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Empirical critical IS research

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EMPIRICAL CRITICAL IS RESEARCH

Abstract

IS can be viewed as a socio-technical system. It has social effects as well as operational and business impacts on organisations. Critical IS research represents one type of approach to investigating the social dimension of IS. However there has been relatively little empirical work in this tradition. This paper reviews the early years of Critical IS research. It addresses the question of why empirical CIS research has attracted comparatively little attention so far. The results of empirical critical case work suggest that this is a potentially powerful method for generating greater insight into the impact of IS on organisation and how it is used. The paper concludes with some ideas about the future of this research approach.

Key Words: *Critical Systems Theory, Critical IS research, Empirical critical IS research, critical reflection, organisational IS*

I Introduction

The importance of the social and organisational impact of the new technology on organisations was recognised early in the development of the IS research discipline. The perception of the significance of the social impact of IS has led to general acceptance that it should be viewed as a socio-technical phenomenon. Critical IS research is concerned with the social dimension of IS.

Critical IS research applies the ideas of critical social theory (CST) to the subject of information systems impact on organisations. Theory suggests that this approach has much to offer in terms of insights into the effects that the social structure and norms of an organisation has on the way that IS is used by and affects employees in their work. However there is comparatively little published empirical critical IS research. Many papers focus on theoretical issues. There have been relatively few empirical studies (Orlikowski and Baroudi, 1991; Lyytinen, 1992; Brooke, 2002b; Adam, 2002; Doolin and Lowe, 2002; Varey et al, 2002).

The empirical research that has been executed demonstrates the power of this approach to generate valuable findings as to the impact of social arrangements on our perception of the world, in particular on the effects of IS in the business world.

This paper addresses the question of why empirical CIS research has attracted comparatively little attention so far. It aims to assess the exiting and potential future contribution of this type of research. It argues that empirical Critical IS Research is a valuable tool for understanding how the use made of ISs by an organisation's workforce affect and are affected by the organisational norms.

The paper starts with an overview of the main developments in CIS research – its early aims and achievements. Section 3 reviews what IS research has established about the impact of IS on organisations. The following sections (4 and 5) identify the key elements of the critical research methodology, assess the results of five published cases and review the practical problems of carrying out research studies in this tradition.

2 Critical IS Research

Critical IS developed from the application of the ideas of CST to the social dimension of the implementation of IS/IT in organisations. CST has exerted a strong influence on IS researchers concerned with this aspect of IS. These theories have offered one type of social model that can be used as a basis for viewing and analysing the complex and multifarious ways in which IS can affect organisations social structures and routines. The potential that IS seemed to offer for supporting the attractive social ideals proposed by the CST has driven another strand of CIS research (Lyytinen, 1992).

According to Brooke (2002b) critical research has it's roots in the critical theory of the Frankfurt school of the 1920s. Critical social theorists like Habermas and Weber sought to identify and criticise the 'taken-for-granted assumptions about aspects of their contemporary society' (Brooke, 2002b). They attempted to analyse the effects of the uneven power distribution that they saw in the society of their day. They were particularly concerned with the distorting effect of social domination on the individual. The achievement of the emancipated actor is a central issue for this school of thought. It is the Communicative Action Theory of Habermas (1984) that has tended to dominate critical IS research.

The ideas of both Habermas (1984) and Weber have been used by CIS to demonstrate the restrictive nature of instrumental rationality (Lyytinen, 1992) that has formed the basis of managerial ideology, models and operational analyses and hence the management of IS. Critical IS has also used these

ideas to contribute to the wider debate on the value and relevance of the positivist research methodology, which was the dominant approach for early IS research (Lyytinen, 1992; Brooke, 2002b). To the Critical IS researcher the subject to be studied is the social world. This differs profoundly from the natural world in that it is constructed by the interaction of many individual people and social groups, all of whom are unique. Social phenomena are created by humans and can be understood only through the interpretation of human communications (Orlikowski and Baroudi, 1991; Deetz, 1996; Bryman, 2004). Positivism is ill equipped to deal with the full range of social phenomena.

Critical IS research has been an accepted methodology for IS research since the early 1990s. Orlikowski and Baroudi (1991) identified three philosophical perspectives which they considered valid and useful approaches for IS research. These were positivist, interpretivist and critical. These perspectives have since achieved wide spread theoretical acceptance by the IS research community (Myers, 2004). However surveys of published IS journal papers have repeatedly attested to the dominance of the positivist paradigm (Orlikowski and Baroudi, 1991; Dube and Pare, 2003; Chen and Hirshheim, 2004). Considerable progress has been made in establishing standards for evaluating empirical IS research in the positivist tradition (Benbasat, 1987; Lee, 1989; Eisenhardt, 1989; Lee and Baskerville, 2003; Yin, 1994,2003) and in the interpretivist tradition (Walsham, 1995; Stake, 1995; Klein and Myers, 1999; Macpherson et al, 2000; Bryman, 2004). Less has been written about empirical Critical IS. The judgement of Orlikowski and Baroudi in 1991 that 'the form of theory and knowledge in this tradition is uncertain' would still be made today.

The potential of IT to enhance communication between group members drove another strand of CIS. The quality and appropriateness of communication between individuals and groups is a key factor in creating conditions favourable to the 'ideal speech' of CAT proposed by Habermas. From the early days of networks and databases it seemed clear that IT had much to contribute to human communications. For the IS researchers concerned with the problems encountered in designing and developing new IS (ISD) this aspect of IT was thought to offer the possibility of more open and hence more effective ISD methodologies. Hirschheim and Klein (1994) speculate that IS could help to mitigate distortion in communication between users and developers by facilitating the widest possible debate of organizational problems. Lyytinen and Hirschheim (1988) went further when they suggested that IS could support discursive action (for ISD) through the dual role of providing the means for criticism and learning. They identified three ways in which IS could contribute to discursive acts: by establishing new channels for communication, redistributing access to existing information, and providing new information relevant to the subject at hand. These ideas are attractive but they do not seem to have had much practical impact (Lyytinen, 1992; Brooke, 2002b)

ISD is not an activity that can be accomplished within the IT department alone, separate from the rest of the organisation. The final users of the planned new system have long been recognised as the key to successful design. These individuals and groups are normally outside the IT department and are increasingly likely to be scattered throughout all parts of an organisation. It would not be practicable to apply the standards and practice of CAT in the IT department for the process of ISD and not apply these ideas elsewhere throughout the organisation. Hence the key to this strand of IS research is the culture and practice of the organisation as whole and this has attracted little attention.

CIS appears to have had a greater impact on the way we think about IS and its impact on organisations than it has had on the way we use IS within organisations. It has contributed new philosophical paradigms (views on the characteristics and nature of the social world (ontology) and what we can know about it (epistemology)) to apply to IS. It has helped to reduce the influence of the dominant research paradigm of positivism. It has expanded the range of potential research methods. It does not appear to have had much impact on ISD methodology. CIS researchers were not the only group to see the potential for IS to support social change. The next section reviews the research on this topic.

3   IS and organisational practice

New Information Systems provides ' an unprecedented opportunity for the redistribution of knowledge, resources and conventions in organisations' (Orlikowski and Robey, 1991). Nonetheless many studies have shown that new information systems tend to be used to support the social and organisational status quo (Markus, 1983; Zuboff, 1988; Smith, 1988 (quoted by Orlikowski and Baroudi, 1991); Markus and Robey, 1988; Orlikowski, 1992; Myers, 1994; Markus and Keil, 1994; Robey and Sahay, 1996; Trauth and Jessup, 2000; Doolin and Lowe, 2002).

Organisations are understandably most concerned to obtain value from their investment in new IS. Their aim is to achieve systems success. This has tended to focus both practitioner and research interest onto the concept of IS project success and its achievement. The emphasis on quantitative measures of IS success is one outcome of the use of the factor research approach to investigate information systems success. The factor research approach seeks to identify those variables that predict IS success (or failure) and test empirical associations between predictors and outcomes (Newman and Robey, 1992; Seddon, 1997; Larsen and Myers, 1999; DeLone and McLean, 2003). For the factor research stream success was initially largely equated with system design and usage. However, an information systems development project can be considered successful by these measures, and yet yield little business value (Newman and Robey, 1992; Nandhakumar, 1996). There is general agreement that information systems investment should deliver business value, by researchers and practitioners alike (Soh and Markus, 1995; Bussen and Myers, 1997; Davern and Kaufman, 2000; DeLone and McLean, 2003; Larsen, 2003; Melville et al. 2004). The definition of IS Business Value proposed by Cronk and Fitzgerald (2002) 'if an investment is valuable, it will make a difference to organisational performance' is consistent with Orlikowski's 'value in use' '..technology is not valuable, meaningful or consequential by itself; it only becomes so when people use it' (Orlikowski, 1999, p253 of Marchand et al, 1999). This definition establishes the central role of organisational context in obtaining value from IS investment. But as most case research shows organisations seek to manage their organisational culture in order to achieve business value not to achieve culture change.

A typical case example is described by Kohli and Kettinger (2004) in which in which the interaction of the organisational culture, business need and staff attitudes and skills have a critical impact on the business value obtained from a new information system. Over the period of the case, these three factors change or are changed in such a way as to transform a relatively ineffective information system project to one that contributes significant business value.

The organisation is a hospital and the case describes the attempts of the hospital management to introduce an information system aimed at improving the decision making of the physicians employed by the hospital. The hospital management was under pressure to reduce clinical costs, while continuing to improve the quality of patient care. It was accepted that the physicians controlled the clinical process that in turn determined the costs and quality achieved. The route to better practice was through 'informating' this group. The management had a clear business aim and their definition and measure of business value was relatively precise. This was to reduce costs per case and improve quality care. The improvement in care was interpreted as reduced variance in clinical activities, because this was thought to signal the adoption of best practice. A clinical DSS was developed 'to collect and process physician benchmarking information' (Kohli and Kettinger p370, 2004). The information system was designed to track individual physician's activities through his or her patient data on costs and quality measures like length of stay (LOS). The system produced reports that could be used by the various clinical specialities (departments) to monitor performance and hopefully improve the decision making of each physician. The clinical DSS was managed by the central IT department who produced the reports. Although the information system

was agreed to be a success in that the physicians acknowledged that it accurately represented clinical practice, the early results were disappointing in terms of adoption by physicians. By classic measures, that of user response, the system was a failure, as most physicians and clinical specialities made little use of the information provided by it. The case description explains how the norms by which the physicians operated worked to reduce their willingness to use this information system.

At this stage, two initiatives were started by the management and design team. The information system was redesigned to one in which the information could be delivered straight to each physician through his or her PC, instead of through paper reports from management. It was renamed a physicians profiling system (PPS) and came under their own personal control to interrogate and use as they saw fit. In addition the management sought to work with existing group cultural norms of peer pressure and assessment to create the conditions within which physicians would view the system as a valuable tool to improve their own and their group's performance. The outcome of this second initiative was successful in terms of the management aims. For the first year following implementation both cost and quality indicators improved significantly.

This case demonstrates how the business need was met through an iterative process that eventually matched the information system to the organisational culture. At the end of the process the physicians were beginning to internalise (master) the information provided to them and use it to improve their own performance and in the process produce significant business value for the hospital. In practice organisations aim to achieve successful IS implementation rather than changing organisational practices

4   CIS research methodology

The critical IS researcher is concerned with the effect that systems have on the work and social conditions of the individual. Like interpretivists, the critical researcher is concerned with a social world and seeks to understand the effects of new information systems on this world (Walsham, 1993). However this is not enough. To the critical theorist most social worlds have objective properties that harm their members and 'render sense making and communication problematic politically vulnerable' (Ngwenyama and Lee, 1997). The primary aim of the researcher is to critique existing conditions so as to make people aware of the various existing forms of social domination and to enable the human actors to transform existing social structures (Macpherson et al, 2000). Critical IS research is concerned with the contribution that a new information systems can make to the achievement of social ideals (Orlikowski and Baroudi, 1991; Hirschheim and Klein, 1994; Ngwenyama and Lee, 1997; Klein and Myers, 1999; Brooke, 2002b; Myers, 2004; Bryman, 2004).

Critical IS research has drawn to a great extent on the ideas of the philosophers of the Frankfurt School for the ideal of an organisation and in particular to the CAT of Habermas (Brooke, 2002a). This has been the lens through which existing practices have been viewed and critiqued. It differs from interpretive research on the following points (Orlikowski and Baroudi, 1991; Brooke, 2002a,b; Ngwenyama, 2002)

    The Primary goal (discussed above)

    The selection of factors that are held to be key influences on social structures and use of new information systems

    The use of the theories of Critical Social Theorists like Habermas as a standard by which to measure social conditions

    Belief that humans can and should change their conditions.

The interpretivist perspective ignores a number of important factors, of which Orlikowski and Baroudi (1991) considered four the most significant. Interpretivism ignores the wider context of experiences external to the case situation and fails to incorporate the effects of unintended consequences of individual actions. It neglects both structural conflicts within organizations and the way in which a particular social situation develops through historical change. Critical research overcomes some of these criticisms. A central belief of critical researchers is that social reality is historically constituted so that this dimension would be explicitly investigated. The study of social and structural conflict is also an explicit aim for critical research. Myers (1994) would claim that critical hermeneutics is even more effective in overcoming the basic weaknesses of interpretivism.

More recent work has criticised critical research for its lack of an effective social theory of emancipation, inadequate conceptualisation of power and over reliance on the theories of Habermas (Brooke, 2002b). Recent debate has focused on the need to use alternative social models proposed by other social theorists as a benchmark for social ideals (Brooke, 2002b; Adams 2002).

What constitutes rigor for a information systems case research in the critical tradition is far from clear. The ideas developed below are based on the work of Brooke (2002a) and the example of three empirical papers (Myers, 1994; Ngwenyama and Lee, 1997; and McAulay et al, 2002). Critical IS cases:

Critique taken for granted assumptions underpinning organizational behaviour
Base the analysis on social theory – explaining relevance of the chosen theory or theorist
Develop case material on the IS phenomena to similar standards as for an interpretivist case
Develop knowledge that enables change and indicates new ways of working
Autocritique - subjecting the work to critical reflection

5 Empirical cases in Critical IS Research

This section reviews the work of five cases that claim or appear to conform to the aims and approach of critical IS research. These range from individual examples of Computer mediated communication (CMC) (Ngwenyama and Lee, 1997; Cecez-Kecmanovic, 2001) to an evaluation exercise on outsourcing (McAulay et al, 2002), a failed information systems project (Myers, 1994) and one case investigating the realisation of CAT within an organisation (Heng and de Moor, 2003). Some of the implications of this work for future empirical CIS research are suggested.

5.1 The cases and their findings

Critiquing the assumptions behind existing social and organizational arrangements can take many forms. The case by Myers (1994) uses a technique of critical hermeneutics to interpret and understand the apparent conflict in the position of the various stakeholders with respect to the information systems under review. The case by McAulay et al (2002) uses the theories of Habermas to evaluate the underlying ideological concepts that informed the opinions of the case managers on outsourcing. Ngwenyama and Lee (1997) and Cecez-Kecmanovic (2001) apply the ideas of Habermas to a hermaneutic textual analysis of an example email communication exchange. Only McAulay et al's (2002) paper offer an autocritique. As Orlikowski and Baroudi (1991) found critical research tends to be less effective at self-evaluation. The knowledge developed in all three cases contributes to our general perception of the way social arrangements can dominate our thinking, although none offer specific suggestions for change. Critical research is by its nature focuses on single unique situations. Generalisability does not seem to be a prime aim (Lee and Baskerville, 2003), nonetheless all three papers produce significant contributions to theory. Ngwenyama and Lee (1997) contribute a modification of the information richness theory of communication (Daft and Lengel, 1986). Myers (1994) deepens and enhances the concept of information systems success, which has relevance to every information systems project, and

McAulay et al (2002) contribute an additional factor for incorporation into evaluation methodology, of relevance to most evaluation exercises.

Heng and de Moor (2003) demonstrate a different approach to CIS research. They investigated a case example in which the internet was used with the aim of creating the conditions for the ideal speech conditions defined by Habermas (1984). In their view the case demonstrated that the ideals of CAT are almost certainly impossible to implement fully in practice. This result is consistent with some theorising about CAT (White, 1997). Nonetheless it is significant that the attempt was based on the use of electronic communications.

5.2   Source Data

Two of these studies are case based, one analyses an interchange of emails and one a CMC discussion. Effective as the results achieved are, only the examples from Ngwenyama and Lee (1997) and Cecez-Kecmanovic (2001) can be easily subjected to further analysis from different view-points and using other social theories. The case material for the other studies may be available to the authors but not easily to other analysts. Yet the essence of critical research is that interpretation will vary between actors and will change with social theories and over time. For further reflection and re-interpretation, information, particularly soft, textual information needs to be accessible.

The significance of text - recorded communications, statements, case descriptions, reports, documents, plans - for critical research is well illustrated by the Computer mediated communication (CMC) discussion analysed by Cecez-Kecmanovic (2001). She used the ideas of Habermas to critically assess the 'communicative practices and dialogical structures embedded in the email discussion' (Cecez-Kecmanovic, 2001, p151). It is the process of the interchange of communications that she came to analyse. Reflection, the exercise of re-assessing actions and assumptions, is a key idea for critical researchers and this cannot be done without the ability to retrieve the relevant records of the social interactions of the participants. The case discussed by Cecez-Kecmanovic (2001) was a consultation exercise carried out at a university via a CMC and hence the discussion was automatically saved in electronic form. The dialogue had to be publicised to all members of the university and was available for analysis by any interested participant.

Critical IS research is not feasible without the types of information generated by case studies, in which the interaction of the actors and social groups are described in as much detail as is practical. The soft types of information such as textual description, graphics and conversations are of particular importance. This is the type that takes the most time and effort to collect. Data that measures phenomena, numerically or to some predefined structure is becoming easier and less costly to collect and store electronically. Soft information is more difficult and expensive to identify, define, find, collect and input to suitable software programs. Empirical critical IS research will be of much greater value when we are able to use the information collected for individual studies for repeated review and re-interpretation. The only practical way in which this can be achieved is if the information is stored electronically in a form that allows easy access and retrieval.

5.3   Significance of theory

The choice of theory by which to critique existing conditions is a key choice in the way the analysis is carried out. All but one of the cases base their critique on Habermas's ideas. The case analysis carried out by Myers (1994) was picked out as an example of good interpretivist case work by Klein and Myers (1999) although Myers himself designates the work to be both interpretive and critical (Myers, 1994, page 190). Brooke's (2002b) claim that CIS research is over dependent on the theories of Habermas are borne out by this set of case examples. It is difficult to assess the significance of this until other case work is carried out using alternative social theories.

5.4   Future work

Empirical CIS research has great potential to further understanding of existing social conditions. It can enable our understanding of organisational processes and their effect on us as individuals and social groups. But the results of these cases suggest that this type of research is also a powerful technique for subjecting current IS theories to critical investigation. They demonstrate the potential of empirical CIS to strengthen and enhance existing IS theories.

The ubiquitous information environment that is currently developing, based on the spread of portable computing devices and the growing reach and communications capacity of the wireless communication infrastructure has profound implications for empirical CIS research. In the last two decades, the exponential growth in the capacity of computers paralleled by a similar rate of reduction in costs (Moore, 1965, 2003; Gelsinger et al, 1998) has supported the proliferation of new information systems applications and ever more powerful laptops and PDAs. This been joined by an explosive expansion of communications capacity, both fixed line and wireless. Growth in investment in ICT and communications infrastructure accelerated during the 1990s (OECD, 2003; Hundley et al, 2003). Both developments have profound implications for critical research. Both reduce the cost of transferring soft information to electronic storage. Both increase ease of access to this information. Other developments on the agenda such as data capture technologies like voice recognition, more effective indexing and structuring of soft information and more sophisticated search engines will also tend to support this trend.

The work described in the cases is profoundly affected by the outlook, assumptions and skills of the researcher. Interpretivist case research has similar characteristics. But CIS has the added factor of choice of social theory to adopt. The relative paucity of empirical work in this research stream can be ascribed in part to the large amount of work required to obtain the type of information required for it and the skill needed to analyse and interpret the results.

The empirical work described above seems to offer little towards one of the goals of CIS – that of suggesting ways for human actors to transform existing social structures. This research approach can increase our understanding of existing social effects but changing these conditions (if deemed appropriate) would be a major undertaking.

6   Conclusions

Critical reflection is one way for organisations to learn from their experiences. Many companies have systems that monitor their business operations with a view to continually improving services, efficiency and use of information technology. Empirical critical IS research offers a method for monitoring, assessing and learning about the working of information systems within social systems. Its principle value lies in the increased understanding it generates. It has a particularly powerful technique for assessing existing IS theories and models. But the practical barriers to empirical work remain serious.

The quality of empirical critical IS research is largely determined by the nature and type of information accessible for analysis and re-analysis. Organisations can continually review and re-interpret and reflect on their activities if and only if the appropriate information can be retrieved on request. A ubiquitous information environment could transform empirical critical IS research. Such an environment would offer cheaper and easier ways for capturing and storing the type of case information required. It would be relatively easy for all members of an organisation to contribute through the use of electronic computing devices to capture and store their description of the routine operations and regular social interactions that make up their working lives.

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