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STRUCTURATION THEORY AND INFORMATION SYSTEM DEVELOPMENT - FRAMEWORKS FOR PRACTICE

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ABSTRACT

Giddens' structuration theory (ST) offers an account of social life in terms of social practices developing and changing over time and space, which makes no attempt to directly theorize the Information Systems (IS) domain. IS researchers have long been interested in it as a way of deepening understanding; a common application is the analysis of empirical situations using Giddens' 'dimensions of the duality of structure' model. Other writers, most notably Orlikowski, have used it help theorize the field. Often the mode of research employed has been the interpretative case study. However, direct attempts to influence practice (an important component of working in an applied field), perhaps through the vehicle of action research, have yet to be undertaken. There are at least three serious problems with attempting this. The first is the inaccessibility of the theory to IS researchers and practitioners. The second is the absence of specific theories of technology. The third is Giddens' own disinterest in practical uses of his work – which leaves no obvious path to follow. This paper explores that path, in the context of information system development (ISD). Some frameworks for practice are suggested which are translated into forms of discourse that are more accessible to the IS community. In particular, we include an empirical illustration to demonstrate the potential of ISD tools based on structuration theory.

1. INTRODUCTION

Social theory has a substantial part to play in the development of the discipline of IS, in helping to understand and interact with the societal, organizational and personal contexts without which the technology is meaningless. Anthony Giddens has made a substantial contribution to that theory, and his mature formulation of structuration theory (expressed in 'The Constitution of Society' 1984) has been used in the study of IS for some time. Giddens' main claim for his theory is that it draws together the two principal

strands of social thinking. In the structuralist tradition the emphasis is on structure (as constraint), whereas in the phenomenological and hermeneutic traditions the human agent is the primary focus. Structuration theory attempts to recast structure and agency as a mutually dependent duality. Much of previous thinking about IS in structurational terms has revolved around Giddens' 'dimensions of the duality of structure' model (Rose 1998), which fleshes out the concepts of structure and interaction (agency). IS researchers have generated a significant body of work, and there are already three published reviews of this literature. In the most recent of these, Rose (1998) points out that ST has been used to theorize the field of IS and to analyse empirical situations involving IS, but little attempt has been made to 'operationalise' the theory – that is, to use it in an attempt to directly influence IS practice. In an applied field, it should be taken as axiomatic that useful theory should lead to improvements in the capacity for effective action. In the context of IS development this is clearly practicable.

ISD is often conceptualised as two mutually dependent processes: analysing an organizational (social) situation, and designing and implementing computerized information support for it. Structuration theory has already shown itself to be a potent vehicle for the first of these activities. This paper sets out the path for operationalising ST in the context of IS development. As depicted in Figure 1, part of this path involves translating the research style of the social theorist, concerned with pure theory and presented the elaborate prose which is rich in associations for other social theorists, into discourse styles more familiar to IS researchers and practitioners.

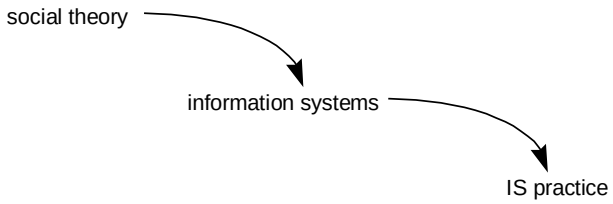

Figure 1: *Translation between discourse styles*

The second part of bringing ST closer to practice involves designing suitable research activities. Whilst the translation activities specified above show what must be done in the theoretical realm, one appropriate style for researching practical help for ISD is action research. Checkland (1990) sets out the action research cycle of theory and practice (Figure 2).

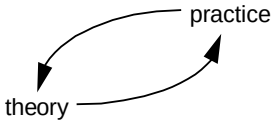

Figure 2: *Checkland's action research cycle*

In the present case, where the research starts with a known body of theory, and the application area is also known, the research activities can be mapped out in more detail (Figure 3).

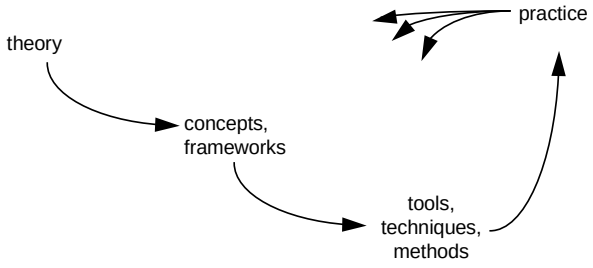

Figure 3: *From structuration theory to ISD practice*

Structuration theory is too complex, diverse and alien to be adapted wholesale. Relevant concepts must be selected and adapted into theoretical frameworks which have value for the IS community. Since the mode of practice of ISD is known to be at least partly based on tools, techniques and methods, a sensible course of action is to develop and refine ST based tools in the action research cycle. Practitioners using such tools may be entirely unaware of the theory base behind their actions.

This paper illustrates how the basic concepts of ST may be adapted to the discourse style of the IS discipline, by adopting a more familiar mode of practice (models, frameworks, vocabulary, tools) and weaving in IS concepts. An empirical illustration of a simple prioritisation tool is provided to demonstrate the capacity of Structuration Theory for informing effective action in ISD. The paper also provides coherent frameworks which will provide the foundation for the development of practical help for the developer in future research.

2. STRUCTURATION THEORY – BASIC TENETS

2.1. Agency

Human agency, in Giddens' formulation, is the 'capacity to make a difference' (also known as 'transformative capacity') (Giddens 1984 pp 14). Agency is intimately connected with power - in fact this is one of its defining characteristics, since the loss of the capacity to make a difference is also powerlessness. In practice, human agents almost always retain some transformational capacity - though it be small. Power involves the exploitation of resources. 'Resources (focused by signification and legitimation) are structured properties of social systems, drawn on and reproduced by knowledgeable agents in the course of interaction' (Giddens 1984 pp 15). Resources are 'of two kinds: authoritative resources, which derive from the co-ordination of the activity of human agents, and allocative resources, which stem from control of material products or aspects of the natural world' (Giddens 1984). Power is not itself a resource. Actions have intended and unintended consequences.

2.2. Structure

Giddens defines structure as 'rules and resources recursively implicated in social reproduction; institutionalised features of social systems have structural properties in the sense that relationships are stabilized across time and space'. Structure can be 'conceptualised abstractly as two aspects of rules - normative elements and codes of signification. (Giddens 1984 pp xxx1) Structure 'exist only as memory traces, the organic basis of human knowledgeability, and is instanciated in action' (Giddens 1984 pp 377). Structure refers, in social analysis to 'the structuring properties allowing the 'binding' of time space in social systems, the properties which make it possible for discernibly similar social practices to exist across varying spans of time and space and which lend them a 'systemic' form. To say that structure is a 'virtual order' of transformative relations means that social systems as reproduced social practices, do not have 'structures' but rather exhibit 'structural properties' and that structure exists, as time-space presence, only in its instanciations in such practices and as memory traces orienting the conduct of knowledgeable human agents' (Giddens 1984 pp 17). Giddens regards structure not merely as constraining, but also as enabling - an important distinction from the use of the concept by most writers.

2.3. The Duality of Structure

Giddens recasts the two independent sets of phenomena (dualism) of structure and agency as a 'duality' - two concepts which are dependent upon each other and recursively related. 'The structural properties of social systems are both medium and outcome of the practices they recursively organize' (Giddens 1984 pp 25). The 'dimensions' of the duality of structure are given in the following well-known diagram (Figure 4):

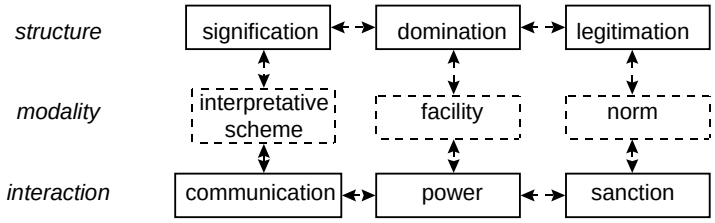

Figure 4: *Dimensions of the duality of structure, Giddens (1984)*

Social structure and human interaction are broken down into three dimensions (solely for the purpose of analysis) and the recursive character of these dimensions is illustrated by the linking modalities. Thus, as human actors communicate, they draw on interpretative schemes to help make sense of interactions; at the same time those interactions reproduce and modify those interpretative schemes which are embedded in social structure as meaning or signification. Similarly the facility to allocate resources is enacted in the wielding of power, and produces and reproduces social structures of domination, and moral codes (norms) help determine what can be sanctioned in human interaction, which iteratively produce structures of legitimation.

2.4. Structuration

Structuration is therefore the process whereby the duality of structure evolves and is reproduced over time space. Agents in their actions constantly produce and reproduce and develop the social structures which both constrain and enable them. 'All structural properties of social systems…are the medium and outcome of the contingently accomplished activities of situated actors. The reflexive monitoring of action in situations of co-presence is the main anchoring feature of social integration' (Giddens 1984 pp 191). Thus a conference delegate giving a paper takes part in a social interaction in which ideas are communicated between speaker and audience. However, the participants bring with them the history of other presentations at conferences, codes of behaviour, belief and value systems, dress codes, ways of organizing and proceeding and of interpreting the ideas. These constitute structure for the interaction. As the presentation proceeds it re-enacts the structure, thus replicating it and helping it to form part of a practice which will help determine how future presentations will be conducted.

2.5. Social Integration and System Integration, Time Space Distanciation, Routinisation

Giddens distinguishes between the cohesive effects of social interactions which take place when actors are physically present, and wider systemic effects of interactions across distance. 'The reflexive monitoring of action in situations of co-presence is the main anchoring feature of social integration' (Giddens 1984 pp 191). 'Whereas social integration refers to face-to-face reciprocities between agents who meet in circumstances of co-presence, and therefore preserves a concern for *praxis in situ*, [social] system integration refers to reciprocities between absent agents, i.e. agents who are physically and/or temporally situated in different settings, which admits the possibility of intersituational articulations of systemic patterns' (Cohen 1990). Our conference delegate may receive advice from a colleague in the next office on the form of a scientific paper, thus helping determine social practice. However, they may equally well pick up formatting instructions from the conference web site, written some weeks earlier by a colleague in another country. This helps replicate social practice on a wider scale than the face-to-face interactions permit.

Time space distanciation involves the 'stretching of social systems across time-space, on the basis of mechanisms of social and system integration' (Giddens 1984 pp 377). As the recursive and reflexive structuration of social interaction extends between people over geographical distance and over time, so the embeddedness or 'bite' of those practices increases. 'The structural properties of social systems exist only in so far as forms of social conduct are reproduced chronically across time and space' (Giddens 1984 pp

xxi). The delegate, equipped with conventionally written scientific paper and overhead projector slides, may expect to deliver his presentation successfully in most parts of the developed world - these practices have been widely accepted for some time. However, should (s)he wish to submit by email and employ a laptop computer for the presentation, then some inquiries are in order, these practices are less widely observed, but may, in the future become standard.

If social practice becomes reasonably stable over time and space, then routines - practices in which actors habitually engage - develop. Routines constitute 'the habitual, taken-for-granted character of the vast bulk of the activities of day-to-day social life.' (Giddens 1984 pp 376). The writing of a scientific paper and its conference delivery, once a social practice to be painfully acquired, may, with the years, become commonplace, a routine part of an academic's life. 'All social interaction is situated interaction - situated in time and space. It can be understood as the fitful yet routinised occurrence of encounters, fading away in time and space, yet constantly reconstituted within different areas of time-space. The regular or routine features of encounters, in time as well as space, represent institutionalised features of social systems' (Giddens 1984 pp 86).

2.6. Critique

A central reservation about structuration theory in the critique of other social theorists has centered around the 'conflation' of structure and agency. Conflation 'concerns the problem of reducing structure to action (or vice versa) and the [consequent] difficulty of documenting an institution *apart* from action' (Barley and Tolbert 1997). Archer (1996) argues that conflating structure and agency weakens their analytical power and elides the distinction between Lockwood's original conception of 'social' and 'system' integration. She maintains that, in order to account for why things are 'so and not otherwise,' it is necessary to maintain the analytical distinction between the 'parts' of society and its 'people,' and supplies an ontological grounding for the distinction in Realism. Structure and agency, in her view, are 'phased over different tracts of time' (human actions over the short term, structures enduring) which allows their analytical separation.

Giddens conceptualisation of structure ('rules and resources' existing only in memory traces and instanciated in action) is somewhat rarefied ('loose and abstract' according to Thompson 1989) in comparison to the structuralist tradition of social thought, where structure has a far more tangible function in constraining human action. This has lead to criticisms of subjectivism: - that Giddens does not so much resolve the dualism of action and structure, as offer victory to the knowledgeable human actor, in a particularly Western, modern and liberal tradition of thought (Clegg 1989). Thus Archer (1982) and Layder (1987) argue that Giddens undermines any sense of structures as pre-constituted and relatively autonomous, or determinant of action.

A more telling criticism for the IS discipline, which must be concerned with purposeful change, is obliquely referred to by Stinchcombe (1990) when he queries how the theoretical base explains historical change. The critique is developed further by Archer (1996). Giddens view of structuration offers a conceptual mechanism for explaining the reproduction of social structure; however, she asserts, this is not the crucial question which needs addressing. The question of substance is: 'why do some forms of social reproduction succeed and become institutionalised, and others do not?' Why, for instance, should the communist societal model in Eastern Europe give way to democratic capitalism? Why should one information system take its place successfully in organizational life, and another not? For this question the theory of structuration has no direct answers.

Most of this critique is at the ontological level of the internal logic of the theory of structuration. However Giddens' focus on the ontological content of social theory (Gregson 1989), and his lack of interest in wielding the 'methodological scalpel' (what Hekman (1990) describes as his 'failure to present a viable epistemology') leave the structurationist researcher with serious difficulties. The lack of concrete empirical example in his own work, together with its abstract conceptual focus similarly offers few clues as to how to proceed in the everyday world in the gathering of useful understanding, and its reflection back into the

world of practice. Moreover, Giddens does not provide any conceptual base for developing a 'critical' stance (in the sense used by Habermas) (Bernstein 1989); in other words for developing normative models of how things *should* be, as opposed to how they are. Without this the theory becomes a 'categorization system' (Turner 1990) for the purposes of analytical comparison with the world - the mode in which it has most frequently been used in IS research.

In summary, then, structuration theory is a powerful vehicle for sensitising understanding of the social. The root traditions of the IS discipline - management and computer science - have tended to lend it a technological focus and positivist research traditions. This paper takes the robust stance that any corrective to that tradition, offering a social focus and more interpretative methodology is welcome. Moreover Giddens' theory is manifestly well constructed and well respected, and an obvious contender for the task. However, problems remain to be solved - besides the more technical issues raised above, three stand out. Firstly, for IS work, the role of information systems in structuration must be understood. Secondly, the theory must be accessible to IS researchers and practitioners; that is couched in our mode of discourse, not that of social theorists. Thirdly, and possibly most difficult given the absence of models to follow, the gap between Giddens' rarefied theoretical world and doing practical things in the everyday world must be bridged.

3. STRUCTURATION THEORY IN IS RESEARCH

There have been a number of published reviews of the use of structuration theory in IS research. Walsham and Han (1991) analysed the literature under the headings of *operational studies*, its use as a *meta theory* and the use *of specific concepts* from the theory. Jones (1997) developed this account into four types of use of the theory: attempts to reconstruct the theory to accommodate technology, application of the theory as an analytical tool, use of the theory as meta-theory, and use of concepts from structuration theory to inform IS research. Rose (1998) pointed out that ST has been used to theorize the field of IS and to analyse empirical situations involving IS, but little attempt has been made to 'operationalise' the theory – that is, to use it in an attempt to directly influence IS practice. Rather than review the literature again, the following section highlights some of the major ST developments which contribute to the frameworks for practice.

3.1. Theorizing

There have been some sustained and well articulated attempts at theorizing aspects of the IS field using structuration theory. In Orlikowski and Robey (1991), the tenets of structuration theory are applied to help understand the relationship between IT and organizations. In their work, the 'duality' of technology is explored – IT is seen as the social product of subjective human action within specific structural and cultural contexts, and simultaneously an objective set of rules and resources involved in mediating human action, and thus hence contributing to the creation, recreation and transformation of those contexts. The concept of the duality of technology is explored further in Orlikowski (1992).

A second sustained attempt to theorize part of the IS field ('advanced' IT) is provided by Adaptive Structuration Theory (AST) (DeSanctis and Poole 1994; and Nagasandrum and Bostrom 1994 in an associated effort). Some ideas from structuration theory are developed in conjunction with the concepts of 'spirit' and 'appropriation.' In this way the authors claim to integrate Giddens with the decision making school of theoretical thinking to provide an analytical framework which provides insight, particularly into the group decision support systems (GDSS) which are the focus of their empirical work. Clearly the style of this theorizing is different from Orlikowski's. Finite lists of concepts are used to give structure for micro level analysis of actions and speech in the research situation, rather than the broad-brush approach of Orlikowski. However, the AST approach comes in for sustained attack from Jones (1997), who points out that Giddens' somewhat rarefied concept of structure is incompatible with the more traditional view adopted in AST, and that this view is then elaborated 'through underspecified concepts such as 'spirit' and

'appropriation' for which no substantive theoretical justification is offered, to produce a contingency type model of technology 'impacts' which Giddens has specifically criticized.

As 'meta-theory' from a social contructivist stable, structuration theory does not provide 'middle range theory about specific phenomena that can be explored or tested directly and empirically' (Olikowski and Robey 1991). Neither is it 'specific about the technology' (Monteiro and Hanseth 1996). Orlikowski's broad-brush approach to rethinking information technology is well in keeping with the tradition of Giddens' work. The work of Poole and DeSanctis represents an attempt to operationalise the theory as 'propositional' – containing specifics which can be tested in a positivistic tradition. Though, at first sight more useful to the practitioner, there are two dangers with this approach. Firstly, although fleshing out Giddens' work with concepts more relevant to IS appears a gain in accessibility; in fact this gain is swallowed up by arguments about the validity of the concepts. Secondly, the research style is largely incompatible with Giddens' own, which is bound to lead to tensions. The inherent weakness of some of this theorising is that it tends to reinforce the equation of technology with structure and structural constraint. In IS this tends to take the form: technology is built by human agency; thereafter it constrains what we do - characterized as the 'discontinuous separation of design and use' by Orlikowski (1992). This equation of technology with structural constraint is not consistent with structuration theory. However the deployment of further structuration theory concepts, such as time space distanciation, routinisation, and system integration helps to explain IS practice whilst avoiding this problem (Rose 1999).

3.2. Analysing

Analysing involves applying theory in order to gain insight into an empirical situation. In an early example, Barley (1986) described the introduction of computer tomography scanners into American hospitals, exploring how the actions of the stakeholders and the institutionalised traditions within the organization influenced each other as 'occasions for structuring.' By far the most common starting point is the 'dimensions of the duality of structure' model (Figure 4), using the Giddens' concepts as a checklist for guiding social analysis. A fairly straightforward use of these concepts occurs in Karsten (1995), where Lotus Notes implementations in three organizations are analysed. Brooks (1997) adds the Orlikowski and Robey (1991) structurational framework of systems development to the analytical armoury in reporting upon CAD systems. Jones and Nandhakumar (1993) go further in their analysis of the development of an Executive Information System by reflecting upon the theory - thus completing the circle.

Walsham (1993) provides sustained longitudinal case study analysis covering issues of IS strategy, development, implementation and evaluation in three contrasting organizations. Whilst the book is a model for this kind of research, (with an explicit theory base, well-developed case study analysis and well-justified conclusions), structuration theory is only one of a number of theoretical ideas employed. An eclectic mix of ideas from phenomenology, hermeneutics, Soft Systems Methodology, critical theory and postmodernism form the backdrop for a 'synthesized analytical framework' drawn from the work of Morgan (1986), Pettigrew (1985) and Giddens.

Walsham and Sahay (1996) use structuration theory with actor-network theory to investigate problems in developing Geographical Information Systems in an Indian government department. Though the focus is primarily analytical, they take care to specify the relationship between the two theoretical bases, with Giddens providing 'meta-theory' and actor-network theory providing 'a more detailed methodological and analytical device.'

In summary, the power of structuration theory concepts to analyse empirical situations has been thoroughly demonstrated (Barley (1986), Brooks (1997), DeSanctis and Poole (1994), Jones and Nandhakumar (1993), Karsten (1995), Walsham (1993), Yates and Orlikowski (1992)). Using the components of the 'dimensions of the duality of structure' model as a checklist helps sensitise the analyst to social elements of the situation that might otherwise be less apparent. Occasionally analysts forget that the components of the model have no meaning for Giddens except in the context of structuration – that is it is the developing relationship over

time between structure and interaction which is the focus of the theory – not the snapshot analysis of legitimation, signification and so on. The theory has been used with other theories, but this always brings with it some further difficulties in integrating the theories which are not always well-considered (Rose 1988). Analysis has almost exclusively been done in a retrospective analytical mode, reflecting on situations through the medium of the theory and presenting the accumulated understandings for the edification of other IS academics. Though Walsham (1995) accepts that the presence of the researcher may have an (unintended) bearing on the outcome, little work has been reported in the action research mode – where analysis is *intended* to influence the outcome.

FRAMEWORKS FOR PRACTICE

A structurational theory of IS, couched in an appropriate mode of discourse, might start with a simple model of social practice (Figure 5) as mutually dependent structure and social interaction.

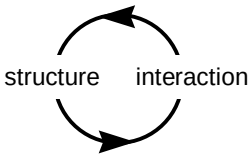

Figure 5: *Social practice*

The concepts from the 'dimensions of the duality of structure' model (perhaps translated into some more accessible form) can be added to this model as required. Structuration is dynamic; social practices evolve over time and space and must replicate even to stay the same (Figure 6). More commonly they evolve as they are reproduced.

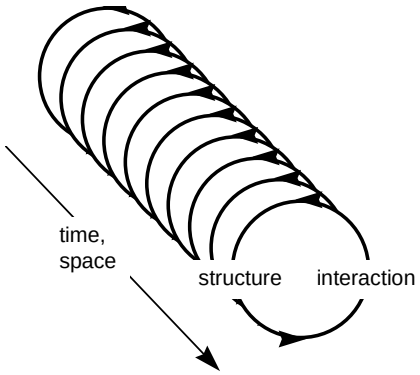

Figure 6: *Structuration over time and space*

The further social practices extend through space and time, the better established they are, and the more likely to be thought of as institutionalised features of social life. The degree of 'embeddedness' of social practice can be mapped on a simple, but powerful matrix (Figure 7).

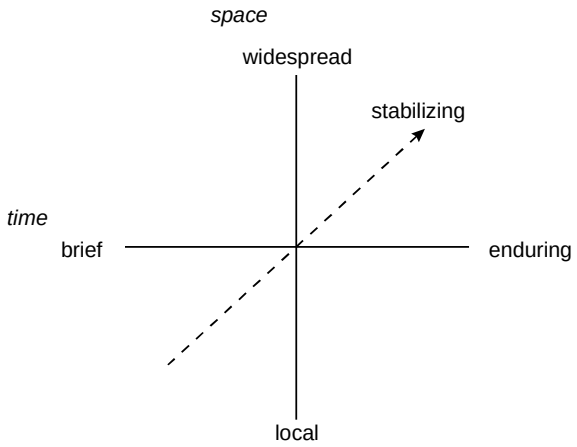

Figure 7: *Social practices stabilizing through time and space*

Social practice which endures over time is, effectively, routine - people repeating recognizably similar encounters. Social practice spreading over distance, involving both geographical space and larger numbers of people, incorporates Giddens concept of system integration. Social practice which spreads through time and space (democracy, market capitalism, watching television) becomes stable, institutionalised. Technology, information systems, may become part of that practice.

Social practices represent the fabric of our daily life on a spectrum from the societal, through the various forms of social collectives that we associate with (in IS, 'organization' is normally taken to be the unit of analysis), to the personal, in our family relationships. They are not really separable - in other words the set of rules and capabilities which enable and constrain a social interaction at work cannot really be distinguished from how we treat our family members, how we vote, or our sexual behaviour; all experiences can be assimilated and may affect all other interactions. Discourse is the medium of structuration; all the concepts with which Giddens represents structure and interaction (signification, domination, legitimation, communication, power, sanction) are mediated by it. Social practice, then, is mediated by discourse. In IS work, subsets of social practice (often characterized as business systems within organizations) become the focus of attention. These are somewhat arbitrarily determined, usually on the basis of their task orientation. Some of the more formal mediating roles of discourse (characterized as information) for business systems can be supported by computerized information systems. Typical roles performed by IS are information storage (mediation of interactions over time) communication (mediation of interactions over distance) and automation of interactions. Where information provision is organized it may be thought of as a social system in its own right - a system supporting or 'serving' (Checkland and Holwell, 1998) the business system. The business system is here conceptualised as a set of practices performing some purposeful task such as designing a new product, or processing orders. Organized information provision is the information systems domain, and it may be usefully thought of as having three interlocked components. The social system devoted to collecting, storing and disseminating relevant information may be characterized as information practice. This social system may be supported by computer and communications technologies (which are, of course, designed technological artifacts and cannot be described as social systems); in this case information practice may be heavily enmeshed with use of the technologies. A further relevant social system is that devoted to the development, maintenance and management of the technology - the agents of this system tend to be IS professionals. These systems are represented in **Figure 8**. Since social practices do not, in reality, occur in such a conveniently segmented fashion, it must be accepted that these distinctions are for analytical convenience only. However, each system can, in principal, be analysed as a set of routinised social practices with the set of concepts that Giddens provides. This is likely to provide a sharp set of social insights which may complement other perspectives.

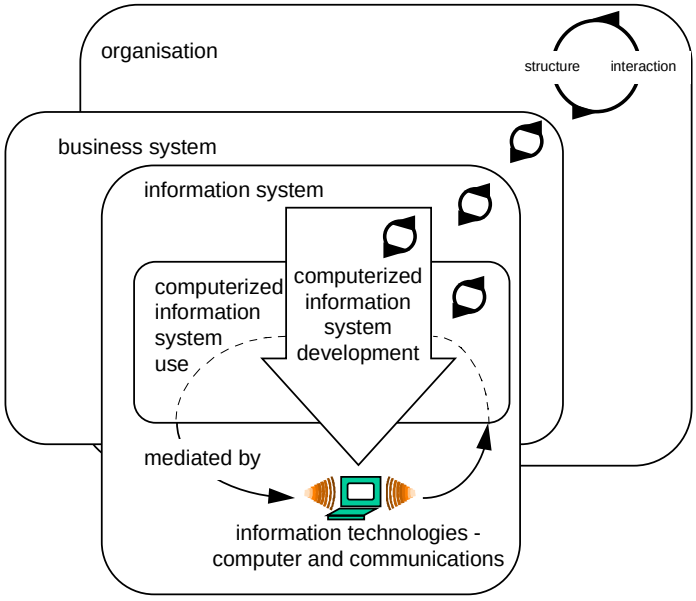

Figure 8: *Relevant sets of social practice, represented as social systems*

Information technologies may be understood as a material resource that supports information practice which in turn supports a wider set of social practices. It does not embody structure. However, as a designed and managed artifact it is constituted, (Orlikowski 1991) by human agents through a set of social practices involving IS professionals and others. A significant part of those practices involve studying parts of other social systems, here characterized as computerized information system use, business system, and organisation. As a product of human agency, IT will inevitably reflect the structures of the social system that designs and manages it, and their interpretations of the social system that it is intended to serve. Those interpretations, once embedded in silicon and software, may become relatively inflexible, compared to the development of social practice, and it is this inflexibility which is the source of the influence of IT. Technologies enable interactions (as with the telephone), but they may also partly constrain them. All social interactions of a similar type which are computer mediated may be encouraged to take a standardized form. Therefore they tend to replicate and stabilize those interactions into routines. As well as replicating social practices over time they have the power to encourage the replication of social practices over distance, through their close involvement with communications technologies. Therefore they are a powerful influence promoting time space distanciation. Communications technologies also mediate interactions between actors who are not co-present, thus promoting system integration. Viewed in this way, it is not necessary to think of computerized information systems as embodying structural properties to account for their influence.

In summary: an information system may be theorized (in structurational terms) as a social system (information practice), supported by a material resources (information technologies), which are designed and managed by a further social system. IS, in turn, supports the interactions of a wider business system. Designed technological artifacts reflect the structure of the social system which designs, builds and manages it, and that social system's interpretations of the interactions of the information practice and business system that it serves. The technologies may tend to routinise social practice through the mechanisms of time space distanciation, and system integration. Since social practice has the capacity to develop more quickly than IT, dissonance and deviation may develop between the set of interactions that the technology was designed to mediate, and the current set of business practices.

ILLUSTRATION: PRIORITISING INTRANET DEVELOPMENT

To illustrate the capacity of structuration theory for effective action in ISD, we offer the following example to show these notions discussed above may be translated into a simple tool to prioritise IS development.

The background to the situation described here emanates from an empirical field study that we conducted in a manufacturing organisation in Denmark (Bansler et al 2000, Scheepers 1999). The organisation is large, established and its business system could be described as typically hierarchical in nature, characterised by deeply embedded social structures at unit level largely revolving around functional specialisation. At the time of our study, senior management tasked the corporate IT department to spearhead the introduction of a corporate intranet, with one of the goals to foster more inter-functional communication and cooperation (to "break down functional 'silos' "). The organisation had well-established practices of IT use, as well as an extensive computerised network infrastructure. E-mail was an established communication medium throughout the organisation. We interviewed (amongst other) the project leader responsible for implementing the corporate intranet. With fairly limited resources (a small development budget and team of four programmers), she had to prioritise the development of the corporate intranet and needs to decide which applications to develop first. She mentioned to us that she was looking for that initial intranet "killer application" that would trigger widespread intranet use in the organisation. Referring to **Figure 7**, this may be translated into a social use practice that would stabilize in both time (recurrent, regular use) and space (number of users).

For simplicity, let's assume our project leader has identified two promising alternative intranet applications that her team can implement. They can either start with an intranet-based telephone directory (to replace the current paper-based directory), or alternatively, start with an intranet-based discussion facility with various threaded discussion forums (to foster cross-functional debate in line with management's vision). Again for simplicity, let's assume each of these alternatives is comparable in terms of cost, development effort, and available development skills bases.

Examples of considerations (based on notions from Structuration Theory)	*Alternative 1: Intranet-based Telephone Directory*	*Alternative 2: Threaded Discussion Group Facility*
Analysis of social practice mediated by existing IT	No IT solution - current practice is to look up telephone numbers in paper directory.	Current business practices (e.g. mediated by established use of e-mail) more intra-functional rather than cross-functional.
Dissonance and deviation between current IT mediated interaction and current set of business practices	No current IT solution - "Green fields" scenario for new intranet alternative	Management perceives need to break down functional silos. Current E-mail can support this drive, but in fact may "compete" with new intranet-based alternative.
Influence of other sets of social practice	Established paper-based practice may be so deeply embedded as to "compete" with intranet alternative.	Lack of existing established cross-functional social practices may impede success of discussion groups.
Potential trajectory of social practice to stabilize through time and space (mediated by new IT)	Potentially promising, depending on staff's acceptance of intranet-based solution. Intranet-mediated practice may be "forced" (i.e. by halting the production of the paper-based directory).	Discussion groups with no user activity may actually replicate and stabilize pattern of lack of cross-functional coordination. Intranet-mediated practice cannot be "forced".

Table 1: *Considerations and assessment*

Drawing on the discussed Structuration Theory notions, a series of considerations could be developed, which the project leader could assess in her situation. We illustrate a few typical structurational considerations and an example assessment in Table 1. Naturally, these considerations should be extended to

adequately encapsulate the structuration processes at organisation (e.g. historic practices, the business system, information system, use and development practices). In this simple example, it would make sense to develop Alternative 1 first. Alternative 2 should be revisited, only once evolution of the broader set of business practices has taken place.

4. FUTURE DIRECTIONS

4.1. Lessons Learnt

The basic premise of this work is that social factors are of importance to ISD, and their consideration is under-represented in Information System development practice. Working with structuration theory is a powerful reminder that the outcome of systems development is a way of working (a social system) that incorporates a computer system, not the technological artifact in isolation. The developments outlined in this paper follow the Orlikowski model, not that of Poole and DeSanctis. Structuration theory provides a 'way of seeing' social practice (Olikowski and Robey, 1991); in other words a broad set of guidelines for analysis of social phenomena, not a detailed checklist of things to remember or propositions about causal relationships. We try to incorporate its central tenets without adding in other theories that already exist, or inventing new concepts to make it more specific to the empirical problem area. Both of these approaches clearly lead to theoretical problems, though they may, of course, bring practical benefits. Following Orlikowski, computer systems are viewed both as constituted by human agency and providing the setting for human interaction. Interactions are both enabled and constrained in different measures. Both these features can be used pragmatically to facilitate and control organizational practices. Giddens' adopts a social constructivist stance, but the theory offers neither normative models for practice, nor explicit models of change. This leaves the would-be systems developer with the ability to analyse social practice (but not to define it), but without a blueprint for what future practice should look like, or a route for getting there. These components of development must be supplied from elsewhere. All these considerations suggest that the theory is suitable for a general informing tools, rather than devices for manufacturing outcomes for design or programming. The Soft Systems Methodology of Checkland may be a better model for such tools than conventional structured methods.

4.2. Tools for System Development Based on Structuration Theory

Future research will concentrate on the implications of the structurational frameworks to inform IS development. Because of the nature of the theory basis, it is initially considered suitable for analysis aspects of system development work, since this role is already quite well developed in the literature. A structurational starting point for systems analysis might be the analysis of social interactions mediated by existing computer systems, rather than process, data, object, entity. Deviance between intended and actual interactions could be studied. Key aspects of all relevant social systems might be analysed, rather than a narrow concentration on a supposedly objectively observable business system. Linking this analysis into the basic vocabulary of systems design remains a problem, as it is with Soft Systems Methodology. The conceptual and linguistic basis of this kind of social constructivist work is rather at odds with the formalisms which are commonly used for computer system specifications. Clearly practitioners are not in a position to do complex theoretical analysis on a day-to-day basis, so the devices which encourage good observation of the social characteristics of information systems must be partly built into the tools they use. In other words, the tools may have theoretical foundations which encourage good practice (in this case social analysis) without the user of the tool really being aware of them. Ahistorical analysis, that is analysis with no longitudinal aspect is not encouraged by structuration theory. Some awareness of the evolution of social practice over time and space is necessary for analysis to be structurational. Analysis of the trajectory of social practice (stabilizing/destabilizing) may be developed. . Social practices which are well stabilized can be leveraged with IT. Decisions about other sets of social practices to be routinised in IS could be

encouraged. Tools for analysts may, in the first instance, map social practice as interactions between stakeholders in terms of actions and structure, noting the current mediating role of technology.

5. CONCLUSIONS

When practical applications are in mind, computer and communications technologies cannot usefully be studied in isolation from their social contexts. Organizational practice is only a particular variety of social practice, with its own structures and interactions. Since well-developed social theory is available, it makes sense to appropriate it to help in that study, in the manner of Orlikowski's structurational model of technology. The power of structuration theory to illuminate empirical situations in IS with hindsight has is well demonstrated. It makes sense to engage in efforts towards developing ST-based concepts to influence action. We have illustrated with an empirical account that this is indeed both feasible and a potentially fruitful endeavour.

However, moving towards using those concepts for making decisions about practice requires frameworks which inhabit the realm of discourse familiar to the IS community. This may be achieved by adopting a style of theory building (diagrams, explanations and terminology) which is familiar, and embodying the theory in IS tools. Further work is certainly necessary to move the theory into the domain of IS practice – both in its incorporation in analysis, but also in problem-solving tools. These ideas hold much promise for IS development strategies which better balance the technical and the social.

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