

## Institutional Aspects of Systems Development

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### Abstract

*This paper reports on research into how a systems development methodology (SDM) operates as an institution: specifically – an institutional carrier in the process of systems development. The case study develops the argument that institutional structures (such as authority, norms, symbolic values, and routine ways of doing things) embedded within the methodology are active forces in the systems development process, and therefore constitutes 'institution'. We ground our argument on the findings from a study of an in-house developed SDM in a large IT department within a major bank in Australia. The findings show how the SDM exerts its influence in the bank through a combination of shared regulative, normative, and cultural-cognitive elements. As a second contribution to research, the study operationalises a framework derived from new institutional theory that integrates elements of a social actor model outside its original domain to provide a deeper understanding of the institutional forces at play in information systems development. All these findings are significant in that they draw attention to the role of institutional carriers, control structures, conflicting interests, and power that appear largely outside the domain of the systems developer.*

### Keywords

Social actor model, institutional theory, information systems practice, institutional carrier.

### INTRODUCTION

The prevalence and use of information and communication technologies (ICTs) in organisations have become an institution in its own right (Avgerou 2002). Institutions exhibit properties of stability because of the processes set in motion by mechanisms that resist change. Examples of ICTs as institutions are: the Microsoft Windows operating system that has spread and now dominates almost every industry desk top and home computer worldwide; online computer reservation systems that have impacted the entire airline and travel industry; and systems development methodologies (SDMs) that according to Avison and Fitzgerald (2006) address many of the functions required in developing information systems such as determining or regulating activities and providing resources to support actions. We also believe that the significance of SDMs resides in its expanding role in the regulation of human affairs. SDMs as artefacts of the systems development process articulate and facilitate the reproduction of relations that are institutional, political, and socio-economic (Hirschheim and Klein 1989).

Institutions, therefore, are taken for granted standardised sequences of activity which establish and maintain features of social life (DiMaggio & Powell 1983), and according to new institutional theory (Scott 2001) these influence mechanisms force organisations to conform to norms, traditions, and social expectations. Although rules, norms and cultural beliefs are central properties of institutions, the concept of institution also encompasses associated behaviour and material resources: that is the activities that produce and reproduce them.

Ciborra, & Hanseth (1999) and more recently Avgerou (2002) both indicate that information technology (such as a SDM) can assume the properties of an institution on the basis that they constitute the background condition for action, enforcing constraints, giving direction and meaning, and setting the range of opportunities for undertaking action. The implication is that institutions can be carried by artefacts, such as information technology where it becomes taken for granted in the form of habituated behaviour or routines.

Our review of the literature reveals that previous research on SDMs tend to focus on the features of the methodology and systems developer's behaviours while underemphasising the role of context and institutional structures (Chae & Poole 2005). Among the many studies of SDM enactment, few pay attention to the role of context, social and organisational structures embedded in the systems development methodology. Orlikowski & Iacono (2001) argue that most IS literature treats IS as separable from the social, organisational and institutional contexts in which they are instantiated, appropriated, and enacted. When SDMs are viewed as technical artefacts that are relatively discrete and fixed, it is easy to view the use of an SDM as an independent event. This view

encourages the belief that institutional structures have little to do with the enactment of an SDM in the workplace. Techno-centric views of the systems development process omit the role of human agents and the existing organisational and social contexts in the enactment of systems development artefacts. This paper provides one example of a technical artefact – a systems development methodology (SDM) – as an institutional carrier affecting the systems development process. In this case example, the methodology is mandated for all projects in a support role and these standard procedures in all development and maintenance projects constitute routines.

A detailed account of the institutional character of ICTs – in this case, an SDM, is important because researchers still have an incomplete understanding of how IT practitioners collectively use tools, techniques or methodologies in their day-to-day work, or the forces that impact on the situated use of these devices for systems development. This paper argues that the work that has been carried out and published is limited in its ability to consider the social and institutional aspects of methodology use. It is our contention that most field research on methodology use has an individualistic, systems developer orientation with little recognition that software development takes place in a complex social context. This paper further argues that SDM use needs to be understood in a wider institutional context comprising both social relations and social infrastructures in and outside the organisation.

An institutional perspective offers several advantages for IS researchers. According to Orlikowski & Barley (2001:154) this perspective offers ‘a structural and systematic understanding of how technologies are embedded in complex interdependent social, economic, and political networks, and how they are shaped by such broader institutional influences’. In the case excerpts, institution is identified empirically as taken for granted, or standardised activities that shape – in some instances they mostly constrain, others enable – work practices. According to Jepperson, (1991:150) institutions are transmitted by being embedded in carriers. This paper argues that the SDM acts as a major institutional carrier. Accordingly, our question is how do SDMs as technical artefacts carry institutional structures?

The paper answers this question by operationalising a framework that integrates elements of a social actor model (Lamb & Kling 2003) to provide a deeper understanding of the institutional forces at play in information systems development. Insight with respect to this focus is derived from a case study of the deployment of an in-house developed methodology in a large IT department of a major Australian bank (*The Bank* – a pseudonym).

This paper uses the term systems development methodology very broadly to cover the totality of development approaches. Employing a broad interpretation is necessary due to the difficulty in defining SDM ‘use’ (Iivari & Huisman 2007). To overcome this ambiguity, Iivari & Huisman (2007:38) prefer the term ‘deployment’ rather than ‘use’, and distinguish three major aspects of SDM deployment: use, impact, and support. Methodology *use* refers to the intensity of methodology deployment across an organisation, while methodology *impact* refers to aspects of quality and productivity issues in systems development. In this paper, we adopt the latter meaning in terms of a methodology’s *support* role: as a production, coordination, and organizational technology.

This paper’s primary objective is to report on field research into how a systems development methodology (SDM) is an institution, or specifically – an institutional carrier in the process of systems development within a large Australian bank. A second objective is to contribute to institutional theory by provide insights into the process of applying Lamb & Kling’s (2003) *user as social actor model* as a theoretical lens to generate findings of information systems (IS) practice.

This paper is distinct and significant because the *user as social actor model* is relatively new, and Lamb & Kling provided few methodological guidelines for operationalising the four dimensions and sixteen constructs central to theorising about the enactment of information & communication technology (ICT) in practice. We claim that this work is both instructive and innovative in the sense that there is theoretical value in drawing on and incorporating contributions from a prior case study outside its original domain, and providing instantiation of an ICT as an institutional carrier.

## **THEORETICAL FRAMEWORK**

### **Institutional Theory**

The institutional elements that structure people’s work activities in formal organisations in modern society have been studied extensively in organisational theory (DiMaggio & Powell 1983; Scott 2001; Zucker 1987). According to Scott (2001), new institutional theory is a body of knowledge that studies the relationships between organisations and their environments focussing on how structures become established (or institutionalised) as guidelines for social behaviour. A central principal of this theory is that institutions operate at various levels (jurisdictions of the institutional form), from the world system to interpersonal action; and are transmitted by various types of carriers, including technical artefacts (Scott 2001: 81). In terms of the case,

Table 1 illustrates these various levels, with an additional level added – individuals – based on the social actor model.

**Table 1.** Levels in Institutional Analysis, adapted from Scott (2001:85)

LEVEL	THE CASE
World system	Australia
Societal	The finance, communications & IT sector
Organisational field	Australia's top 4 trading banks
Organisational population	<i>The Bank</i>
Organisation	IT division with <i>The Bank</i>
Organisational subsystems	Systems developers
Individuals	

Scott (2001) provides an encompassing framework bringing some coherence to the wide-ranging literature on new institutional theory. This framework known as the ‘three pillars’ posits that institutions are comprised of regulative, normative and cultural-cognitive elements, that together with associated activities and resources, provides a different basis for legitimacy, and hence, social conformance (Scott 2001:48). The three pillars form a continuum moving from the conscious (legally enforced) to the unconscious (taken for granted). These three pillars of institutions, according to Scott (2001) are transmitted by being embedded in various types of repositories or carriers. Scott (2001:77) identifies four types of carriers: symbolic systems, relational systems, routines, and artefacts. Since institutions do not exist empirically (Bjorck 2004), we provide illustrations from the case where they materialise as examples:

- Symbolic systems (standard processes, to values, to widely held beliefs or ideas in the heads of organisational actors). For example, many developers held the view that the SDM provides a common language enabling communication of ideas between developers, the client, and those external to the organisation.
- Relational systems (governance systems emphasising authority or power). For example, the business client held authority over developers based on funding and the stage gate approval process.
- Routines (habitualised behaviour or repetitive patterns of activity such as operating procedures encoded into technology or soft organisational routines such as jobs). For example, as the SDM was mandated, developers were required to produce documentation at all stages of development and gain sign-off before the next stage of development could occur.
- Artefacts (such as technologies embedded in both hardware and software). For example, the SDM itself. This paper argues that aspects of the above three carriers are embedded in its functionality and form.

Avgerou (2000) has also identified a number of institutional characteristics of information technology, including the professional practices and expertise for the development and use of IT applications. For instance, large organisations which develop their information systems in-house, invariably rely on standardised methodical professional practices. These practices are encoded in systems development methodologies. According to Avgerou (2000) the use of SDMs to systemise technical processes is not ‘irrational’ and serves purposes other than the immediate task of building and implementing an information system to support an organisational set of activities. SDMs make possible the professionalisation of systems development by assigning technical roles such as analyst, programmer, or project manager; and as Rowlands (2007:1) reported:

*“it is the policies and practices embedded in the SDM through sign-off and stage-gate funding that constitute the structural exercise of power. These findings indicate that the constraints based around the accepted and everyday use of a methodology by systems developers obviates the need for more overt or direct forms of control”.*

New institutional theory is hence a powerful framework to explain the actions of actors in work practices, and the deployment of ICTs. New institutional theory focuses on social and contextual aspects at a macro level – the environment – for understanding various actors’ behaviour in a work practice, as opposed to economic theories that argue a case for organisational behaviour based on rational choice. As our interest lies in investigating the interactions between systems developers and context in relation to a specific systems development methodology, we adopted an institutional lens in line with other IS studies (Avgerou 2000; Cho & Mathiassen 2007; Currie 2004).

The concept of institution has a broad sense in institutional theory. In this case, institution manifests itself as taken for granted, or standardised activities that shape – in some instances they mostly constrain – work practices. Using this working definition, we consider the SDM has become institutionalised within *The Bank* because of its longevity of use and its associated practices have become routine. Similarly, as the transcripts will

show, the SDM goes relatively unnoticed where developers take it for granted in performing their day-to-day work.

Another key characteristic of institutional studies is that they implicitly or explicitly relate to what DiMaggio & Powell (1983) call an *organisational field*. This particular focus on *organisational field* by new institutionalists refers to a frame of reference where a number of organisations (key suppliers, resource and product consumers, regulatory agencies, and other organisations that produce similar services or products) engage in a specific activity. It is their interactions in the aggregate that constitute a recognised area of institutional life.

Building on this traditional, we apply a particular institutional approach, Lamb & Kling's *user as social actor model* (Lamb & Kling 2003) to analyse how a particular SDM manifests itself as an institutional carrier.

### The User as Social Actor Model

Lamb & Kling's (2003) framework focuses on the *use* of ICTs and aims to develop a social actor model of 'users' in an organisational setting. The model, via the four dimensions, operates at multiple levels. The dimensions *interactions* and *identities* relate organisationally situated individuals to others and to the technologies they use to interact with and present themselves to others. The dimensions — *affiliations* and *environments* relate people to their organisation, and to the industries and environments of those organisations.

By being able to use the model at a work practice level, we contrast the simplicity and power of this model in comparison to structuration theory (Giddens 1986) which we classify as a meta theory operating at a higher level of generality to the exclusion of understanding individual motivations, and likewise local issues as a context for action. On the other-hand, the *social actor model* (supported by institutional theory), is a model of practice operating at a lower level of generality, with an emphasis on analysing the organisational setting in terms of developer's *interactions* with organisational *affiliates* and the *environment*; and most importantly the impact of organisational constraint on *individuals*.

A further key feature of the model is the notion of a *user as social actor* as a unit of analysis. According to Lamb (2006) the term *social actor* is a construct that conflates people's interactions, their information environments, and their technologies. Consequently, the *user* is reconceptualised – not as a technically focused or socially thin, passive user of technology – but a person who acts with information technology in a social setting. To avoid potential confusion, we need to point out that in this case involving systems developers, it is the developers and the business client who are the 'users' of the technology (the SDM), in contrast to conventional IS literature, where the user is often portrayed (let's say) as an office worker being the recipient of a developed system.

The *user as social actor model* was chosen for pragmatic and methodological reasons. The model was new, celebrated, and we saw it enthusiastically as an opportunity to 'try it out'. Lamb & Kling's (2003) paper was awarded the 2003 *MIS Quarterly* best research paper award. Second, as Lamb & Kling (2003: 219) offered, "the model provides a framework for the systematic research of complex, highly contextualised ICT use in organisations, rather than the study of isolated aspects of ICT use in de-contextualised settings". Third, we wanted to study the practitioners (systems developers) at the micro, meso, and macro level. Fourth, the four dimensions and sixteen characteristics of the model seemed understandable, and relatively easy to operationalise in our research design. In sum, the case applied the *user as social actor model* as a conceptual lens to understand methodology use within a single organisational setting. We consider the model provides an appropriate theoretical lens to examine ICT enactment; first, because of its emphasis on exploring the impact of institutional structures on the enactment process in organisational settings (Lamb & Kling 2003); and second, because of its focus on networked technologies in increasingly knowledge-intensive industries such as IT (Lamb 2006).

To illuminate the institutional context that impacts on methodology enactment, we provide Lamb & Kling's general description of the four interdependent social actor dimensions: affiliations, environments, interactions, and identities as shown in Table 2. First, **affiliations** are networked, exchange-related, multiple and changing. Second, their **environments** are technical, institutional, ICT-enhanced, and expansive. Third, their **interactions** are (mostly) legitimate, action-enabling, constructed and role-based. And finally, social actors continually improvise their uses of the ISDM and reconfigure their organisational roles (**identities**) to reconstruct and represent themselves as competent, ICT-savvy social actors.

Our research made use of Lamb & Kling's (2003) *social actor model* by illuminating methodology enactment at five levels: individual, project, IT department, organisation, and organisational field (*c.f.* Table 1). The following paragraphs provide description of the model's four dimensions in terms of the context of the research example. Further descriptions, with samples from the case, are presented in Table 3.

**Affiliations** represent inter- and intra-organisational relationships created and supported by organisational members as a result of their day-to-day activities. Systems developers work together with the methodology

comprising professional networks. These networks exist within *The Bank* but also apply to the IT and financial industries as well, and to a wider national and international context.

**Environments.** The environment an organisation operates in is shaped by the kind of affiliations it has formed with industry, other financial institutions and its clients. Methodology enactment needs to recognise the normative, regulatory, and cognitive institutionalised practices of *The Bank*, and other associations that circumscribe organisational action.

**Interactions.** Systems developers see themselves as organisational members working with others (project members, managers, and the client) enacting the methodology (and other media such as email) in support of their interactions. Information and resources are mobilised as systems developers socially engage internally, and with *affiliated* organisations.

**Identities.** Systems developers regularly enact SDMs to compile and present information to various affiliates. In so doing, they create an identity for their organisation and for themselves. Systems developers are defined by their presentations as individuals (analyst programmer) or a collective entity (IT professional).

**Table 2.** Multi-dimensional Conceptualisation of a Social Actor

SOCIAL ACTOR DIMENSIONS	CHARACTERISTICS and BEHAVIOURS of Connected and Situated Individuals (Lamb and Kling, 2003:213)
<b>Affiliations</b>  (Definition: organisational and professional relationships that connect an organisation member to industry, national and international networks).	Social actor relationships are shaped by networks of organisational affiliations.
	Relationships are dynamic, and related informational exchanges change with flows of capital, labour, and other resources.
	Relationships are multilevel, multivalent, multi-network ie. local/global group, organisation, inter-group, inter-organisational culture.
	As relationships change, interaction practices migrate within and across organisations.
<b>Environments</b>  (Definition: stabilised, regulated and/or institutionalised practices, associations and locations that circumscribe organisational action).	Organisational environments exert technical and institutional practices (standards) on the company and their members.
	Environmental dynamics require a display of overall competence.
	ICTs are part of the organisational environment.
	ICTs are part of the industry, national, and/or global environment.
<b>Interactions</b>  (Definition: information, resources and media of exchange that organisation members mobilise as they engage with members of affiliated organisations).	Organisational members seek to communicate in legitimate ways.
	Organisational members build, design and develop interactions that make information actionable.
	ICTs become part of the interaction process as people transform and embed available informational resources into connections and interactions.
	As organisational members, people perform socially embedded (role-based), highly specialised actions on behalf of the organisation.
<b>Identities</b>  (Definition: avowed presentations of the self and ascribed profiles of organisation members as individual and collective entities).	Social actor identities have an ICT use component.
	ICT-enhanced networks heighten multiple identities as expert or novice.
	ICT-enhanced connections among organisation members transcend roles.
	Social actors use ICTs to construct identities and control perceptions.

Each of the four dimensions is comprised of four further characteristics or behaviours of connected and situated individuals (*c.f.* Table 2). These sixteen behaviours were used to develop the initial coding scheme (*c.f.* Table 3) for the qualitative analysis of data to be discussed next. Only Table 3 has been included for illustration purposes as space limitations preclude the inclusion of the remaining three tables for the *Affiliations*, *Environment* and *Identity* dimensions. For further descriptions, readers are referred to Rowlands (2007).

## RESEARCH METHOD

The research centred on exploring the impact of institutional structures on the enactment process and how systems developers carry out their work in *The Bank*. Thus, essentially concerned with organisational rather than technical issues, we determined that the interpretive case study was highly appropriate for this purpose. The empirical inquiry (where data was derived from sense-making and experience of the field, rather than rational thinking, ideas, or theory) aimed to investigate and capture richness of organisational behaviour – namely, the enactment of an ISDM (the technology) within the real-life context of *The Bank*.

## Data Collection

According to Lamb & Kling (2003:221), *the social actor model* can be used to guide data collection and to pose interview questions. We didn't do that. Instead, interviews with systems developers dealt with the following general issues: reasons or motives for using the SDM; the conditions that shaped their use; and the enactment process itself. Respondents were asked to talk about specific situations, events and people. The model was used only in data analysis as a theoretical lens to draw meaning from the interview data. It helped make sense of what occurred in the field, provided a set of constructs to be investigated from the interviews, and guided our interpretation and focus.

## Data Analysis

As the social actor model is relatively new, and few methodological guidelines or examples exist for operationalising the four dimensions and sixteen constructs, this section provides insights into the process of applying the model as an institutional lens to analyse data and generate findings of IS practice. The analysis of transcripts involved five steps. The analytical techniques adopted during the research design are explained below, and follows an identical approach to analysis developed and reported by the author Rowlands (2006; 2007) and subsequently used in Van Akkeren and Rowlands (2007).

Step 1: *Interpretive translation of social actor model*. In this first step, the sixteen characteristics and behaviours of connected and situated individuals (Lamb & Kling 2003:213) were interpreted by the author and translated to an equivalent meaning in terms of the case scenario. For instance, in the dimension *Interactions*, the first behaviour is that "*organisational members seek to communicate in legitimate ways*" (c.f. Table 3, row 1, column 2). We had already conducted the interviews and had re-read the transcripts a number of times. By being familiar with the context, and through a process of understanding from a source domain (the familiar: the sixteen social actor constructs) to a target domain (the relative unfamiliar: the interview text), we interpreted or instantiated the first behaviour to mean "*the ISDM mandates documentation throughout all phases & calls for meetings, both formal & informal among affiliates to review them*" (c.f. Table 3, row 1, column 3). While multiple interpretations were possible, and through a process of iteration and revision, we settled on an interpretation taken from the interview transcripts that best fitted what we thought was the meaning of the original construct. This process of interpretation and translation (or mapping) of the original constructs to a match in the transcripts continued for the entire sixteen behaviours of the connected and situated individual.

Step 2: *Coding of Institutional Structure*. Based on key words from the *user as social actor model*, codes were assigned to match the examples from the case (c.f. Table 3, column 1). We created and operationalised a list of codes prior to content analysis (step 3) based on the model's framework. By operationalisation, we mean that the concepts from *the social actor model* were expressed in variables or coded elements that could be identified in textual analysis. In my research, a code is defined as an abbreviation or symbol applied to a segment of words (e.g. a sentence or paragraph) that captures the essence and description of the construct. Coding, then, is labelling fragments of data by identifying key points, as opposed to coding by micro-analysis of the data, word-by-word, or line-by-line. The coding of the institutional context was challenging and demanded in-depth knowledge of business practice and an understanding of the local institutional norms and business culture.

Step 3: *Content Analysis*. In attempting to gain theoretical understanding of the complexity of the text, *the social actor model* was used in a form of content analysis where the text was systematically listed, coded and categorised according to the sixteen behaviours of the connected and situated individual (described in column 1 of Table 3). The list of researcher-constructed labels that best captured the description of the phenomenon was then deductively applied to the text to codify, count, and extract the data associated with each interview. This same format was carried through the entire thirty interviews.

Step 4: *Managing the Data*. In terms of data management issues, the process of analysis was assisted by and recorded in a database through procedures such as importing transcribed interviews, coding against the sixteen constructs, adding comments and reflections, sorting the interpretations by code; and text retrieval of selected instances into the body of the research report.

Step 5: *Writing the narrative*. The last step in analysis involved presenting a "story" piecing together interviewee accounts taken from the entire case study database, guided by the theoretical lens offered by *social actor model*. In this narrative (with sample excerpts shown in the following section), we present informed perspectives in a coherent and convincing story. To assist in this 'understanding', the social actor model provided a focus on specific social, organisational, and individual phenomena in a particular setting. The model enabled the author to tie together a number of individual phenomena to construct a broader higher-level schema. One schema (as reported in Rowlands 2007) was a focus on the power relations between systems developers and the business client at the workplace. While step 1 described theorising (using instantiation) at an elementary level, step 5 involved theorising at a higher level of abstraction where we moved away from directly observable individual and organisational activities towards theorising at a level of abstraction higher than the empirical

world involving non-observable, structural issues such as power. It was at this level that we began to focus on organisational structures and constraints and their influence on the systems developers.

### The Case

The research centred on exploring the enactment process and how systems developers carry out their work in *The Bank*. The banking and financial services sector was deemed appropriate because of the extremely important role that ICTs play in the success of companies in this industry, and importantly, the banking industry is highly technical, highly competitive, and highly regulated.

The organisational field includes two major technology suppliers (an international hardware vendor and a national telecommunications provider), systems developers, the internal business client, the local IT industry, and other relevant organisations such as software contracting firms (*c.f.* Table 1). The cohesiveness of the field is held together by a combination of shared regulative, normative, and cultural-cognitive frameworks (Scott 2001). According to Currie (2004) the IT industry can be understood as an organisational field since it comprises a network of parties operating in concert with a variety of tangible and intangible interests.

What follows is an application of the social actor model to the specific characteristics of the case.

## ANALYSIS AND FINDINGS

In terms of theoretical contribution, the case aimed to produce an understanding of the institutional context of SDM enactment. By way of empirically supported examples, the excerpts below illustrate the constraining aspects of the SDM, and how the SDM manifests itself as *institution* in day-to-day actions within *The Bank*.

### Interactions

**Table 3.** A Social Actor View of *Interactions*

Social Actor Dimensions and Code	Characteristics & Behaviours of Connected and Situated Individuals (Lamb & Kling, 2003:213)	Examples from the Case
<b>Interactions [IN]</b>		
[IN-DOCN]	Organisational members seek to communicate in legitimate ways	The SDM mandates documentation throughout all phases & calls for meetings, both formal & informal among affiliates to review them.
[IN-ACTION]	Organisational members build, design and develop interactions that make information actionable	The SDM mandates the generation of specifications becoming actionable documents requiring a sign-off at each stage. This is the work culture imposed by business clients on IT.
[IN-TAILOR]	ICTs become part of the interaction process as people transform, tailor and embed available informational resources into connections and interactions	Developers tailor the SDM in pragmatic and ingenious ways as part of the design documentation process.
[IN-CONSTR]	As organisational members, people perform socially embedded, highly specialised actions on behalf of the organisation	Using the SDM dictates and constrains their role within the bank – it tells developers what they must do – it's the bank's way.

According to *the social actor model* individuals are involved in networks that take shape within and among organisations. Networking refers to the *interactions* where organisational members work and interact with others (affiliates) using a methodology (and other media) in support of their interactions. In terms of *The Bank*, we saw the SDM as a vehicle to bring together project members to coordinate their tasks when interacting with clients, industry bodies and business partners. The *interaction* dimension was by far the most prominent in the interviews as it describes systems developers in their day-to-day work role networking and relating themselves to others and to the SDM they use to interact with. Our analysis identified a range of interaction behaviours such as producing documentation, seeking sign-off, tailoring or circumventing their job tasks, and acting in constrained ways.

According to *the social actor model* in Table 3, organisational members seek to communicate in legitimate ways. We sought examples of this, and in its most visible form, the SDM mandates documentation [IN-DOCN] throughout all phases of the development lifecycle and requires project leaders to call for meetings, both formal and informal among affiliates to review project status and sign-off on documentation. It is the requirement to attend meetings and the necessity to gain approval - both forms of legitimate communication that are governed by the SDM. We see here an example of the SDM (as institution) regularising the work of developers. Below is

an example of a programmer citing the amount of documentation required as a lot of red tape and excessive time:

*basically the main argument against this red tape or what is seen as a red tape is the time factor involved. ...obviously the more approvals you need the more people you need to contact. If certain people aren't around then it takes longer for the approval to come through.*

A further dimension of the *social actor model* was that while organisations are connected as networks, within those networks, relationships with other actors are often in misalignment or even in conflict. This condition puts pressure on organisation members to develop interactions that presents information in an acceptable, standardised format. *Social actor model* asserts that when this information is exchanged in this format it is made actionable. In terms of the case example, we translated this as the methodology mandating the generation of specifications that become actionable documents [IN-ACTION] requiring a sign-off at each stage. Developers were forced to do things. We provided evidence that developers viewed sign-off in two ways: enabling – to gain approval so that work could commence on the next stage; and constraining – as a way whereby business clients maintain power and authority over the development process. A project manager mentioned a structural role of the methodology, through sign-off, enabled the business client to keep financial control of the project:

*...you have to get sign off at various points. Yes, the methodology is used by the technology people to build things. But, before you can get funding for the next stage the technology group needs to provide to business things for the project to then proceed to the next phase. So if you want funding to go on further, you'll need to do things. So it [the SDM] forces you to do things.*

Further evidence, and another prominent interaction code among the transcripts was that using the SDM and following routine patterns of work dictated and constrained [IN-CONSTR] their role within *The Bank* – it told developers what they must do – it's *The Bank's* way thereby enforcing the regulations and the authority structures of systems development, etc. We provided examples such as the following where one senior analyst believed that business used the methodology as a form of control by locking development teams into unreasonable schedules making it very difficult on the developers and in the end, producing poor quality systems because:

*.. it means that your development time is locked in. Usually, your technical needs are bolted. You're told that you've got to develop a system, so there always has to be an estimate. So what it means to me is that once you've signed-off on a certain amount of money those requirements will be delivered by the end of the project. We're sort of locked in.*

And, the upshot of this constraining work practice, according to the same analyst was that in a typical project:

*we've got this time frame, we have to deliver this project. What you typically do is try and develop 100% of it but what you end up doing is developing 100% of it at 80% quality, instead of developing 80% of it at 100% quality. So you have this thrashing period in the last months of the project where developers are working long hours and making mistakes, causing errors which cause more problems, and so it goes on.*

A further prominent *interaction* identified in Table 3 that served to influence the enactment of the SDM was that as part of the interaction process between networks, organisational members use their professional knowledge to manipulate (tailor and transform) the SDM in order to complete the task at hand, devising different ways of enacting the SDM in the process [IN-TAILOR]. Many developers mentioned that they did not follow the method slavishly and that it was often circumvented because some required tasks are simply overkill. Similarly, depending on the size of the project, IT developers didn't want to be doing everything to the same level of detail all of the time. Time was the main reason for tailoring or circumventing the methodology, as a junior analyst described:

*If a small project only has a few parties involved and those few people already know each other and the task that we are taking is routine, then that doesn't require much documentation or formal sign off. In that sense taking time to do something that isn't really necessary is a waste of time.*

The above example provides evidence that developers do have active agency, that is, some ability to shape their working practice although as the excerpt illustrates, the constraints of their work environment means that developers are often limited in what they can do. The degree to which structure and agency are allowed depends on the context.

We conclude the analysis, by reporting that by taking an institutional perspective with a specific focus on structures at the individual, project, organisational and environment levels, the above examples provided a grounded description showing how the power relations structurally embedded within the SDM influenced enactment within *The Bank*. This institutional perspective, through the specific frame of one of the four dimensions, has not been applied to SDM enactment and hence provides a fresh perspective on contextual issues surrounding SDM enactment than reported on before. The findings show how systems developers' concerns and

everyday work is shaped by stabilised work practices and the unequal authority relations that exist between the business client and systems developers. Another key finding is support for the proposition that SDMs are more than just technical artefacts transmitting institution, but are institutions that exert their own type of agency, and that SDMs also interact with human agency in the systems development process.

## DISCUSSION AND CONCLUSION

This study was motivated by the need to better understand how systems developers' concerns and everyday work practices are shaped by institutional structures including the SDM. Framing our discussion using Lamb & Kling's (2003) *social actor model*, in addition to drawing upon wider contributions from the literature on new institutional theory (Scott 2001) and disciplinary agency (Chae & Poole 2005), this paper shows on how institutional structures (such as authority, norms, routine ways of doing things, and symbolic values) embedded within the methodology are active forces in the systems development process.

This study has reported on how new institutional theory provides a useful lens to analyse and conceptualise ICTs as institutions grounded in the social and contextual process where mandates, authority relations, industry standards etc, have all legitimised and made sense of their existence. The case study presents findings that SDMs significantly inform and shape the cognitions and actions of organisational members engaged in systems development. The case also found that institutional forces embedded within development methodologies are active forces in the systems development process. The transcripts indicate that the influence of methodologies occurs both through the material constraints and prescriptions of process mandated by the methodology, and through the experiences and learning from previous use of the methodology that shapes developers' approaches to using the SDM in their workplace. The case builds on the empirical findings of many studies of technology appropriation that how technology is appropriated is always problematic in light of pre-existing work practices, work culture, institutional forces and other socio-technical elements associated with the technology (*c.f.* Gosain, 2004). We conclude that SDMs as social institutions exert their own types of agency that interact with human agency in the systems development process, and that the enactment of an SDM is interplay between two types of agency: human agency and disciplinary agency.

Pickering's (1995) theory of practice of science (cited in Chae & Poole 2005) provide key insights for our discussion of agency in systems development. Pickering argues that agency refers to a thing or person that acts to produce a particular result. That is, agency at its base is the ability to do something or have effects. He distinguishes three different types of agency: the material agency of the natural world, which acts via natural laws; human agency, characterised by human intent, reflexive monitoring of action, and meaningful construction of the social world; and disciplinary agency, in which the agency of a discipline – such as systems development – leads people through a series of actions and also neutralises these actions for them.

Disciplinary agency is defined as the shaping and channelling of human action by conceptual and cultural systems. Disciplines are bodies of knowledge that preserve concepts, practices, and values that can be employed in action (Chae and Poole 2005:23). Systems developers therefore work within disciplines that provide scaffolding for their actions. Disciplines provide generalisable procedures applied in the production and reproduction of artefacts, and are largely based on social structures. As this case has demonstrated, the disciplinary elements used in systems development are rather fixed or predetermined by the institutionalised nature of the technical artefact – the SDM. For instance, the institutional structures of the SDM do not just impose constraints on development process; they are also enabling to the extent that they provide a repertoire of already existing institutional principles of work (e.g. conventions, practices, common understandings, power relationships) that human agents enrol in their activities. As Orlikowski and Robey (1991:159) put it 'systems developers draw on the values and conventions of their organisation, occupation, and training to build information systems.... They are informed by information systems development methodologies and knowledge about their organisation to build information systems.' In deciphering the role of agency in our case, we argue that the local methodology presents a unique combination of human and disciplinary agency.

In reference to the utility of the concept of the *user as social actor model*, we claim that through the interpretive translation of the model, the sixteen coded behaviours drew a multi-level focus on the way the SDM was enacted, that the case provides evidence for Lamb & Kling's (2003) central argument that the systems developer is best conceptualised as a social actor and not a technically focussed methodology user; and that there is an explicit link between individual actions and a larger social context. This claim, of providing further evidence is important in the social sciences. For instance, research such as this where the model is extrapolated outside its original domain demonstrates the model's explanatory power by transcending the unit of analysis to include the individual, workplace, and industry level.

### Limitations & Recommendations for Future Research

All research designs have limitations. While this research did not set out to test the user as social actor model, future research may develop propositions for testing using a more positivistic research design (Greenaway & Chan 2005; Silva & Backhouse 2003). A natural area for future research is to study the other half of the business client-systems developer pair to explore impressions of the business client or how different stakeholders view their relationship with systems developers. Apart from Kirsch et al. (2002), there is a paucity of recent research about the management of ISD projects and the role of SDMs from the client's perspective. Second, as this paper predominantly provides insight into institutional factors affecting SDM enactment, there is a need for process research to complement existing research in the field (Currie 2004). What needs to be researched further is the interplay of institutional conditions and process by which systems developers come to be involved with SDMs in their day-to-day work practices. Apart from this paper, and that of Avgerou (2002), there has been little attention given to the intentions, actions, context or processes surrounding SDM institutionalisation that explain how these issues interact and how and why outcomes are associated. Process research and methods that track activities over time are needed to fill this gap.

In conclusion then, rather than using the case as a 'test' of the model, the case succeeds in establishing the plausibility of the social actor model by providing evidence of its capacity through concept instantiation to provide meaningful analytical codes; and as argued provides a fresh perspective on contextual issues surrounding SDM enactment than reported on before. Further research employing the sixteen characteristics and behaviours of the user as social actor model in other cases or a similar organisational field are required. Lastly, we concur with Lamb and Kling (2003) that their contextual model offers relevance in helping IS researchers to better understand ICT related phenomena.

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