1990

STRUCTURATION THEORY AND INFORMATION SYSTEMS RESEARCH

Geoff Walsham
Cambridge University

Chun-Kwong Han
Cambridge University

STRUCTURATION THEORY AND INFORMATION SYSTEMS RESEARCH

Geoff Walsham
Chun-Kwong Han
Management Studies Group
Department of Engineering
Cambridge University

ABSTRACT

Research on the social and organizational aspects of information systems often lacks an adequate theoretical and methodological basis. In this paper, we propose that structuration theory provides a broad conception of social action and human society which can be used as the basis for empirically-orientated theory and research. A critique is given of some published work, which makes use of the theory, on the introduction of new technology and group decision support systems. A categorization of the use of structuration theory in IS research is proposed and new application areas are identified and discussed, including design and development, strategy formation, user resistance to implementation, and the informating aspects of information systems.

1. INTRODUCTION

There has been an increasing recognition in recent years of the need for information systems research which addresses social and organizational issues as its main focus. A number of researchers have contributed to the development of new approaches; for example, some key authors are brought together in the collection of articles in Boland and Hirschheim (1987) and the paper by Lyytinen (1987) provides a valuable survey of some theoretical and methodological approaches. However, despite the growing literature in the area of socially-focussed IS research, there remains a shortage of well-grounded theory and methodology on how to address the social and organizational aspects and issues of relevance to information systems.

One approach to theory development is to draw on the existing literature in the various social sciences, such as sociology and organization theory, and apply this work to IS research. However, within the social sciences, there are many different schools of thought regarding the appropriate way to address social issues. One author who has attempted to survey these different traditions and to synthesize a more integrated approach is Anthony Giddens. The resulting theory of structuration (Giddens 1976, 1979, 1984) provides a high-level conceptual scheme to "order and inform processes of enquiry into social life"; it can be thought of, at one level, as a meta-theory within which other theories and methodologies can be contained. Structuration theory is a compelling and original attempt to move beyond the apparent opposition between perspectives which emphasize the conditioning effects of social structure and those which emphasize the importance of social action.

Structuration theory has provoked a vigorous and sustained debate within sociology and the social sciences (see, for example, Clark, Modgil and Modgil 1990; Cohen 1989; and Held and Thompson 1989). In addition, a small number of researchers working in the general fields of management and organizations have recognized the insight and broad applicability of structuration theory. It is beyond the scope of this paper to survey in detail the work outside the specific area of information systems but interesting examples of the use of the theory include Riley (1983) on organizational culture, Roberts and Scapens (1985) and Roberts (1990) in the area of accounting, and Willmott (1987) on the study of managerial work.

In this paper, we assess the value of structuration theory for information systems research. First, a concise description of some key elements of the theory is given. This is followed by a literature review and critique of some published information systems research which utilizes the theory and then, as the main thrust of the paper, we present a categorization of the use of structuration theory as a valuable theoretical model for research linked to specific IS topics and issues. Finally, we summarize our view on the high potential of the theory for future IS research.

2. KEY ELEMENTS OF STRUCTURATION THEORY

One of the principal aims of structuration theory is to resolve the debate between those social theories, such as interpretative sociologies, which place their emphasis at the level of human agents and human action and alternative theories, such as structuralism and functionalism, which emphasize the structure of social systems. This *agency/*

structure debate is resolved by Giddens into a *duality of structure* whereby agents and structures are not two independently given sets of phenomena but represent a duality whereby structure is drawn on in human interactions but, in so doing, social structures are produced and reproduced.

This fundamental concept of structuration theory can be further illuminated by a schematic chart of the analytical dimensions of the duality of structure as shown in Figure 1.
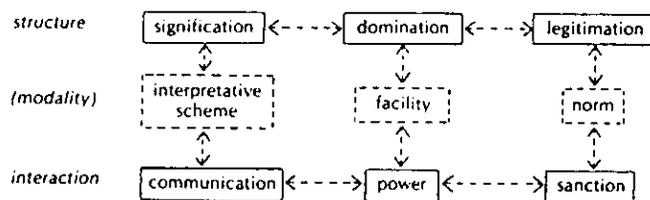

Figure 1. Analytical Dimensions of Duality of Structure

In this diagram, both *social structure* and *human interaction* are broken down into three dimensions and are then *interlinked by three modalities* as shown. First, human communication involves the use of interpretative schemes which are stocks of knowledge that human actors draw upon in order to make sense of their own and others' actions. They thereby produce and reproduce structures of meaning which are termed structures of signification. Second, human agents utilize power in interaction by drawing on facilities such as the ability to allocate material and human resources; in so doing, they produce and reproduce structures of domination. Finally, human agents sanction their actions by drawing on norms or standards of morality and thus produce and reproduce social structures of legitimation. It is important to note that the separation of structure and interaction into three dimensions is merely a helpful analytical device since the dimensions are inextricably interlinked; for example, although signification is structured through language, language use also expresses aspects of domination and has normative force.

The above description implies that social action can reproduce existing structure but also produce new structure. The model of human agency in the theory views human beings as *monitoring their conduct and its results in a reflexive way* which, together with an emphasis on the inevitability of *unintended consequences of intentional human conduct*, implies that all action carries within it the seeds of change; thus all action can both transform as well as reproduce existing structure. Structure is regarded as *rules and resources* which exist only as memory traces in human minds and are made manifest only in the instances when they are drawn on in action and interaction.

To complete this brief outline of structuration theory, it is worth mentioning two further aspects of Giddens' view of human agency. First, he distinguishes between *practical consciousness*, or the ability to act in a knowledgeable way, and *discursive consciousness*, which is concerned with

being able to explicitly describe actions and motivations. The view of human agency in structuration theory emphasizes the former since human beings are viewed as being more knowledgeable than "what they can say." A second and related idea is the concept of the *routinization* of most social activities which is of major significance in explaining the "fixity" of much social conduct and the corresponding stability of institutions.

3. LITERATURE REVIEW ON IS RESEARCH USING STRUCTURATION THEORY

3.1 Introduction of New Technology

Barley (1986) describes the introduction of computer tomography (CT) scanners into the radiology departments of two different community hospitals in Massachusetts. The technology provided an information system for the radiologists and technicians concerned with the scanning process. Structuration theory is used as a basis for the exploration of how the actions of the technicians and radiologists and the institutionalized traditions or forms within the organizations influenced each other over time or, in Barley's words, "how the institutional realm and the realm of action configure each other." The introduction of the identical technology resulted in very different organizational outcomes in the two hospitals, arising from the different social process or structuring which occurred in each case.

The paper traces the relationship between action and structure over time and how the new technology, when introduced, disturbed the processes of routinization at the level of action and thus led to changed structure. The three dimensions of the duality of structure can be discerned in the case studies where Barley describes aspects of communication/signification, power/domination and sanction/legitimation although he does not use these terms directly in the case descriptions. Explicit mention is made of the unanticipated consequences of intended action; for example, Barley describes how a group of radiologists withdrew from the CT scanning process during one period of time in order to discourage the dependence of the technicians, but the result was the reverse of that intended, with an increase in dependence.

The paper is a concrete application of structuration theory in the broad area of information systems, but two qualifications can be put forward. First, in terms of the conclusions of the paper, Barley describes his work as a form of "soft determinism" which is searching for regularity in the impacts which are likely to occur following the introduction of new technology. One can argue that the inherent variability in the action and conduct of human beings, in the history of organizations and in the influence of broader contexts may make it infeasible to find such regularity, particularly as the case study is relatively simple compared to many cases of the introduction of information technology in organizations. A second qualification is that the

54

paper uses a rather limited version of structuration theory in its empirical analysis, particularly in the use of scripts as a linkage device between action and structure; this point will be discussed more fully later.

3.2 Group Decision Support Systems

A second significant application of structuration theory has been reported in the area of group decision support systems (GDSS) (Poole and DeSanctis 1989a, 1989b). The authors note that the use of technologies by groups is a complex issue and, as in Barley's work, that various groups use the "same" GDSS in different ways. Structuration theory is used as a way of looking at how groups appropriate GDSS technology and, in so doing, produce and reproduce the rules and resources, or structure, linked to the GDSS. In view of the diversity of human action and interaction, this results in different structure in different contexts since there are many different sets of rules and resources which can be associated with the use of the same technology, particularly in the complex social context surrounding the use of a GDSS.

The work reported here indicates the value of structuration theory as a way of conceptualizing the context of group decision support systems, but no empirical work on specific cases is described. If this should be attempted in the future, a major concern needs to be raised. The members of the group using a GDSS, unlike perhaps the radiologists and technicians in Barley's case studies, will not typically have simple roles in their organizations nor will their interaction be limited to the narrow context of the use of the GDSS. The broader organizational context which reflects structures of signification, domination and legitimation will impact, and in turn will be impacted by, interactions during the use of the GDSS. The implication is that empirical work on specific case studies will need to take these broader contexts and their links with GDSS action into account; the effect of these broader contexts has not been brought out in the published work to date.

3.3 Other Published Work

A small number of other papers have suggested structuration theory as a theoretical model for research on specific IS areas. Lyytinen and Hirschheim (1987) propose the use of the theory as a model of the social and organizational setting when investigating IS failure; in particular, they suggest that the theory would be a valuable way of investigating the institutionalization of information systems and how this impacts IS failure. Robey and Zmud (1988) include structuration theory as one of the possible theoretical perspectives in conducting research on end-user computing. They emphasize that structuration is a process theory which requires testing in empirical situations over time and they formulate some hypotheses regarding Information Centers arising from the structuration model.

The Lyytinen and Hirschheim and Robey and Zmud papers provide only a brief mention of structuration theory and no empirical work is described. Two other papers go further in both descriptive terms and empirical application. Boland (1985) contains a good short interpretation of structuration theory and its relevance to the production and reproduction of culture. He also gives an empirical example concerned with the use of budgets but this is a classroom case which lacks the richness of a genuine organizational environment. Han and Walsham (1989) describe the use of structuration theory for the multi-level analysis of IS and give an example of a large national information system in a developing country. The paper explores the role of broader contexts and outlines relationships between structures at various levels within the society and IS action; however, more detail would be required to provide conclusive evidence of the value of the theory for empirical work in this area.

A recent paper by Orlikowski (1990) contains an interesting account of the use of structuration theory as a model for understanding the nature of technology in organizations. Technology is viewed both as constructed and enacted by human agents and as having institutional properties which constrain and enable human action. The paper illustrates this view of technology using a case study of the development and use of software productivity tools in a consultancy organization. The theoretical view of the dualistic nature of technology is valuable although, in contrast to structuration theory, technology assumes a central role rather than the human agent. With respect to the empirical work, the case is quite rich in some respects, but the dynamics of the process of change in the development and use of the productivity tools are not described and the linkage device between action and structure is not adequately specified.

4. A CATEGORIZATION OF APPLICATIONS OF STRUCTURATION THEORY IN IS RESEARCH

Structuration theory is a meta-theory in the sense that other theoretical approaches such as interpretative sociology and structuralism can be related to it and located within it. However, the theory does not provide a recipe for empirical research and, in Giddens' own words (1984):

> I do not try to wield a methodological scalpel....I do not believe there is anything in either the logic or substance of structuration theory which would somehow prohibit the use of some specific research technique....The points of connection of structuration theory with empirical research are to do with working out the logical implications of studying a "subject matter" of which the researcher is already a part and with elucidating the substantive

55

connotations of the core notions of action and structure.

Following the spirit of this, we now consider the subject matter of information systems and identify some points of connection between structuration theory and specific IS topics and issues. The proposed application areas share the common characteristic that the mutual unfolding of the interaction between action and structure across time and space is a key element of study. We do not, in general, aim to replace existing research techniques but to identify where structuration theory could provide a valuable framework to complement and locate existing research. We illustrate this using published IS work. Potential applications of the theory are discussed under the headings of operational studies, use as a meta-theory, and use of specific concepts; this is a convenient categorization but the three categories are not mutually exclusive.

4.1 Operational Studies

Following the earlier discussion of the work of Barley and Orlikowski, structuration theory is valuable in carrying out empirical studies of *IS use* and the way in which this modifies social and organizational structures and vice versa. The power of the theory here lies in its emphasis on the inter-linked nature of action and structure and its provision of operational concepts such as the three dimensions of structure and interaction and their linking modalities. According to structuration theory, any process study needs to consider the inter-linking of action and structure; further examples include such topics as *system specification, design and development* and the *process of IS evaluation*.

While some progress has been made, considerably more work is needed to provide good ways of empirically identifying the links between action and structure in the type of application areas discussed above. Barley uses the concept of scripts as a linkage device which are

> outlines of recurrent patterns of interaction that define, in observable and behavioral terms, the essence of actors' roles... actors' identities are replaced by the positions they play, their behaviours and speech are reduced to generic form and content, and the action's unfolding is charted as a sequence of turns composed of typical acts [Barley 1986, p. 83].

Giddens (1984, p. 84) characterized the use of scripts as a dramaturgical viewpoint that emphasizes the "given" character of roles. He suggests a broader link between structure and action based on an analysis of "social position" of which social roles is a specific subset involving face-to-face encounters, well-defined entities and normative definitions of "expected" behavior. Giddens argues that broader contexts such as the positioning of individuals with

respect to home, workplace, city, nation-state and world systems increasingly relate to the incidental details of daily life; thus an analysis of the linkages between action and structure in a focal system should not be restricted to the boundaries of that system.

The above discussion should not be taken to mean that analysis of roles is of no significance. Such analysis, in the context of a GDSS for example, would focus on the interaction behavior of the actors in the focal setting. However, this action is conditioned by, and in turn conditions, structure which extends beyond the focal system as discussed earlier. Empirical work cannot ignore these broader contexts of action and structure if it wishes to provide rich descriptions and explanations of social behavior.

4.2 Use as a Meta-Theory

We mentioned earlier the position of structuration theory as a meta-theory within which to locate, interpret and illuminate other approaches. In this section, we illustrate this in specific terms by analyzing a recent article on the *institutional character of computerized information systems* (Kling and Iacono 1989) and earlier work on web models (Kling 1987). We will re-interpret and critique this research from the perspective of structuration theory.

The main thrust of the Kling-Iacono article is that much research on information systems, including the political action approach, the socio-technical design approach and indeed web models themselves, do not place sufficient emphasis on an analysis of information systems as institutions. From the perspective of structuration theory, their criticisms can be understood as an undue emphasis on action and insufficient attention to structure. It is interesting that the article refers to routinization as implicated in the reproduction of structure since this mirrors the use of the term in structuration theory.

Considering now a critique of the article and its predecessors, we look first at the level of *action*. In the original formulation of web models, resource dependency was a key explanatory variable of computerization action. This corresponds quite closely to the power/domination dimension and associated rules and resources in structuration theory. Unequal attention is given to the other two aspects of social practice, namely communication and sanction. As an illustration of this, emphasis is placed on standard operating procedures but equal importance attaches in practice to the values/norms which are implicitly embedded in standard operating procedures and to agents' mutual knowledge regarding the procedures.

With respect to *structure*, the Kling-Iacono article views institutions as constraints and, while this is a valid perspective, the conceptualization of institutions in structuration

theory sees them as inevitable and views them as enabling as well as constraining. Our earlier comments on the limited view of context in studies of IS use also apply to some extent to the Kling-Iacono article, through their use of the social organization of computing as their defining boundary, although a major contribution of the earlier web models was the enlargement of the contextual boundaries being studied in IS research.

The main contribution of structuration theory is not in its conception of either action or structure but their reconciliation in the *duality of structure*, and its operationalization of appropriate linkage mechanisms, at least from a theoretical standpoint. The longitudinal case study described in the Kling-Iacono article certainly deals with the processual nature of the development of information systems but the mutual unfolding and two-way link between action and structure, which is central to structuration theory, is not articulated and explored.

The above critique should not be seen as a fundamental criticism of the action orientation of the basic web models or the later institutional analysis. The argument being made is that structuration theory can be used to locate and illuminate the work to date from a broad theoretical perspective and to suggest avenues for further empirical analysis. The value of structuration theory as a meta-theory lies in its subtle view of social life and human society built upon a synthesis of a large body of earlier work in the social sciences; this enables much other research, both theoretical and empirical, to be located within it. As a further illustration of this, Espejo (1985) criticized the phenomenological approach of *information systems development* taken by Lyytinen and Klein (1985) as being too wrapped up in the mental processes of the observers rather than the structural constraints within which action takes place. From a structuration theory perspective, the phenomenological approach emphasizes action while the cybernetic design approach to organizations which underpins Espejo's comments emphasizes structure. Both approaches can be perceived as limited from the meta-perspective of structuration theory.

4.3 Use of Specific Concepts

Structuration theory contains a wide range of concepts designed to flesh out the basic model of the action/structure duality. Giddens has elaborated on each of these concepts in his writings but has always related them back to the broader constitution of social life. The exclusive use of an individual concept without relating it to the overall theme of structuration theory is an incomplete application. Nevertheless, with this qualification, individual concepts can be of value in informing substantive analyses. In this section, we introduce some further IS topics and issues and relate them briefly to some of the concepts of structuration theory. In each case, it would be possible, and indeed desirable, to undertake a more comprehensive analysis of

the IS area using the full range of the concepts in structuration theory, but such analysis is beyond the scope of this paper.

Our first example concerns *resistance to information systems* which has been interestingly discussed by Markus (1983). In this article, she describes a case study of the resistance to the introduction of a new accounting system within a divisionalized organization. Concepts from structuration theory of relevance here are *structural contradiction* and its relation to *conflict*. Structural contradiction refers to a disjunction between different principles of system organization and, in Markus' case, can be taken to be the inherent contradiction between the divisional accountants' role and responsibilities concerned with providing information for local management and control, and the central accountants' role in coordinating and maintaining control at the head office. According to structuration theory, conflict is a struggle between actors and collectivities which tends to coincide with structural contradiction along its main "fault lines." In the case study, the attempted introduction of a new information system designed to increase central control was the stimulus for major conflict between the divisional and central accountants at the level of action, which was conditioned by and reproduced the structural contradiction between the accountants' roles, and resulted in a protracted battle over a long time period of several years.

A second IS issue where structuration theory can be applied concerns the changes in work roles brought about by IS, particularly in the context of *system design and development*. This area has been explored by the socio-technical school of systems design (for example, Mumford 1987) and some of their approaches and conclusions can be illustrated using concepts from structuration theory. The theory emphasizes that human *knowledgeability* is strongly linked to what people are able to "do" rather than what they can say; this is the distinction between *practical* and *discursive consciousness* referred to earlier. The implication for system design and development is that designers should not merely ask people what they do but, as suggested by the socio-technical approach, should work with them in a direct way over a period of time in an attempt to capture their knowledgeability. Socio-technical design is also concerned with changing what people do and this, in the terminology of structuration theory, involves disrupting the *routinization* which is a key element in a human being's sense of security. The implication of this for IS practice is not that change in work practices should be avoided but that it is a more complex issue than some system design approaches would imply; the implication for IS research is that structuration theory concepts such as knowledgeability, practical and discursive consciousness, and routinization could be valuable ways of conceptualizing the basis of work practices.

We turn now to the topic of *IS strategy* which has been of increasing interest in recent years as the strategic and

competitive advantage aspects of information systems have become important to many organizations. Much of the literature in this area is prescriptive but is based on rather simplistic views and models of the processes whereby strategy is generated within organizations. Mintzberg (1978) coined the term "strategy formation" to describe the emergent nature of this process but much research on IS strategy has not taken account of this grounded perspective on the realities of organizational life. Strategy formation is a particularly relevant area for the application of structuration theory where existing structure at both the organizational and societal levels conditions the actions of individuals concerned in the strategy formation process and these in turn produce and reproduce structure over time. At the level of action, the *knowledgeability* of human actors in the process is nicely balanced by the *unanticipated consequences of intentional conduct* which are particularly important in the strategic area. Skilled actors in organizations are aware of this latter aspect and IS strategy derives from a complex process of human interaction and the *reflexive monitoring of conduct*. The implications of this brief discussion for IS research are that structuration theory is of high potential as a theoretical basis for the generation of descriptions of the IS strategy formation process and that prescriptive work on strategy needs to be more firmly based on better descriptive models.

The final topic in this section is concerned with the *informating aspects of IS*, using the term coined by Zuboff (1988) to describe the increased information and visibility brought about by computerized information systems; this is related to issues such as the improved monitoring of work and corresponding increases in efficiency but also involves such contentious issues as surveillance and control. Giddens (1984, p. 262) refers specifically to information systems in this context when he expresses the view that information storage is a fundamental phenomenon permitting *time-space distanciation* and a thread which ties together various sorts of resources in *reproduced structures of domination*. In structuration theory, structures of domination imply an asymmetrical distribution of resources. Resources are of two types: *allocative resources* are material resources involved in the generation of power and derive from human dominion over nature; *authoritative resources* are non-material and derive from the capability of harnessing the activities of human beings. Information thus constitutes an authoritative resource in the exercise of power and the vastly increased capacity for information storage in recent years due to advancements in computer and telecommunications technologies permits a much greater co-ordination of control across time and space. This theoretical perspective is strongly related to the current emphasis in the management and organizational literature on globalization and interdependence. Giddens (1984) develops the theoretical issues of time and space in his more recent work and has proposed that issues of the time-space constitution of social systems should be at the heart of social theory. Information systems are critical in this context and their investigation using the

time-space concepts of structuration theory would be a valuable area for future IS research.

5. CONCLUSIONS

The function of theory is to provide a focussed and insightful way to interpret and illuminate areas and issues in the real world. The shortage of adequate theory on the social and organizational aspects of information systems has negative implications for IS practice, since practice relies on implicit or explicit theoretical bases which condition and are conditioned by the actions of practitioners. In this paper, we have proposed that structuration theory offers a valuable approach to theory development in the IS field. It is important to note that the theory is not a panacea and, more generally, that the search for an all-encompassing social theory is futile. Nevertheless, structuration theory is a sophisticated theory of human social life and human society and the theory has generated widespread interest in the social sciences; we have attempted to show that it has high potential as an insightful method of analysis for a number of specific IS topics and issues.

We have suggested a categorization of the potential application of structuration theory in IS research in terms of operational studies, use as meta-theory and use of individual concepts. With respect to operational studies, we have discussed some existing IS research on new technology introduction and GDSS and have suggested ways in which these analyses could be extended, particularly with respect to the way action and structure are linked. In terms of a meta-theory, we demonstrated the one-sided nature both of approaches such as web models which emphasize action and of theories such as institutional analysis which emphasize structure. Finally, we illustrated that structuration theory offers a system of concepts which are individually useful and that taken together offer a broad view of social reality of value in a range of IS research areas. Specific topics identified for further analysis using the concepts of structuration theory include IS specification, design and development; IS strategy and its formation; user resistance to IS; and the informating nature of information systems.

6. REFERENCES

Barley, S. R. "Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments." *Administrative Science Quarterly*, Volume 31, March 1986, pp. 78-108.

Boland, R. J., and Hirschheim, R. A. *Critical Issues in Information Systems Research*. New York: Wiley, 1987.

Boland, R. J. "Accounting and the Reproduction of Culture: Budgets and the Process of Structuration."

Working Paper Number 1168, College of Commerce and Business Administration, University of Illinois, Urbana, 1985.

Clark, J.; Modgil, C.; and Modgil, S. (eds.). *Anthony Giddens: Consensus and Controversy*. London: Falmer Press, 1990.

Cohen, I. J. *Structuration Theory: Anthony Giddens and the Constitution of Social Life*. London: MacMillan, 1989.

Espejo, R. "Comment by Raul Espejo." In E. Mumford and R. Hirschheim (eds.), *Research Methods in Information Systems*, Amsterdam: North-Holland, 1985.

Giddens, A. *Central Problems in Social Theory*. London: Macmillan, 1979.

Giddens, A. *The Constitution of Society*. Cambridge: Polity Press, 1984.

Giddens, A. *New Rules of Sociological Method*. London: Hutchinson, 1976.

Han, C. K., and Walsham, G. "Public Policy and Information Systems in Government: A Mixed Level Analysis of Computerization." Management Studies Research Paper No 3/89, Cambridge University, United Kingdom, 1989.

Held, D., and Thompson, J. B. (eds.). *Social Theories of Modern Societies: Anthony Giddens and His Critics*. Cambridge: Cambridge University Press, 1989.

Kling, R. "Defining the Boundaries of Computing across Complex Organizations." In R. J. Boland and R. A. Hirschheim (eds.), *Critical Issues in Information Systems Research*, New York: Wiley, 1987.

Kling, R., and Iacono, S. "The Institutional Character of Computerized Information Systems." *Office: Technology and People*, Volume 5, Number 1, 1989, pp. 7-28.

Lyytinen, K. "Different Perspectives on Information Systems: Problems and Solutions." *ACM Computing Surveys*, Volume 19, Number 1, 1987, pp. 5-46.

Lyytinen, K., and Hirschheim, R. "Information Systems Failures – A Survey and Classification of the Empirical Literature." *Oxford Surveys in IT*, Volume 4, 1987, pp. 257-309.

Lyytinen, K., and Klein, H. K. "The Critical Theory of Jurgen Habermas as a Basis for a Theory of Information Systems." In E. Mumford and R. Hirschheim (eds.), *Research Methods in Information Systems*, Amsterdam: North-Holland, 1985.

Markus, M. L. "Power, Politics, and MIS Implementation." *Communications of the ACM*, Volume 26, Number 6, 1983, pp. 430-445.

Mintzberg, H. "Patterns in Strategy Formation." *Management Science*, Volume 24, Number 9, 1978, pp. 934-948.

Mumford, E. "Sociotechnical Systems Design: Evolving Theory and Practice." In G. Bjerknes, P. Ehn, and M. Kyng (eds.), *Computers and Democracy: A Scandinavian Challenge*, Aldershot: Avebury, 1987.

Orlikowski, W. J. "The Duality of Technology: Rethinking the Concept of Technology in Organizations." Sloan School of Management Working Paper No 3141, Massachusetts Institute of Technology, 1990.

Poole, M. S., and DeSanctis, G. "Understanding the Use of Group Decision Support Systems: The Theory of Adaptive Structuration." In C. Steinfield and J. Fulk (eds.), *Perspectives on Organizations and New Information Technology*, Beverly Hills, California: Sage, 1989a.

Poole, M. S., and DeSanctis, G. "Use of Group Decision Support Systems as an Appropriation Process." In *Proceedings of the Twenty-Second Annual Hawaii International Conference on Systems Sciences*, Volume 4, 1989, pp. 149-157.

Riley, P. "A Structurationist Account of Political Culture." *Administrative Science Quarterly*, Volume 28, 1983, pp. 414-437.

Roberts, J., and Scapens, R. "Accounting Systems and Systems of Accountability – Understanding Accounting Practices in Their Organizational Contexts." *Accounting, Organizations & Society*, Volume 10, Number 4, 1985, pp. 443-456.

Roberts, J. "Strategy and Accounting in a UK Conglomerate." *Accounting, Organizations and Society*, Volume 15, Number 1/2, 1990, pp. 107-126.

Robey, D., and Zmud, R. "Research on End-User Computing: Theoretical Perspectives from Organization Theory." In K. M. Kaiser and H. J. Oppelland (eds.), *Desktop Information Technology*, Amsterdam: North-Holland, 1990, pp. 15-36.

Willmott, H. "Studying Managerial Work: A Critique and a Proposal." *Journal of Management Studies*, Volume 24, Number 3, 1987, pp. 249-270.

Zuboff, S. *In the Age of the Smart Machine: The Future of Work and Power*. New York: Basic Books, 1988.