

Limitations of information systems theory and practice: a case for pluralism

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Abstract

This paper presents a case for pluralism and diversity in information systems practice, research, and theoretical development based on the diversity of contexts within which the pervasive and generic technologies of information handling are deployed. Attempts to 'tidy up' or axiomatize information systems as an academic field may limit rather than expand our ability to study information systems phenomena. Such attempts are premature at least, since we know far too little about how the world sees information systems and how it interacts with and assimilates our puny designed artefacts. Three problematic cases are outlined in this paper to substantiate this position, and it is argued that while refinement and depth are required and plenty of theory awaits us, it must be as part of an open, multi-themed and questioning process.

Keywords

Information systems, theory, research and practice, pluralism

1 INTRODUCTION

There is widespread concern that the field of information systems is thin on theory. This rather new discipline studies a great breadth of issues regarding the application of new information technologies in organisations and societies, and draws from many other established disciplines - such as software engineering, organisational theory, psychology and anthropology. Dealing with a technology which advances rapidly and affects all kinds of organisations, the discipline of information systems has developed a strong but narrow

normative and vocational character, and devotes relatively little effort to refinement of its conceptual aspects. The community of information systems researchers and practitioners does not even share a common definition of the term 'information system' and certainly does not have a widely influential theory of information appropriate for understanding information handling activities in human structures.

There have been various efforts to address the diversity and lack of rigor seen in the concepts that are applied in the various topics studied within the information systems discipline, in the research methods used, and in the methodical practice proposed. Several frameworks have been offered to delineate the borders and the character of information systems research (Mason and Mitroff, 1973; Ives *et al.*, 1980), some theories and frameworks adapted from other disciplines have been suggested as the conceptual foundations for the study of information systems (Stamper, 1973; Walsham, 1991, Orlikowski and Robey, 1991), conferences have been organised to debate the appropriateness of research method (Mumford *et al.*, 1985; Nissen *et al.*, 1992), and substantial resources have been mobilised to systematise methodical IS practice (Avison and Fitzgerald, 1989).

While such efforts have to some degree been influential in shaping the perceptions of information systems, related research, and practice, opinions about the evolution of this field of study are still divided. Some believe that what is needed is consolidation of diverse frameworks, concepts, methods, and approaches. This conference stems from such a conviction. Others, however, are sceptical of the feasibility, the necessity, and even the desirability of a rigorous discipline based on an axiomatic set of concepts (Keen, 1991; Banville and Landry, 1992; Achterberg *et al.*, 1991). Such authors suggest that diversity in conceptions, research approaches, and practice are not to be seen as a limitation but rather as an expression of the richness of the phenomena associated with the handling of information and the utilisation of powerful information technologies in what are essentially people-focused and social settings. Efforts to develop a rigorous 'science' entails at best the risk of creating an esoteric field 'talking mainly to itself about itself' (Keen, 1991) and failing to deliver insights or to contribute to the changes potentially available to organisations through the use of information technologies.

In this paper we argue for the latter position. First we trace the evolution of the field of information systems and discuss the biases and the limitations of current research and practice. We then give examples of situations where there is manifestly poor understanding of the modalities of information systems, their development and their impact and where inadequate knowledge makes us unable to guide effective utilisation of information technology and the consequent organisational change. We suggest that the cases we sketch are fundamentally problematic and unamenable to current theory, even in fragmentary forms. Rather they demand an acceptance of plurality of concepts, methods and practice. We propose that maturity in the field of information systems will be signified by coping with such complex phenomena of socio-organisational change related with people, information and technology, with all its richness and diversity, and without imposing over-simplifying or unidimensional abstractions. To that end, searching for or constructing one theory, and attaching supremacy to particular designed ways of thinking or acting over other means of human cognition or behaviour, are unlikely to be very useful. Our discipline needs to be able to accommodate different conceptions, either borrowed from other fields or emerging directly from the endeavours of the information systems research community, elaborating on

various perspectives, some technical and others social, and using different epistemological means.

Such a position does not make questions of quality in research and practice irrelevant; it does not imply an 'anything is acceptable' attitude. To the contrary, questions of quality are very prominent and relevant and must be addressed; but they are tested against effectiveness of the endeavours of the research community to propose convincing conceptual schemes for the understanding of information system related phenomena, and to influence information system related activities. They are not to be assured by evaluating our various works against some synthetic construct, however internally consistent it may be.

2 EVOLUTION OF THE FIELD OF INFORMATION SYSTEMS

Information systems may be a relatively new field of study, but it certainly has not emerged spontaneously or fully formed. Rather, in order to achieve a distinct identity as an academic field of study, it has struggled and still struggles, to distinguish itself from a number of other more or less established subjects that are studied and taught in the institutions of academia. It has equally had to develop alongside a set of rapidly developing information technology industries that now form a very significant part of the economies of developed countries.

First and foremost, and principally for historical reasons, the field of information systems has sought to develop an identity distinct from computer science and software engineering (Friedman and Cornford, 1989). This distinction can be simply (and perhaps contentiously) made by suggesting that, while computer science is about how computers work (as hardware and software), and software engineering is about building technical systems (ensembles of hardware and software) that meet given specifications, information systems is about understanding what is or might be done with these technical systems, and the effects that they have in the human/organisational/social world.

The relationship between the putative field of information systems and that of computer science has never been an easy one. The desire of computer scientists to establish their own scientific credentials has led that field to emphasise a search for theoretical and scientific principles and for the establishment of a mathematical basis for their subject. This has, in turn, led to a relative rejection within the computer science community of the study of mere 'applications' and the problems of their development in favour of the search for a deeper theoretical understanding of computation (King, 1994). For those who are interested in what information technology means in a wider setting - the organisation, the workplace, the home, or the national and global economy - such computer science has had little directly to offer. Those who wished to address these issues therefore had to look elsewhere.

The more recently established field of software engineering that has emerged out of the 'art' of computer programming does sit to some degree between the two concerns outlined above - the computer as science and the computer as application. The core of software engineering is the process of taking a specification and turning it into a software product. We must acknowledge the increased emphasis in the past decade that software engineering has given to such topics as managing the software development process within projects and as team activities, devising improved means of eliciting and expressing a specification and sharing it with those who sponsor development projects, as well as to incorporating an increasingly sophisticated conception of the human-computer interface into software

engineering practice. As software engineers develop and refine the focus of their concern to include these types of issue they have provided a strengthening input into what we describe in this paper as the broader field of information systems. Even so, while software engineering has certainly shifted its boundaries in the past decade, it still does not encompass the whole range of issues that need to be addressed when information systems are studied in the full richness of their operational setting.

The principal alternative starting point for the study of information systems has been within fields that concern themselves with the study of organisations (as opposed to the study of technology *per se*). Since organisations (businesses, government departments and public agencies) have been the primary context for the deployment of information technology - in other words where applications happen - their study has provided a substantial body of work upon which information systems researchers can draw and to which they can potentially contribute. This has led the field of information systems to develop a concern with issues of how organisations are structured and operate, and where and how new forms of information handling are conceived of, planned and implemented. Thus information systems has drawn heavily from the fields of management, organisational theory, sociology and social psychology. In some areas the relationship has been a two-way one, such that issues raised by the new means of information handling have influenced substantial areas within these other disciplines. For example, organisational theorists have had to reconsider how organisations are structured and operate in the light of the use of computers and communications technology - see for example Drucker (1988).

This point of departure for the field received a further impetus in the 1980s, when information technology and information systems rose to prominence within the general field of strategic management. Throughout the 1980s more and more businesses and public sector organisations were encouraged to view their main information handling activities as strategic systems, not just vital to their operations but an important determinant of their success. Concepts such as competitive advantage, efficiency and productivity, product portfolios, marketing, industry structure and value chains all had to be reworked and rethought in terms of the impact that information technology and information management might have (Porter and Millar, 1985; Scott Morton; 1991, Hammer and Champy, 1993). As a consequence, information systems became increasingly self-consciously managed in their own right and became the direct concern of more senior managers. In this sense, information systems became more and more strongly a discipline that addressed issues concerned with how information technology is thought about and used within business organisations. This being in some contrast to the earlier tradition in which information systems were addressed almost exclusively at a project and functional level, but seldom substantially in terms of organisational direction or strategy.

To be able to address such questions adequately the discipline has had to expand its boundaries beyond narrow issues of current or imminent technologies and their management and integration into organisations. Significant strands of research in the last decade have pursued a more general understanding of the environment within which information technologies are developed and deployed, both within the fabric of people's working lives, and in the organisations and social structures that they participate in. Among other issues, this has led to a concern with questions of the fundamental character of the thing we call *information* and how it is used, more particularly how it is used by people, singly and in groups (Stamper, 1985; Land, 1985). There has also developed a substantial body of interest

in the economic and social consequences of this technology, ranging from concerns with issues of gender, information technology in the developing world, the future of work, citizenship, education, surveillance and data protection, through to the changing spatial dimensions of a world wired for high bandwidth communications.

3 THE DUBIOUS NATURE OF INFORMATION SYSTEMS

As suggested above, work in information systems draws upon many areas of established knowledge; for example, psychology for understanding issues of human-computer interaction, economics in determining the business value of a company's investments in information systems (Parker, Benson and Trainor, 1988) or geography in exploring the effect of new telecommunications on patterns of urban growth (Castells, 1989). Thus, one may very easily identify information systems as a multidisciplinary or hybrid field of study.

In this spirit King (1994) reviews the information systems 'field' from his perspective as the editor of *Information Systems Research*. He nonetheless uses quote marks around the word field to indicate its still dubious nature. King speaks of information systems as, 'an intellectual convocation that arose from the confluence of interests among individuals from many fields who continue to pledge allegiance to those fields through useful ties of various kinds.' He then goes on to argue for the vital importance of the reference disciplines that contribute to this convocation, both as a means to provide sound intellectual basis for work (intellectual capital), and in order to provide guidance and orientation when information systems researchers enter new and unexplored territory. King makes another relevant comment alluding to the transient nature of the field. He contends that what unites the information systems community is a shared interest in the phenomenal and radical improvement seen in information technology, which leads to revolutionary change with revolutionary consequences. He notes, however, that revolutions are episodes in history which come to an end. A discipline built in a revolutionary epoch may have little validity once the exceptional becomes absorbed into the everyday. This should perhaps not be seen as an argument against the existence of a field of information systems, but rather as a caveat to those who believe that they are attending at the founding of a major new discipline of the social sciences.

It is however the conviction of many that information systems is more than a convenient meeting point for a variety of fields or disciplines that have an *ad hoc* or ephemeral relevance in understanding what information technology means in any particular given context. Rather, they would claim, the distinct notion of an information system can provide the basis for an explicit and coherent body of scholarship based on its own theoretical principles and with a contribution to make to practice which is independent of any contributing fields of study. In the language of systems thinking, there is an emergent property here (Checkland, 1981), and the whole is greater than the sum of its parts. Swanson and Ramiller (1994) express this in the following terms. '... we are ourselves optimistic that the common bonds of interest in information technology among researchers will prove as durable and lasting as information technology itself appears to be Once attracted to the IS academic village, many scholars will continue to choose to reside there, and will carry on the building of a heterogeneous, and yet congenial, community.' Still, several aspects of information systems research and

practice suggest its rather dubious nature. In this section we discuss what we consider to be significant biases and limitations.

Predominant concern with large business organisations

A significant element of the identity of the field of information systems comes from the influence exerted by the concerns of the largest consumers of information technology, business organisations. Indeed, in the United States, *management information systems*, MIS, is still used as the basic description for most introductory information systems teaching, and the origins of MIS are clearly to be found in the needs and aspirations of business. To this day, in the United States, most information systems research and teaching takes place within business schools and largely follows their vocational and business driven agenda and assumes a rationality of competitiveness. As a consequence it tends to ignore the significance of cultural factors, or rather assumes a particular culture, that of the large corporation of the 'West'. The main driving aspiration is then success in a market environment and as a consequence relatively little research has been undertaken in the government sector and in non-market driven cultures.

There is an influential socio-technical perspective in information systems; it is often proposed that 'information systems are social systems'. This phrase can be traced back at least as far as a paper by Land and Hirschheim (1983) in which they wrote, 'an information system is a social system that uses information technology'. A well argued recent statement of the socio-technical perspective is contained in Davis *et al.* (1992) in which an information systems failure is explored using an hermeneutic approach and on the basis of exploring technical characteristics *and* social and organisational features. In the words of Orlikowski and Robey (1991), there is concern, at the very least, to treat technology as an important *social* object, perhaps with fixed material features, but certainly with indeterminate social implications. The use of such technology is then seen as an occasion for change and as a provocation to existing structures. Out of this perspective there has developed an interest in the ways in which information systems can emancipate or empower the individual or the group (Zuboff, 1988). This may be seen as making people more productive (effective) by supporting their inherent abilities as information handlers (flexibility, intelligence, decision making) at the same time as serving their needs as human beings (autonomy, control, security, society). Nonetheless, this is still for the most part subsumed into a broader context of the business culture.

Drive of technology

In some contrast to the MIS perspective, Europe, during the late 1970s and 1980s, took a more technological point of departure in information systems research, with issues of both theory and practice more likely to be addressed from within computer science departments. This theme has been reinforced through the 1980s by various national and European Community initiatives to promote information technology research on the basis of a 'technology push' model of economic development. Thus the European Community's Esprit programmes, and the British Government's Alvey programme both emphasised technology development and software engineering, while playing down work based on softer or more organisational focused analyses. This emphasis on systems development has led in turn to a deep interest in Europe in information systems development methodologies both aside from and encompassing software process models (Olle *et al.*, 1988). Within this national

characteristics and concerns have been able to express themselves; for example, distinct Scandinavian, British, French and German schools are discernible.

The consequent concern with systems development methodology found in Europe through the 1980s has allowed the exploration of a number of areas that challenge or contrast with the business and management focus of MIS. Thus, European researchers have explored such areas as participative approaches to systems design, infological and datalogical perspectives, soft systems methods, problem structuring and project management perspectives. (Land and Hirschheim, 1983; Lundenberg *et al*, 1981; Checkland, 1981; Checkland and Scholes, 1990; Berkeley *et al*, 1990)

A current example of the continuing technical driving force is the interest within the information systems development community in object-oriented analysis (Coad and Yourdon, 1990). This interest is quite explicitly based on developments in object-oriented programming, with object-oriented design coming in the middle (Booch, 1991). The principal force that initiates and drives development in these directions is still a technical one - in essence a particular style of programming and software construction. The assumption is made that because object orientation is seen to be a 'good thing' in terms of qualities of the technology, then, by extension, an analogous analysis process needs to be created. This is not to argue that it is necessarily wrong to pursue such avenues; perhaps issues of technology should drive analysis methods. Perhaps indeed our technology is so weak and fragile that it *demand*s an analysis process tailored to the image of the technology. But if this is so, then it is an expression of a very particular view of the balance of technological to other forces within the discipline.

Uncomfortable link between the engineering and social science perspectives

While we have suggested above that the field of information systems is linked to work within the social sciences, and organisational theory in particular, the strength of these links is in truth very variable. Many times these links are limited to a cursory recognition of the organisational context within which information technology is deployed, and the most potent driving forces within the field of information systems are still, for the most part, derived out of a technical and engineering perspective. This is very easy to see, not least in the names and concepts used within the field; for example, information engineering, office automation, business process re-engineering or the ubiquitous use of the word system to describe concrete phenomena. The use of the term engineering is today found both in the context of development methodologies (information engineering) as well as that of organisational design (business process re-engineering). While both these subjects are in the mainstream of information systems, they both give rise to some qualms. Can information or businesses be engineered?

In a narrow sense they can. Information structures (databases, formal procedures and message flows) can be designed, and these designs can be based on theoretical principles and be tested and validated appropriately. Indeed, the theoretical principles that underlie relational databases and data modelling represent perhaps one of the few readily applicable theories of a semi-scientific character that the discipline of information systems can build on from the computer science discipline.

In the case of re-engineering the business the claims for a discipline of design are more problematic (Hammer and Champney, 1993; Jones, 1994). To some cynics it remains consultancy hype, or the rebranding of old ideas, or a euphemism for drastic reorganisation in

the face of economic imperatives. Even so, the ideas that underlie business process re-engineering are fairly distinct even if they are not as new as its proponents claim. The notion of going back to a reconsideration of the fundamentals of what a business does (its processes), in particular from the perspective of customers and the delivery of valued service, has been a part of the rhetoric of computing for decades - see for example Matteis's account of re-engineering the back office at Citibank (1979).

Normative character

There is an emphasis within information systems on the pursuit of explicit instructions as to *how* to do things, for example in systems development methodologies and strategy formulation, with far less emphasis placed on the subtle questions of *why*. This has given the information systems discipline a strong normative flavour, and promoted the development of myriad methodologies, frameworks, checklists and (at times simple minded) formulae for success.

Even the socio-technical approaches discussed above are for the most part normative, concerned with establishing a standard, and are in this way prescriptive. The aim in most cases is to propose a method or to give advice that can be used in such a manner as to result in 'better' systems in use. More significantly, we must recognise that such approaches are underpinned by a particular set of values held by their proponents. These values then dictate what will be recognised as a 'better' system - be it in terms of job satisfaction, social cohesion, feelings of security or self worth, or the rights of workers to involvement in development of the work processes they are a part of. From here it is also understood (but usually less well specified) that being 'better' in these terms will lead to other organisationally desired benefits. For example, a contented and fulfilled workforce will provide enhanced levels of service to customers, which will translate into improved profitability.

Unresolved methodological questions

Finally we note the unresolved methodological debate in information systems. Research in the field faces severe limitations of methodological legitimacy. Despite repeated calls for methodological pluralism (Mumford *et al.*, 1985; Nissen *et al.*, 1991; Galliers, 1992) the positivist research paradigm continues to be the most established and respected. This restricts journal publications to a form that emphasises the provision of statistical empirical evidence validating hypotheses on trends, practices or opinions. One curious consequence is that the most influential publications which provide new ideas and become the source of hypotheses for further research either follow no method (for example Hammer's article on Business Process Re-engineering in Harvard Business Review (1990)) or are drawn from other fields (for example structuration theory).

Efforts to improve the legitimacy of alternative methods have had little effect, partly because of the conservative nature of the institutions involved and the vested interests of the members of these institutions (e.g. journal's editorial boards, the American university systems judgement of academic quality) and partly because there has been relatively little effort to develop alternative methods appropriate for information systems.

The limitations of perspective outlined above are the real character of information systems as it is practised and studied in today's world. To deny these aspects is not going to help in developing the field, nor is any attempt to 'tidy up' this situation likely to deliver

any substantial result. Furthermore, the practical relevance and effectiveness of information systems knowledge as it stands today is too narrow to even begin to address real problems when we move away from the 'ideal' context. Below three examples drawn from our own research are given to illustrate this thesis.

4 PROBLEMATIC SITUATIONS AND THE USE OF THEORY

The Greek Public Sector

The first example is from a public sector organisation in Greece devoted to providing social security benefits. From the 1980s this organization has struggled to develop new generations of computer-based information systems, an endeavour that has been associated with more general efforts to 'modernise' the organisation, to improve accountability, and to work out effective operations and management structures. However, successive projects have failed even to be implemented, let alone to result in desirable modernisation effects. When the most recent development effort reached the pilot implementation stage, the system delivered was very different from what was initially specified, and its use was easily assimilated by the existing dysfunctional operations rather than contributing to their elimination. Systems initially designed for distributed data processing were eventually implemented as centralised systems reinforcing the status quo. Current information systems theory and statements of good-practice were shown as little help to guide a successful course of actions in this case. Efforts to transfer know-how for strategy formulation, for systems development or for information systems management were ineffective, and ended up producing a caricature of the intended practices and structures.

The difficulties faced in this case may be related to the nature of public administration in Greece, and the rationality and the culture that prevail in Greek public sector organisations. Indeed, there are studies of the Greek public administration sector which reveal the existence of a rationality that is inimical to modernisation efforts (Tsoukalas, 1989). But current information systems theory assumes a capacity for planning and organising which are the very characteristics which are missing here and, although these qualities may be seen as desirable by many, they are stoutly resisted through various structural and behavioural obstacles.

The success of computerisation in a case such as this must be related to Greece's efforts for the reform of public administration. In isolation, information systems may be seen as an enabler of such organisational change, but real change requires understanding of the context and the dynamics of any desired the transformation. To the extent that the efforts for the reform of the administration have been misconceived or ineffective, information systems theory has failed, and any future development efforts which follow the shallow rhetoric of information driven change are highly likely to fail too.

Alternatively, modernisation efforts may bring better results in terms of improvements of services and organisational performance by deviating from what is now understood as good (theory based) practice. It may be more effective not to attempt to 'align IS strategy to business strategy' or to 'design' improved information handling, nor to define clear objectives, or to organise systems development projects as substantial technological interventions. Instead, local offices might be encouraged to purchase or build their own information systems resources. It is unlikely that such an approach will serve objectives of

accountability or 'modernisation' in the sense of eliminating inefficiencies that result from the turbulent history of public administration of Greece, but it might encourage or even empower employees to do a better job.

Information technology and SMEs

The second example of inadequate information systems theory is the case of IT diffusion in small, entrepreneurial enterprises. Such organisations comprise a substantial percentage of the economy of most countries, and equally in most countries they constitute the most substantial provider of employment. IT in its most recent highly flexible form of microcomputers, packaged software and telecommunications is very accessible by these organisations, opening opportunities not only for efficiency improvements, but also for linking into networks of suppliers, customers, and service providers, and therefore gaining access to wider markets. Indeed, economic theory attaches a prominent role to small and medium enterprises (SMEs) linked by means of telecommunications and information technology to form regional consortia (Piore and Sabel, 1984). It has been argued that the socio-economic structure of such networks of small business firms, flexible specialisation, is more effective within the current competitive environment than mass production in Fordist organisations. The validity of such a thesis may still have to be proved. However, few would argue against the significance of the small companies sector or their need to exploit the potential of IT. But little attention has been given to the requirements of such organisations in the information systems literature and next to no theory exists to support such efforts.

Rather the methods for information systems planning and development have been designed to meet the needs primarily of large, well established, and well managed organisations and research on the effectiveness of information systems planning and systems development methods has almost excluded SMEs. Even less attention has been given to SMEs in economic contexts which differ from those prevailing in the USA and north Europe.

Information systems theory tends to assume a rather well organised and effectively managed business environment embedded in the context of an advanced economy. For example, the information systems literature tends to assume that an organisation is capable of, and indeed practices, long term planning and suggests methods for relating projects for information systems development to business plans. Similarly, it is assumed that the management of an organisation hosting the development of a new information system is capable of following the methodical process of systems development. More importantly, it assumes that an organization is capable of absorbing and surviving the change implied in moving from the old situation to the new, and of discovering and taking the myriad actions needed to benefit from the implementation of a new system.

A State Corporation

The third example we give here is an oil corporation in Latin America. Until three years ago the company was owned and managed by the state as, in effect, a government department. The company's history has been closely related to the country's efforts for economic growth and independence and it fostered the development of a strong engineering culture together with a sense of mission to serve the good of the country. In order to develop the oil industry in the country, the company was restructured in the form of a corporation

consisting of four almost independent companies, and a great deal of effort was taken to introduce a market oriented management and culture. However, the new corporation was not privatised and remained under state control, even so there has been a huge reduction of personnel. American business consultants were also hired in an effort to introduce new ways of running the company and to help make it competitive.

The development of effective information systems was regarded of paramount importance for the transformation of a state company with a mission to provide employment and energy to the people of the country into a global company that could excel in a highly competitive industry. Indeed, a strategy for a portfolio of integrated applications was launched within the first few months after the company's reform. The plans looked convincing and met with little opposition. However, two years later there was a great deal of concern that there was no progress with the implementation of the strategy. Many managers doubted not only the feasibility but also the appropriateness of the proposed integrated systems that promised to establish new formal information channels, and to provide detailed data about all aspects of the company.

While all parties accepted that they had to address the international standards of their industry, to be as efficient as their competitors, to be able to offer high quality services and products, and to be able to market them effectively, they believed that their national environment, and their status as partly market led and partly government controlled, determined unique requirements for management and for information systems. Their engineering-biased organisational culture, the geographical distribution of their operations, and their links with suppliers and customers in their local market, could not be ignored when considering their information systems requirements and the route to be followed in meeting them.

Current information systems theory can hardly address the complexity of such a case. Information systems professionals have no means to take into account the cultural characteristics and the transient status of this company which combines national political and market imperatives with a strong and distinct organisational culture. While the development of effective information technology infrastructure and information resources is closely linked to the restructuring process of the company it is not in the end of the essence. This is a typical case in many developing countries which are making efforts to adjust their economies to a market regime. It is unrealistic to expect the establishment of a new functional structure and organisational culture as market driven business firms before they are able to develop the much needed computer based information systems. Yet, the parallel process of organisational change and information systems development is hardly understood.

5 DISCUSSION

The case described above are all problematical and each demands careful thought and judgement to bring information systems ideas to bear within a distinct and 'alien' (for IS) context. At the same time, for all these cases, an aware analyst can find valuable concepts and theoretical frameworks in the body of information systems knowledge. This can provide the missing links among the perspectives of economics, management, government, social development and software engineering, and provide the overview and coherence to questions

of IT related change. However, it is highly unlikely that the information systems discipline can fulfil such a role by means of a cohesive general theory or by proposing models and tools of universal validity. General theoretical conceptions, such as structuration theory or semiotics, may be useful as meta-languages, directing attention to aspects which matter, but it must be understood that, intellectually, they are at a distance from the problem situations researchers and practitioners attempt to understand and resolve. Their utility is in improving understanding, designing and framing problems, supporting discourse, and improving the judgement of both researchers and practitioners. But they should not be treated deterministically as scientific laws or as models for action.

Rather, the examples outlined above suggest that there is still a need to continue to address each case within its own circumstances, drawing, perhaps eclectically, from disciplines which have useful insights to offer, and responding to the requirements of diverse cultures and structures. As the diffusion of information technology coincides with - or more accurately enables - globalisation trends, any other approach entails the danger of imposing models of organisational and technological behaviour which convey one particular rationality over any other.

In this spirit Feldman and March (1981) express the overall mix of technology and social concerns within the field of information systems in terms of a description of the subject as being based on a dialectic between students of information behaviour on the one hand and information engineers on the other. Information engineers 'hope to design information systems with some clear elements of sensibility (sic) in them', while for students of behaviour the problem is to 'understand actual human encounters with information'. This notion of a dialectical process is essential in understanding the discipline of information systems as a field of research and as a target for theoretical consolidation. In this way we must set out to find contradictions and then use them as fruitful collisions of ideas from which a higher truth can be reached, even if that truth is transitory or context dependent. One general aim of research that should be made must then be to establish sufficiently rich and diverse views of actual experiences such that contradictions can be detected and explored.

Finally we would quote again from King (1994) who says when considering the field of information systems, 'We are present at an enormous natural experiment that will reveal to the observant fundamental knowledge about ourselves and the world. ... We can learn a great deal from such momentous phenomena if we pay attention and are not distracted from the phenomena by constant demands that we put our disciplinary house in order.'

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