjective reality and objective reality match the social and the material, but sociomateriality emphasizes that the social and the material are constitutively entangled in everyday life. They could be distinctively separated for analysis, but in reality they are profoundly entangled and embedded in social relations. Therefore, sociomateriality has a similar, but

distinctive logic in comparison to Sarker's model. The entanglement between both aspects and the deep intermingling of materiality within practice are of central importance.

Recognizing the effect of these different perceptions is not unique to constructivist work and can be clearly appreciated in the following two passages. Kraemer et al. (1989, p. 8) mention that "management action becomes itself an artifact of the social movements, social structures, work-group folkways and mores, ideological perceptions, and administrative hierarchies surrounding the managers". However, the perception of these effects in the organization could be different for different social actors, according to their organizational roles, formal education, previous experiences, and background. Similarly, Reeve and Petch (1999, p. 2) affirm that "purchasing computers for organizations usually involves a hidden agenda of personal interests, career ambitions, and inter-group politics, as well as rational, dispassionate evaluations of organizational needs". The specific interests and perceptions of different social actors have a differentiated influence on the way they interact with the technology and with other actors in the organization. This body of work suggests that both objective and subjective realities are important in understanding organizational dynamics in general and government IT initiatives in particular (Hossain et al. forthcoming; Ruuska and Teigland 2009; Scholl 2008; Tsai et al. 2009; Tseng 2008).

2.3.3 Multiple Enactments of Information Technologies

Orlikowski (2000) proposes a different way to study the relationships between social structures and information technologies; one that is related to social constructivist approaches. Her work argues that past efforts missed some characteristics of information technologies. She relies on Giddens's (1984) original work to introduce a new way to report these two essential conflicts: emergent structures and the enactment of structures (Gil-Garcia and Hassan 2008). This practice lens, as she calls it, and its basic arguments are still strongly rooted in structuration theory and the assumption of causal recursiveness between social structures and information technology (Grgecic and Rosenkranz 2008; Jones and Karsten 2008; Lyytinen and Newman 2008; Orlikowski 1992; Paré et al. 2008; Pinch and Bijker 1987). Orlikowski (2000, p. 406) explains, "Through repeated interaction, certain technology's properties become implicated in an ongoing process of structuration. The resulting recurrent social practice produces and reproduces particular structures of technology use". These structures of technology use would be different for social groups with differentiated characteristics in terms of background, social context, organizational position, professional experience, or formal education.

Orlikowski's approach acknowledges that all interactions are situational; different groups can enact different properties of the technologies according to their own norms, facilities, and interpretative schemes (Harrison et al. 2007; Orlikowski 2000). Building on this idea, different enactments can result from what may appear

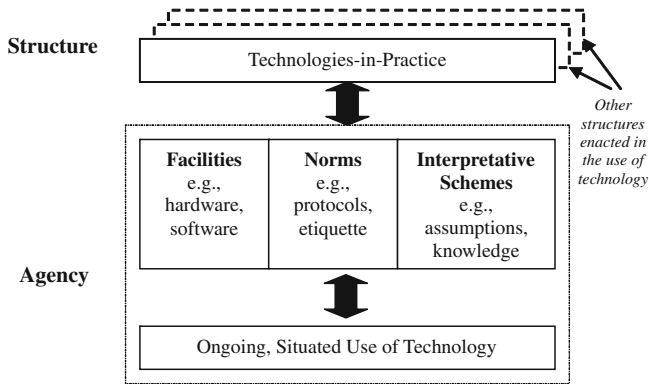


Fig. 2.7 Enactment of technologies-in-practice: one social group [Adapted with permission from Orlikowski (2000). Copyright (2000), the Institute for Operations Research and the Management Sciences, 7240 Parkway Drive, Suite 300, Hanover, Maryland 21076]

to be the same technological properties (see Fig. 2.7). Therefore, social groups with different job positions, personal interests, and professional backgrounds are expected to enact differentiated “technologies in practice,” even when the technological artifact could be seen as essentially the same (Gil-Garcia and Hassan 2008; Hardy 2010; Leonardi 2010; Leonardi and Barley 2008; Meneklis and Douligeris 2008; Orlikowski 2008).

This framework also allows for a better understanding of the emergence of information technologies in use—as people interact with certain structural properties of the system—without any assumption about the stability and relative completeness of the technologies (Gil-Garcia and Hassan 2008; Jarrahi 2010; Orlikowski 2000; Zillien and Hargittai 2009). “Instead, the focus is on what structures emerge as people interact recurrently with whatever properties of the technology are at hand, whether these were built in, added on, modified, or invented on the fly” (Orlikowski 2000, p. 407). This implies that technological artifacts do not necessarily reach stabilization as was initially proposed by sociologists of technology (Bijker and Law 2000; Pinch and Bijker 1987), “IT artifacts are neither fixed nor independent, but they emerge from ongoing social and economic practices” (Orlikowski and Iacono 2006, p. 36).

The social and economic practices are dynamic and context-specific. Therefore, different social groups will enact different technologies-in-practice, but the same social group will also enact different technologies-in-practice at different times and spaces (e.g., past, present, future) (see Fig. 2.8). For instance, Harrison and colleagues (2007) analyze the different enactments of geographic information technologies (GIT) during the response and aftermath of the World Trade Center attacks of September 11. They found that the perceptions of different social groups involved were affected by their previous backgrounds and organizational positions, leading to different technologies-in-practice. They also found that through their intensive interactions, the groups started sharing some of their perceptions and

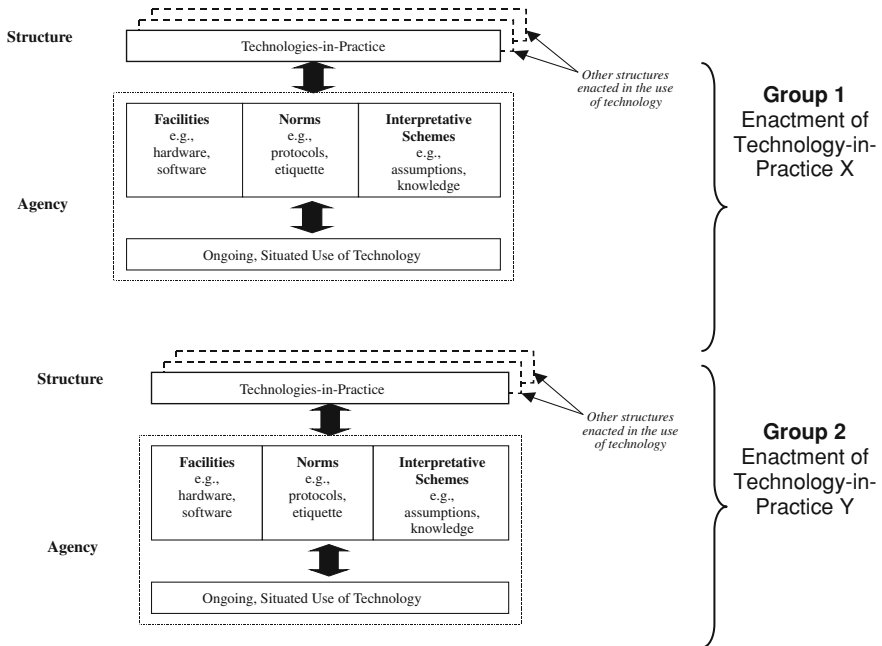


Fig. 2.8 Enactment of technologies-in-practice: two social groups. [Adapted with permission from Orlikowski (2000). Copyright (2000), the Institute for Operations Research and the Management Sciences, 7240 Parkway Drive, Suite 300, Hanover, Maryland 21076]

meanings; at the end, the group enactments of GIT were much more similar to each other than at the beginning (Harrison et al. 2007).

The concept of sociomateriality helps understand the recursive and complex relationships between humans and technologies-in-practice (Orlikowski 2007, 2010b; Orlikowski and Scott 2008). All practices are always sociomaterial, and this sociomateriality shapes the characteristics and possibilities of social and organizational life. Technologies-in-practice become manifestations of organizational practices increasingly entangled with emerging sociomaterialities.

2.4 Enacting Electronic Government Success

After reviewing different theories that take into consideration the dynamic and complex interplay between information technologies and social structures, the technology enactment framework was selected as the foundation of a new integrative model to understand e-government success. First, Fountain's technology enactment theory is suitable for doing research about different stages or processes such as selection, design, implementation, and use of information technologies (Fountain and Gil-Garcia 2006a). Second, consistent with its institutional

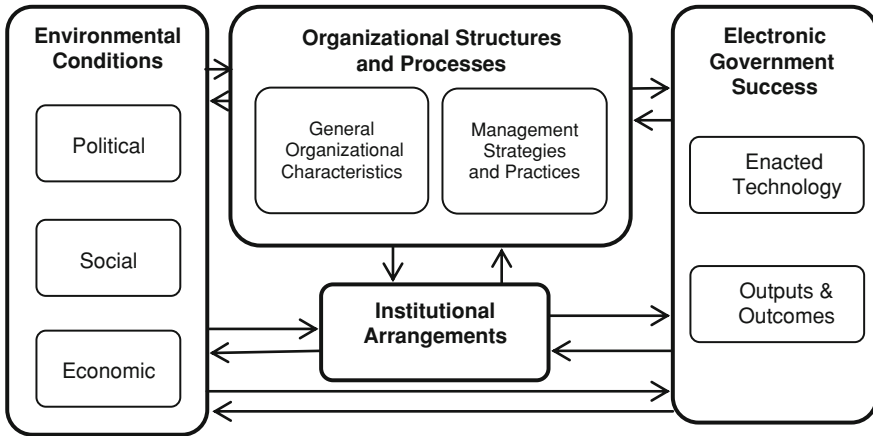


Fig. 2.9 Enacting electronic government success

theoretical basis, this framework allows the organization to be the main unit of analysis (Fountain 2001a, 2001c, 2008), instead of the individual. Third, the theory was developed using empirical data from government agencies and, therefore, takes into consideration some of the particularities of the public sector. Fourth, the theory is flexible enough to be used from a positivist or a non-positivist view. Fifth, related to the previous point, the framework allows for using qualitative and quantitative research strategies. Finally, this framework pays particular attention to institutional arrangements and institutions are essential to understand government phenomena. For these reasons, the technology enactment framework is a strong alternative for the foundation of a new integrative e-government success theory. This subsection presents the development of a new integrative model to understand e-government success. It discusses each of the relevant theoretical constructs and relates them to specific variables found in the literature and already presented in Chap. 1.

Thus, this book proposes a theoretical model to better understand the complex relationships between e-government success and different organizational, institutional, and contextual factors. In order to develop a more comprehensive understanding, the technology enactment theory is complemented with ideas and concepts from recent e-government literature, social constructivism, and other integrative approaches to information technologies (mentioned before in this chapter). I agree that “given the context-specificity of IT artifacts, there is no single, one-size-fits-all conceptualization of technology that will work for all studies” (Orlikowski and Iacono 2006, p. 37) and, therefore, there would not be a one-size-fits-all theoretical model either. However, integrative models could be developed for specific phenomena. This section proposes an integrative theoretical model to understand e-government success (see Fig. 2.9).

As mentioned before, the technology enactment framework belongs to the institutional tradition (Chen and Hsieh 2009; Gil-Garcia and Hassan 2008; Powell and DiMaggio 1991; Scott 2001) and attempts to explain the effects of organizational forms and institutional arrangements on the information technology selected, designed, implemented, and used by government agencies (Antonio Cordella and Iannacci 2010; Gil-Garcia 2005b, 2006; Herrera and Gil-Garcia 2010; Luna-Reyes and Gil-Garcia 2011). According to Fountain (1995, 2001a, 2008), the technology enactment framework pays attention to the relationships between information technology, organizations, embeddedness, and institutions. Therefore, in contrast with other theoretical lenses, this framework does pay special attention to institutions and the role they play in the enactment of government information technologies. This influence is particularly important in government settings, because governments are enabled to act by laws and regulations and the impact of these institutions could be greater than in the private sector.

Being primarily based on Fountain's technology enactment framework, the logic and dynamics of the proposed theoretical model (enacting e-government success) are very similar to the original framework (Fountain 1995, 2001a, 2008). Organizational forms have an impact on the enacted technology and its outcomes. Institutional arrangements have an indirect influence on the enacted technology through their direct influence on organizational forms. Based on the process model of computing change and previous research on IT success, direct impacts from institutional arrangements and environmental conditions are also taken into consideration (Kraemer et al. 1989; Luna-Reyes et al. 2008). Finally, the recursive nature of the relationship between information technologies and social structures is acknowledged in most of the cases with arrows going in the opposite direction, representing bidirectional effects.

By adopting an ensemble view of technology (Orlikowski and Iacono 2001), this theoretical model focuses not only on the enacted technology and organizational outcomes, but also on some of the processes that generate certain organizational structures and processes, as well as certain institutional arrangements. Therefore, it is important to consider the more general environment affecting the technology enactment process. Some of the environmental dimensions identified in previous research (Hall 2002; Herrera and Gil-Garcia 2010; Luna-Reyes and Gil-Garcia 2011; Savvides and Koutrakou 2010; Tsai et al. 2009) can be mapped to the constructs of the technology enactment framework: technological conditions to "objective technology," legal and cultural conditions to "institutional arrangements." However, other important contextual factors are not taken into consideration: political conditions, economic conditions, demographic conditions, and ecological conditions. The proposed model includes the construct "environmental conditions" in order to have a more comprehensive understanding of the relationships between e-government success and its larger environment.

Organizational, institutional, and contextual factors, as well as their multiple interactions, affect the way information technologies are selected, designed, implemented, and used in government organizations (Antonio Cordella and Iannacci 2010; Fountain 2001a, 2008; Gil-Garcia 2005b, 2006; Luna-Reyes and

Gil-Garcia 2011). All these factors produce certain opportunities and constraints: “The mix of opportunities and constraints confronting an organization constitutes the options for action by that part of the government’s political-administrative system that constitutes computing management” (Kraemer et al. 1989, p. 104). In this case, computing management is represented by the social actors with decision-making power within a government agency. They can certainly make important decisions about IT, but their decisions are affected and constrained by organizational and institutional variables. As mentioned by Fountain (2001a, p. 193), “The Internet is a revolutionary lever for institutional change. Yet inside the machinery of the state, amid a web of institutional structures that offer perverse incentives for innovation and efficiency gains, the action of this lever is complex, indirect, and mediated significantly by institutional and organizational arrangements”.

In the proposed model, the success of e-government is defined and represented in terms of enacted technology (e.g., functional interface and other characteristics of the systems) and organizational outputs and outcomes (e.g., efficiency, effectiveness, and other potential results). More specifically, enacted technology refers to certain characteristics of the e-government initiative such as hardware, software, functionality, usability, or accessibility, but also to the derived social relations and diverse uses. E-government success would also include some of the potential outputs and outcomes stated in the goals and objectives of the e-government initiative such as efficiency, cost-savings, effectiveness, greater service quality, transparency, and/or increased citizen participation, among others.

There is also a dynamic interaction between enacted technology, outputs, and organizational structures and processes. So, it is expected that information technologies have an impact on the organization, but it is also expected that the characteristics of the organization and the individuals within the organization affect the way ICTs are implemented and, consequently, their overall results. This recursive way of thinking about certain “technical” characteristics of information systems has been suggested previously. Kling (1993, p. 4) states that “there is a growing realization, as networks tie users together at a rapidly rising rate, that usability cannot generally be determined without our considering how computer systems are shaped by and also alter interdependencies in groups and organizations”. Therefore, information technologies are shaped not only by individual users, but also by the characteristics of the groups and organizations in which those individuals live and work (Leonardi 2010; Leonardi and Barley 2008; Orlikowski 2008, 2010a, 2010c).

The technology enactment framework, the process model of computing change, and other integrative theoretical approaches involve a series of complex and recursive causal relationships. For instance, “the model of computing change... describes a cyclical flow of effects. The environment presents opportunities and constraints, which are filtered by the actions of computing management through its policies, which affect the activities of the computer package and produce outcomes. The consequences of these outcomes, in turn, are fed back to computing management in the form of the needs of the computing package and user demands

to support development and mitigate problems” (Kraemer et al. 1989, p. 109). In addition, “information systems quickly become intertwined in hundreds of ways with performance programs, routines, communication modes, and power” (Fountain 2001a, p. 196). Accordingly, IT initiatives are outcomes of a recursive and complex relationship between information technologies and social structures (organizations, institutions, and policies). As a consequence, the results of IT-related activities are highly uncertain and cannot be easily predicted.

Furthermore, the resulting enacted technology produces certain organizational outcomes in terms of efficiency, transparency, effectiveness, participation, and accountability, among others (Gil-Garcia and Luna-Reyes 2007). These outcomes (good or bad) produce modifications in the technology itself, but also in the long run, may lead to transformations in the organizational forms or even the institutional arrangements (Fountain 2001a, 2008). Thus, similar to other ensemble-view approaches, the technology enactment framework recognizes the complex relationships between information technologies and social structures.

The proposed model of enacting e-government success takes into consideration all these different theoretical constructs and hypothesizes their interrelationships. In addition, in order to reach a more comprehensive understanding of this complex phenomenon from different perspectives, this model considers some ideas from social constructivist approaches. Therefore, perspectives of different relevant social groups should be included in the analysis. This inclusion provides the opportunity to learn about both objective and subjective realities, and thus to have a qualitatively different understanding that does not ignore the differences in perceptions and interests among social actors.

Objective reality is represented by contextual, institutional, and organizational factors that are taken for granted by the relevant groups involved in developing, managing, and interacting with e-government initiatives. Characteristics such as state population, state government size, IT organization budget, IT organization size, existence of usability, accessibility, or other types of training for IT professionals, the number of services provided through the website, contact information presented, and others could be perceived as objective reality that exists independently of the social context. This perception is not necessarily true from a third party perspective, but it is true for the groups involved with the technological artifacts and the social relationships around those artifacts. Objective reality could also include the joint perceptions about the success of an e-government initiative; that is, the characteristics that most participants perceive in a very similar way.

In contrast, subjective reality includes the differentiated perceptions of relevant social groups involved with the technological artifacts. Professional background, position within the organization, and work experience will all affect the way different social groups assign meaning to what may appear to be the same objective reality. Perceptions of efficiency, informal networks, importance, and other qualifying characteristics of the different factors (organizational, institutional, and environmental) or the enacted technology are examples of this subjective reality. The proposed model attempts to capture, at least partially, these two domains of reality in order to obtain a more comprehensive understanding of the

recursive and complex nature of the relationships between information technologies and social structures.

As mentioned above, previous studies have found evidence supporting different factors as important determinants of e-government success. However, most of this research has hypothesized models in which all factors are at the same level of importance and only as direct effects, limiting understanding about the complex relationships among different kinds of factors (e.g., organizational and institutional) (Gil-Garcia 2008). Therefore, these models do not allow a more comprehensive and integrative exploration of e-government success. In contrast, the model proposed in this book attempts to contribute in this direction by allowing indirect effects and explicitly including some of the interrelationships among organizational, institutional, and environmental variables. Below are descriptions of each component of the proposed theoretical model and some specific research questions associated with them.

2.4.1 Electronic Government Success

E-government means different things to different social actors and in different contexts (Antonio Cordella and Iannacci 2010; Gil-Garcia and Luna-Reyes 2003, 2006; Hardy and Williams 2008; Luna-Reyes and Gil-Garcia 2011; Schelin 2003; Scholl et al. 2006) from internal systems to services provided through the Internet, from hardware to organizational technologies, from personal computers in government offices to highly sophisticated information systems that cross organizational boundaries. Furthermore, there is no consensus about what IT success and e-government success mean and how to measure them (Alshawhi and Alalwany 2009; Carbo and Williams 2004; DeLone and Mclean 1992, 2003; Fasanghari and Habibipour 2009; Gil-Garcia and Pardo 2005; Gonzalez et al. 2010; Jun and Weare forthcoming; Morgeson III and Mithas 2009). One way to think about e-government success is in terms of certain success measures. They could be included in the goals and objectives that e-government initiatives attempt to accomplish. Following this logic, an e-government initiative is successful to the extent it achieves its goals and objectives in terms of specific success measures.

Fountain (2001a) contends that the enacted technology can be understood as the perception, design, and use of objective technologies, such as the Internet and different pieces of hardware and software. Therefore, the enacted technology can be represented through the technological features of the current system and the way in which different users take advantage of those technology characteristics (Fountain 2001a; Laudon 1986). These features and potential benefits could be seen as e-government success measures. In contrast, objective technology includes all features that could potentially have been selected as part of the enacted technology, but for some reason are not parts of the information technologies in use (Gabriel Puron Cid and Gil-Garcia 2004).

The perception and use of information technologies within an organization constitute the enacted technology (Fountain 1995, 2001a). The enacted technology construct is similar to what Kraemer et al. (1989) called the computing package. According to these authors, two of its more important elements are its technological sophistication and sociotechnical interface. Both technological sophistication and sociotechnical interface are positively related to computing outcomes (Kraemer et al. 1989): “Computing outcomes are the results of computing package operations that affect the computing system” (Kraemer et al. 1989, p. 106). These results could be direct outputs of the information system or more general organizational outcomes such as efficiency, effectiveness, service quality, increased transparency, and greater citizen participation.

There are objective and subjective computing outcomes that could be used to measure the success of an e-government project. Objective outcomes are the observed results of the computing package and subjective outcomes are the perceptions and interpretations of those results by different groups within the organization (Kraemer et al. 1989). These perceptions could be very different and, in fact, “institutional actors tend to see the world from a particular vantage point colored greatly not by atomistic interests, but by interests and models that derive in part from structural position and ongoing social relations in networks” (Fountain 2001a, p. 83). As a result of the different actors and stakeholders involved in the use of information technologies who have different views and different approaches (Angelopoulos et al. 2010; Foteinou and Pavlidis 2010; Marijn Janssen and Klievink 2010), it is difficult to reach consensus on evaluating the performance of IT projects and information systems. Therefore, understanding and measuring e-government success is not an easy task and faces myriad challenges, from deciding on a measuring technique to incorporating different perspectives on the success of a particular e-government initiative (Angelopoulos et al. 2010; Petter et al. 2008).

2.4.2 Organizational Structures and Processes

According to the technology enactment framework, objective information technologies are, in some way, modified by organizational and inter-organizational factors. In other words, “the embeddedness of government actors in cognitive, cultural, social, and institutional structures influences the design, perceptions, and uses of the Internet and related IT” (Fountain 2001a, p. 88). This is consistent with findings from other studies of public sector information systems (Antonio Cordella and Iannacci 2010; Dawes and Pardo 2002; Ganapati 2011; Herrera and Gil-Garcia 2010; Seongcheol Kim et al. 2009; Kraemer and King 1986; Laudon and Westin 1986; Moon 2002; Mundkur and Venkatesh 2009). Organizational structures and processes could include structural characteristics such as centralization, formalization, and communication channels, among others (Antonio Cordella and Iannacci 2010; Damanpour and Schneider 2009; Lee et al. 2011; Luna-Reyes and

Gil-Garcia 2011; van Veenstra et al. 2010). According to Fountain (1995, 2001a, 2008), several bureaucratic characteristics of the organizations that design, implement, or use the technology are contained in this construct. Organizational and organizational network factors have a direct effect on the enacted technology.

In general terms, organizational factors relate to the organization as a whole and some characteristics of the specific IT initiatives. These factors can include the length of the project, understanding its strategic goals, the extent of change in business processes, the project management approach, and the lack of implementation guidelines (Chang et al. 2001; Davenport 1993; Gil-Garcia et al. 2009; Gil-Garcia and Pardo 2005; Gottschalk 2009; Hussin and Kassim 2010; Reddick 2009b; Seneviratne 1999; Umble et al. 2003). Despite the importance of other organizational factors, adequate funding is undoubtedly one of the most important factors (Barrett and Greene 2000; Caffrey 1998; Dawes and Pardo 2002; Detlor et al. 2010; Edmiston 2003; Fleming et al. 2010; Gonzalez et al. 2010; Harris 2000; Ho 2002; Holden et al. 2003; Moon 2002; NGA 1997; Rose and Grant 2010; West and Berman 2001). The size of the project and the diversity of the users or organizations involved are also two important factors to consider in IT initiatives (Barki et al. 1993; Choudhari et al. 2011; Davis 1982; Dawes and Pardo 2002; Ghapanchi et al. 2008; McFarlan 1981; Melin and Axelsson 2009; Tsai et al. 2009).

In the model proposed in this book, the “organizational structures and processes” construct includes both organizational forms (Fountain 2001a, 2008) and management action (Kraemer et al. 1989). This is consistent with previous integrative models because “computing management is a filter through which environmental opportunities and constraints must pass” (Kraemer et al. 1989, p. 105). This view does not imply that managers always know the exact effects of certain information technologies on the organization, but they have certain expectations about them (Åkesson and Edvardsson 2008; De’ and Sarkar 2010; Fountain 2001a; Gil-Garcia 2006; Kraemer et al. 1989; Sarker 2000). Some of the possible expectations are cost reduction, organizational control, operational integration, increased productivity, and power reinforcement (Andersen et al. 2010; Badri and Alshare 2008; Rowley 2011; Srivastava 2011).

Although organizations are influenced by their environmental conditions, management objectives and interests are very important because they act as filters in the environment (Jansen and Løvdaal 2009; Nunes et al. 2009). In addition, environmental conditions can serve as ways to justify pre-determined actions that are based on other motivations or incentives. For instance, sometimes managers “initiate action for personal and professional motives, sometimes irrespective of environmental conditions. Often, in fact, when computer managers initiate action on non-environmental grounds, environmental conditions enter into the action only as a means of rationalizing and legitimating it” (Kraemer et al. 1989, p. 98). Thus, organizational structures and processes are important e-government success factors. Organizational forms and management action are expected to have a direct influence on the success of an e-government initiative.

RQ1: To what extent organizational structures and processes have a direct effect on e-government success?

2.4.3 Institutional Arrangements

Institutional arrangements can be conceived of as laws, norms, and meaning systems (Scott 2001). These institutional factors constrain the way people act in organizational settings. In fact, “institutions do not just constrain options: they establish the very criteria by which people discover their preferences” (Powell and DiMaggio 1991, p. 11). Therefore, institutional arrangements are very important elements in understanding how information technologies are selected, designed, implemented, and used in public organizations (Antonio Cordella and Iannacci 2010; Fountain 2001a; Gil-Garcia 2006; Hardy and Williams 2008; Hassan and Gil-Garcia 2008; Herrera and Gil-Garcia 2010; Tsai et al. 2009).

Institutions form guidelines for action, but also constrain those actions (Scott 2001). Information technology initiatives involve a complex set of decisions and interactions. These interactions are constrained by different institutional arrangements, but at the same time institutions “frame how those constraints operate” (Fountain 2001a, p. 92). Previous theoretical frameworks have used institutional theory to explain different aspects of information technologies such as adoption, implementation, and management (Bellamy and Taylor 1996; Butler 2003; Antonio Cordella and Iannacci 2010; Hardy and Williams 2008; Hassan and Gil-Garcia 2008; Laudon 1986; Tsai et al. 2009).

Government organizations are usually created and operate by virtue of a specific formal rule or group of rules. In making any kind of decision, including decisions about IT projects, public managers must take into consideration a large number of laws and regulations (Apostolou et al. 2011; Dawes and Nelson 1995; Fletcher 2004; Ghapanchi et al. 2008; Harris 2000; Landsbergen and Wolken 2001; NGA 1997). Federal systems, as in the United States, present additional challenges derived from the particularities of the intergovernmental relationships between different levels of governments and the diversity of local governments (Megan Cook et al. 2004; Chen and Thurmaier 2008; Ghapanchi et al. 2008; Gil-Garcia et al. 2005; Tolbert et al. 2008; Ubaldi and Roy 2010). The checks and balances among the executive, legislative, and judicial branches also pose challenges (Bellamy 2000; dos Santos and Reinhard forthcoming; Gottschalk 2009; Harris 2000; Bruce Rocheleau 2003).

Other institutional arrangements refer to the political complexities of every governmental system. Some examples of these factors are given by Dawes (1996, p. 381): (1) external influences over the decision-making process, such as legislative committees, interest groups, civil servants, and other governmental jurisdictions like local governments; (2) the power of agency discretion, which refers to the capacity of expert bureaucrats to influence programs and policies; and (3) the great importance of some government programs that reinforces vertical connections and creates

disincentives to horizontal collaboration among agencies. For instance, this lack of collaboration can constrain IT projects that attempt to integrate or share information across multiple agencies (Fedorowicz et al. 2009; Fedorowicz et al. 2010; Fountain 2008; Kwon et al. 2009; Pardo et al. 2007; Pardo et al. 2008a; Wenjing 2011).

Institutions are not only laws and regulations, but also norms, actions or behaviors that people accept as good or take for granted (Hossain et al. forthcoming; Khalil 2011; Orlikowski 2000; Sawyer and Tyworth 2006; Scott 2001; Smith 2010; Star and Ruhleder 1996). For example, in modern democracies, privacy, accessibility, and security are seen as very positive and they greatly influence government actions. These are aspects that must be adequately addressed in government IT initiatives (Carter and McBride 2010; Duncan and Roehrig 2003; Joshi et al. 2001; Joshi et al. 2002; Luna-Reyes and Gil-Garcia 2003a; Milner 2000; Rowley 2011; Shareef et al. 2009). In summary, institutional arrangements are represented by laws, regulations, and other cognitive, cultural, or socio-structural constraints found in government contexts. They can both directly and indirectly impact the success of e-government initiatives.

RQ2: To what extent institutional arrangements have a direct effect on e-government success?

RQ3: To what extent institutional arrangements have an indirect effect on e-government success, through their direct effect on organizational structures and processes?

2.4.4 Environmental Conditions

By adopting an ensemble view of technology, this study investigates not only the enacted technology as the technical features and outcomes of government-wide websites, but also the processes that generate certain organizational forms and institutional arrangements. Therefore, it is important to consider the more general environment affecting the technology enactment process and in which the e-government initiatives are embedded. The context of organizations includes very important environmental factors. Some of the environmental dimensions identified in the literature are (1) technological conditions, (2) legal conditions, (3) cultural conditions, (4) political conditions, (5) economic conditions, (6) demographic conditions, and (7) ecological conditions (Clegg and Dunkerley 1980; Hall 2002; Hatch 1997; Meneklis and Douligeris 2010; Schuppan 2009; Srivastava and Teo 2008). Scholars interested in organizational theory have developed different ways to understand the impact of the environment on organizations, as well as how organizations attempt to modify their environments (Aldrich 1979; Burke 2011; Hannan and Freeman 1989; Liao et al. 2011; Pfeffer and Salancik 1978; Scott 1998).

In information systems, researchers have recognized the important role of environmental variables in shaping the way information technology is designed,

implemented, and used in organizations (Kuan and Chau 2001; Laudon 1985; Menachemi et al. 2011; Sila 2010). However, the environment is not the only important factor to take into consideration. Environmental determinism posits that external environmental factors shape organizational characteristics and affect the final technology results. In the extreme, this type of determinism does not allow for management intervention (Anderson 2009; Fountain and Gil-Garcia 2006b; Glaser et al. 1983; Kraemer et al. 1989; Myeong and Choi 2010). The context of organizations is without a doubt an important factor for the success of IT initiatives. Nevertheless, as we will discuss later in this study, environmental conditions are only one of many important variables to take into consideration. Some contextual variables or external pressures such as personnel markets, competition, or political factors may affect the results of IT initiatives (Bellamy 2000; Bozeman and Bretschneider 1986; Chengalur-Smith and Duchessi 1999; Detlor et al. 2010; Laudon 1986; Lee et al. 2011; Pina et al. 2009).

Environmental factors have an impact on the enacted technology and subsequently on its outcomes, which are always indeterminate (Fountain 2001a). In addition, this relationship is not always direct, but mediated by managerial, organizational, or institutional variables. Therefore, under certain conditions “the environmental factors first encounter and become altered by computing management” (Kraemer et al. 1989, p. 54). Besides, an organization’s context is usually not simple and homogenous. Therefore, a model like this should explore how different contextual factors influence the success of e-government.

- RQ4: To what extent environmental conditions have a direct effect on e-government success?**
- RQ5: To what extent environmental conditions have an indirect effect on e-government success, through their direct effect on organizational structures and processes?**
- RQ6: To what extent environmental conditions have an indirect effect on e-government success, through their direct effect on institutional arrangements?**

The model just described in this section could be used to understand any type of e-government initiative, from the use of personal computers to sophisticated organization-wide information systems, from single agency websites to inter-organizational collaboration and information integration. For the purpose of this book, I will demonstrate the usefulness of the “enacting e-government success” framework by analyzing technical, organizational, institutional, and environmental aspects of government-wide websites. The following section explains the reasons for and advantages of using government-wide websites as the example for this book. It is important to clarify that in my view, while e-government is much more than delivering services through the Internet, the empirical work in this book will focus on government websites as just one example of an e-government initiative

and as a good way to discuss e-government success. For this book, government-wide websites are instances of a much broader e-government phenomenon.

2.5 Government-Wide Websites as Instances of the Electronic Government Phenomenon

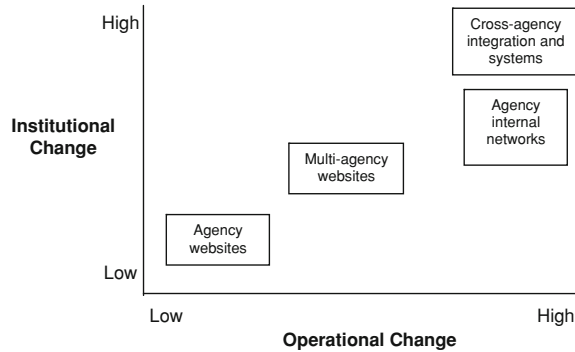
The Internet has the potential to facilitate the relationships between people and organizations. This result is not exclusive to government agencies: “The possibilities of widespread Internet use have also stimulated substantial development in a variety of applications, such as electronic commerce, distance education, electronic publishing, digital libraries, and virtual communities” (Kling 2000, p. 217). Nevertheless, the promises and problems of information technologies for government reform have been widely recognized (Garson 2004; Heeks 1999; Jaeger and Bertot 2010; Kraemer and King 2003; Lee and Lee 2009; Margetts 2009; Scott and Robbins 2010; Seifert and Chung 2009; Tolbert et al. 2008). This section briefly describes government-wide websites as socio-technical phenomena and interesting instances of e-government. It also explains why they could be useful to understand other forms of electronic government.

Recently, there has been more attention to IT initiatives and specifically to developing websites at all levels of government. The interest in studying websites or web portals has also increased over the last decade (Detlor and Finn 2002; Detlor Hupfer et al. 2009; Fletcher 2002, 2004; Gant et al. 2002; Morgeson III and Mithas 2009; Reddick 2009a; Scavo 2003; Tripathi et al. 2011). Websites have the potential to change the way citizens, businesses, and other stakeholders interact with government. They can help with the provision of services, improve communication, and promote participation, collaboration, and citizen engagement with government policies and programs. However, in order to realize all the potential benefits of government websites, it is necessary to understand the technical and social aspects involved in these e-government initiatives.

Government websites are e-government initiatives that started more than ten years ago and have constantly added tools and applications, becoming more complex in terms of technological sophistication and the variety of applications they include. They have not been substituted, but expanded in many different ways, including social media applications and Web 2.0 tools (Bertot et al. 2010; Chang and Kannan 2008; Hrdinová et al. 2010; Osimo 2008; Tapscott et al. 2008). Therefore, some of the challenges and problems for these websites are also expected to be very similar to the ones previously encountered.

Even if we think of a website just as a complex interface, Kling (1993, p. 4) argues, “Interfaces also involve capabilities beyond the primary information processing features of a technology. They entail ways in which people learn about the systems and ways to manage the diverse data sets that routinely arise in using many computerized systems”. Not only do government websites entail a great

Fig. 2.10 Virtual agencies and ease of implementation [Fountain (2001), Reprinted with permission of the publisher]



variety of applications and tools, but also diverse social aspects and interactions among members of the IT and other government organizations, as well as between government and its users. Therefore, the technology is not simply purchased and plugged in; it is individually and organizationally enacted as “a product of design, negotiation, politics, understanding, social construction, entrepreneurship, and leadership” (Fountain 2001a, p. 195). Unfortunately, when people think about a website, they see an interface, and not the complex organizational network that supports the website and the array of institutions that enable or hinder its capabilities. This book attempts to understand how all these elements come together to achieve e-government success.

The more specific case of government-wide websites is especially interesting due to its inter-organizational nature at the virtual level, but its single-organization nature at the physical level. Most of the time, these websites are managed by a single agency responsible for IT in the state or local government as a whole, but these websites require the participation of most government agencies. As a result of this dual nature, inter-agency websites are e-government initiatives that require moderate operational change and moderate institutional change (Fountain 2001a). They are technically complex and require a certain level of organizational collaboration; they are not as simple as a single-agency website or as complex as information and systems integration across multiple agencies (Estermann et al. 2009; Fountain 2001a; Gil-Garcia 2005a, 2006; Gottschalk 2009; Hanna 2011; Klischewski 2011). Therefore, they are interesting and useful in understanding the success of other e-government initiatives (see Fig. 2.10).

Government-wide websites also represent an interesting potential mixture of information technology applications, from restricted intranets and extranets for specific audiences to open government websites, social media, wikis, blogs, and other emergent technologies. Government-wide websites offer information and services from multiple government agencies in such a way that the user does not need to know what organizations are providing which services or information (Chan et al. 2008; Klievink and Janssen 2009b; Seifert and Chung 2009; Taylor and Lips 2008). Areas of interest form the organizational basis for good websites or web portals, as opposed to administrative structures. Multi-agency government

websites can be considered key elements of government reform. They are seen as comprehensive points of access to a great variety of electronic public services.

An inter-agency website is considered a collection of web pages containing a wealth of public information and different services that government agencies provide. As part of broader reform agendas, “groups of agencies linked by common clients, such as students or senior citizens, have developed virtual agencies. These virtual agencies use the connectivity of the web to co-locate the information and transactions of several agencies on one website”(Fountain 2001a, p. 99). Normally, government-wide websites link multiple agencies from the same level of government and with very different missions and audiences (Gottschalk 2009; Ojha et al. 2011; Rorissa et al. 2011). Some authors refer to this as horizontal integration (Gil-Garcia and Martinez-Moyano 2007; Layne and Lee 2001; Wu et al. 2009). Each public audience is served by one or more government agencies, which must collaborate and share information to offer integrated services.

In summary, government-wide websites are moderately complex e-government initiatives that require some level of institutional and operational change. These websites are not disappearing in the short term and are currently integrating new tools and applications, such as social media and Web 2.0, as a way to improve their capabilities and establish better channels of communication with citizens, businesses, and other stakeholders. In addition, government-wide websites are a good representation of the diversity and complexity of some e-government initiatives and most governments around the world have at least informational versions of them. They also face challenges similar to other e-government initiatives, from the lack of adequate financial and human resources to complex legal and policy frameworks, from the complexity of the technology to individual resistance to change. Therefore, they are a good example of the e-government phenomenon as a whole, particularly because the study includes not only their technical aspects, but also their organizational, institutional, and contextual ones. While I acknowledge that these initiatives do not necessarily represent all types of e-government, they are useful for generating lessons about success for other e-government initiatives. Future research should apply the theoretical model proposed in this book to other types of e-government initiatives.

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