ASSESSING THE IMPACTS OF e-GOVERNMENT SYSTEMS

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ABSTRACT

The research outlined in this paper investigates questions that address how researchers and practitioners can anticipate the likely unintended impacts of e-Government systems. Given that there are inherent tensions between providing flexible services to meet citizen needs and the standardisation of government business processes, the research program outlined in this paper aims to develop and refine techniques for modelling the impact of information and communications technology (ICT) in government service delivery. In order to address these questions the research draws on the broad "social shaping of technology" paradigm to model service delivery business processes as socio-technical networks.

Introduction

A popular vision for e-Government is of a seamless infrastructure for the electronic delivery of services which enables citizens to communicate, transact and interact with a range of integrated government activities. Such a vision is tied to the notion of joined-up service delivery in which information and communications technologies (ICTs) are used to facilitate the re-engineering of government business processes across agencies and between levels of government. While a seamless, integrated service delivery infrastructure is a common goal, moving toward this vision is also recognised as being problematic. The difficulties associated with transforming government service delivery are largely related to the complex institutional context in which government services are designed and delivered. This environment is further complicated when the potential impacts that implemented ICT-based systems can have are considered. For instance, there are consistent reports in the Information Systems literature that even though organisational capabilities for designing and implementing ICT-based systems are becoming increasingly sophisticated, frequently these systems have unintended and sometimes negative consequences (DeSanctis & Poole 1994; Ciborra 2000).

As ICTs become integrated into the infrastructure of public administration and service delivery, it is critical that their impact on the relationships between governments, bureaucracy and society are understood; that their benefits are highlighted and that any negative consequences are ameliorated. While there have been several excellent, theoretically grounded approaches to modelling the complexities of e-Government (eg, Institutional Theory has been used to describe the structuring capacities of ICTs in public administration (Fountain, 2001); Activity Theory has been adapted in modelling the delivery of government services (Andersen 2004)), there has been relatively little effort to address the unintended and potentially negative consequences that can and do arise when ICTs are integrated in the organisational infrastructure. In the e-Government domain, it is critical that not only are the likely unintended impacts of ICT-based systems anticipated, but also that there are mechanisms through which these impacts can be addressed.

The research outlined in this paper investigates questions that address how researchers and practitioners can anticipate the likely unintended impacts of e-Government systems. In order to address these questions the research draws on research within the broad "social shaping of technology" paradigm. Specifically, the research draws upon and adapts the Sociotechnical Interaction Network (STIN) modelling approach which was originally developed by the late Rob Kling and his colleagues (Kling et al., 2003). This approach is used to model the network of interactions embedded within the infrastructure of government service delivery. We aim to extend this approach further by integrating it with concepts associated with Constructive Technology Assessment (Rip et al. 1995).

Investigating the Impact of e-Government Systems

The use of ICT in public administration and e-Government initiatives in particular, will undoubtedly provide many long-term benefits for the community at large and over time will transform relationships between citizens and government. However, several reports note that many e-Government initiatives have not delivered expected cost savings and have not generally improved social inclusion, innovation or participation (Taylor 2004). One comprehensive analysis of the impacts of ICTs in public administration shows that of nineteen studies of ICT impacts in public administration, in half the impacts have been positive while one-third report negative impacts (Danziger & Andersen, 2002). Positive impacts largely relate to improved service delivery while negative impacts tend to be associated with a reduction in the level of flexibility available to "street-level" bureaucrats when dealing with citizens. These findings reflect the inherent tension in service delivery initiatives where the efficiency benefits that accrue from the standardisation of processes across agencies must be balanced against local knowledge and expertise that individual providers have when dealing with their constituent citizen clients (Ellingsen et al. 2007). It is apparent that care must be taken when integrating ICTs into transformed government business processes.

Furthermore, it is extremely important that the socially disadvantaged are not neglected in the transformation of government business processes. For instance while much of the emphasis of e-government initiatives is on access to internet and broadband services, the socially disadvantaged members of the community who most require government services are also those least likely to have access to the internet and ICT resources (Dugdale et al. 2005). Consequently, one of the leading challenges for the success of e-Government is to find ways of integrating ICTs into communities in ways that strengthen social inclusion and counter the emergence and deepening of social and economic divides. Questions about the relationship between ICTs and the delivery of services to the community are therefore not merely questions of access to technology during service delivery. They are part of a larger picture including public policy planning, determination and delivery.

Many of the promises of e-government are presented in terms of improved service to citizens and providing public value. Demonstrating and measuring how the community benefits and is affected by government providing online services is however extremely difficult. Typically a business case for e-government initiatives is used to assess both the financial benefits that the initiative will generate as well as providing an assessment of proposed social benefits. The approach developed for the Australian Government for example is based on the notion of "demand and value assessments" in which e-Government business cases identify cost and benefit streams for various stakeholders (King et al 2004). Using this approach the value of e-government initiatives is measured in terms of return on investment. Such an approach promotes sound project management principles and provides the basis for justifying the business case for e-government services; relating prospective costs and benefits to different stakeholder groups and identifying project risks.

This conventional approach to evaluating the impact of ICTs on the delivery of government services views the impact of technologies on society as following an inherent logic leading to particular, predictable patterns of use. However, there has long been a stream of IS research that has reported on the appropriations of technology at the individual level (De Sanctis & Poole 1994) that lead to unintended impacts of the technology. At an organisational level there have been observations of drift of large-scale infrastructures leading to new and unintended structures and consequent new and unintended impacts (Ciborra, 2000). Although some of these unforeseen impacts may be positive, others will be negative. The unintended impacts of implementing IS, the outcomes of their built-in processes and ways of operating, their potential for linking and integrating data from peripheral systems and agencies and the emergent consequences of melding new policy and legislative initiatives with integrated infrastructures appears to be unexamined, unseen and unthought-of. The process through which systems come-to-be, the

possibilities, and decisions made are not recorded and so is largely inaccessible once the system is implemented.

An alternative approach of examining the role of ICTs in the delivery of public sector services is to turn to the tradition of "social shaping" approaches (MacKenzie and Wajcman 1987). In this vein, Dutton (2005) for example, redefines traditional notions of *access* to technology by viewing it as an unpredictable outcome of the choices made by people and institutions about the design and use (or non-use) of the technology. It is the multitude of interactions between actors that determines the ultimate social, economic, business, educational and other outcomes tied to ICT. Similarly, Danzinger et al. (2002) note that the impacts of ICTs encompass a broad range of processes in which individuals and organisations in various roles are constantly interacting and re-organizing and "*these processes of structuration might be altered or shaped by uses of IT in ways that are often subtle, complex, gradual or delayed, and that are difficult to measure with precision"* (Danzinger et al. 2002:5).

The research outlined in this paper aims to develop and refine techniques which are based in a tradition of the social shaping of technology which model the impact of Information and Communications Technology (ICT) in government service delivery. It addresses the question of how a social shaping approach can be used in the assessment and evaluation of integrated electronic service delivery.

The specific issues of relevance to this question are:

- Can the unintended impacts of e-Government systems integration be anticipated?
- How can we accommodate the needs of those at the margins of society within e-Government initiatives?
- What are the strengths and weaknesses of current approaches to forecasting and evaluating e-Government initiatives?
- How can a "social shaping" perspective complement existing approaches to e-Government service delivery?

The following section outlines the approach we are developing in order to address these questions.

Theoretical Lens

An underlying assumption taken in this research is that in the assessment of ICT impact on government service delivery, the technology itself is merely one component of a much larger, complex picture. The complexity of this 'larger picture' indicates that our analysis should examine the technology not in isolation but as a part of a complex interrelated web, ensemble or network of influences. The conceptualisation of an ensemble depicts technology as only one of the many elements in the development or use of information systems. Orlikowski and Iacono (2001) suggest that the ensemble view may examine how the technology *came to be* (illustrated by the Social Construction of Technology and Actor-Network Theory) or *how it comes to be used* (as seen in the web model of Kling and Scacchi (1982) that describes an ensemble of "*equipment, techniques, applications, and people that define a social context*" as well as the infrastructure, social relations, policies and processes around technology in use).

Viewing ICTs as part of an ensemble transcends the view of technology as a tool that can provide defined benefits to governments (e.g. reduced costs and greater efficiencies) or citizens (e.g. empowerment through access to information) (Burn & Robins 2003; Navarra & Cornford 2004). It acknowledges the emergent outcomes of technology use (Markus & Robey 1988; Carroll 2004) and may encourage public administrations to seek to analyse a range of possible outcomes that may emerge from e-government initiatives. The socio-technical interaction network (STIN) modelling approach (Kling et al. 2003)

employs an ensemble approach in studying the network of social relationships of which technology is a part.

To inform our investigation we firstly draw upon Kling et al.'s recommended heuristics for developing STIN models. The authors define a STIN as "*a network that includes people (including organizations), equipment, data, diverse resources …, documents and messages, legal arrangements and enforcement mechanisms, and resource flows*." The relationships between each of these elements of a STIN may be social, economic and political. The focus of Kling et al.'s paper was e-forums but they indicated there were broader applications because "*STIN models help us to understand human behaviours in the use of technology-mediated social settings*" (Kling et al. 2003:48). This view is particularly appropriate for studying the effects of e-government upon people at the margins. Also, the STIN approach is heuristic, to guide but not prescribe activities in analysing an extremely complex situation.

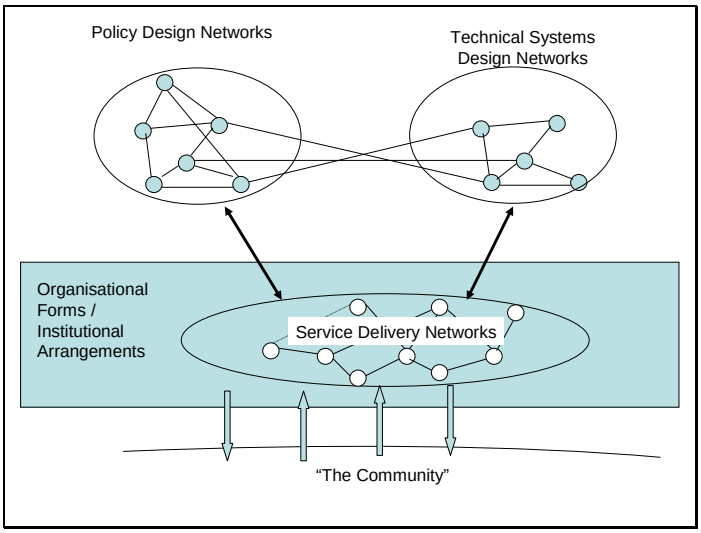

Figure 1: Government Service Delivery Systems as Socio-technical Networks

In order to put the STIN analysis into sufficient context to model the effects of ICTs in government services we initially conceptualise government service delivery in terms of inter-related socio-technical networks (Figure 1). In this way, the delivery of government services to the community is viewed as being performed within a variety institutional and organisational arrangements (departments, agencies, outsourced service providers, etc) via designed ensembles of people, processes, procedures, relationships and technologies. In service delivery networks, ICTs are embedded within the administrative infrastructure and their use by the community can be direct (as in the case of web-based interfaces) or it may be indirect and mediated by public servants (or their delegated agents) as "back office" activities. The socio-technical networks of service delivery are in themselves the outcome of other networks that form the wider cycle of public policy. That is, government departments respond to the changing needs of the community through the policy directions set by their political masters and as new policies are formulated, the infrastructure necessary to deliver the services and administer the policy is designed and set in place. These networks that develop government policy and the networks that develop administrative infrastructure (including the design of ICT-based systems) may however, occur in relative isolation to each other. Therefore, understanding the effects of ICT-based systems that are embedded in the service delivery networks requires attention to be paid to socio-technical networks that precede their implementation. In this research we use the STIN modelling approach to understand the relationships among these various networks because it explicitly recognises the role of ICTs in the shaping of service delivery.

Where the STIN approach can provide a way of conceiving and describing how ICTs become integrated within and shape government business processes, the approach is not sufficient for guiding the process by which that shaping will occur. To provide an overarching structure for this process, we turn to the principles of Constructive Technology Assessment (CTA). Rather than viewing the assessment of technology as a post-hoc product of implemented systems, the assessment itself is viewed as a process. As with the STIN approach CTA is grounded in the social constructivist paradigm and provides a framework for assessing technologies based on principles such as:

- The integration of anticipation of the future effects of technology into the promotion and introduction of technology;
- The inclusion of more social actors and aspects of technology during development and introduction in order to improve the quality of technology in society;
- Change processes should be seen as ongoing, enabling all actors to learn about the possible new linkages between the design options and the demands and preferences of the envisaged users.
- Learning should include aspects of the political and social articulation of acceptability of technology in development and its linkages to broader cultural values in society;
- Actors should be reflexive about the processes of co-evolution of technology and society, of technology and its impacts' (Genus 2005).

The application of these principles to the planning, development and implementation of e-government service delivery may provide an alternative approach to complement existing practice where the benefits and costs of e-Government service delivery are focussed on linear projections of their impact.

Research in Progress

The aim in this research program is to examine questions surrounding the unintended impacts of ICT-based systems particularly in the context of e-Government. To date a case study which used the STIN modelling heuristics to examine the effects of an integrated licensing system on a remote indigenous community in Western Australia has been completed (Letch and Carroll 2007). The STIN analysis was able to draw out a number of issues related to the structuring of of government service delivery through the use of ICTs and identified secondary impacts on community members that arose through the integration of ICT-based systems across agencies. It was apparent however that the STIN approach was limited in suggesting future scenarios for the shaping of the licensing system for delivery to the indigenous community. The research is at the stage where we are now examining the further development of the principles inherent in the STIN modelling in relation to the process and principles that are associated with the Constructive Technology Assessment approach. It is believed that the resultant framework will provide a practical basis for assessing and guiding the impact of e-Government services.

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