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Case Studies in Context: an examination of research influences

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Abstract

The significance of the context in terms of the wider environment of a single case study has been acknowledged by IS researchers. However, there are few clearly explained techniques and methods for taking into account the macro external forces in any given situation. A methodology is discussed that details a number of research influences including dialectic hermeneutics and critical realism as well as methodological techniques for data collection and analysis. When these are combined they go some way to helping the researcher consider the wider context of a case study.

Keywords

Research methodologies, research issues, information systems

INTRODUCTION

The installation and use of information systems over the last twenty to thirty years has become commonplace, and the increasing speed of technological development has created a situation where it often appears that the technology is driving the business. This is particularly true of the Internet and Internet-based trading systems, which are both dynamic and immature, but have quickly become a part of the business landscape. Organisations often struggle to understand the new systems, which they embrace through competitive necessity without understanding how it affects long term strategic plans (Porter, 2001). These difficulties require the information systems discipline to constantly assess the way research is carried out if it is to result in studies that are relevant and pertinent to developing systems and that support practitioners in their need to gain greater understanding of these systems.

This paper discusses the use of an interpretive case study as an example of a research methodology consistent with the requirements for the study of current information systems. A number of research influences that affect the research methodology are then identified and explained. An examination of these research influences, which include methodological techniques for data collection and analysis, highlights the need for consideration of the wider context in a case study. This will enrich the research and enable more productive and effective understanding of information systems to be achieved.

The paper first examines methodological design issues, and the selection of a research paradigm. It then discusses one research methodology, an interpretive case study approach for the study of information systems at a time when many pressures are being brought to bear from the dynamic business environment. An examination of the research influences is made and a model of research influences proposed and considered in an example area of research; that of evaluation processes.

ISSUES IN DESIGNING A RESEARCH METHODOLOGY

The choice of a philosophical approach in designing a research methodology in information systems has traditionally resided in positivism, based on the research methods of the natural sciences (Trauth, 2001:6). This perspective assumes that reality is objectively given and quantifiable measures are independent of researchers and their instruments (Orlikowski and Baroudi, 1991). In contrast an alternative perspective, that of interpretivism assumes that knowledge is socially constructed through language, consciousness and shared meanings

(Myers, 1997). Interpretivism enables research to extend beyond the fact that people communicate to enable examination of what and why they communicate. For example, in the prevailing positivist approach to IS evaluation, the concentration on technical rather than social aspects of a system leads to 'an overly rational, simplistic notion of evaluation which is dysfunctional in the long run due to the inherent unintended consequences it invariably brings about' (Hirschheim and Smithson, 1999). In contrast, an interpretive approach allows for an understanding of phenomena through the meanings that people assign to them and encompasses the range of interpretations and reflections required to address the complexity of the issues.

The development of a cumulative body of knowledge regarding the use and assessment of interpretive research has been gaining pace with several researchers presenting the case for a more holistic approach to IS research (Klein and Myers, 1999; Lee, 1999; Myers, 1994; 1997; Orlikowski and Baroudi, 1991; Trauth, 1997; 2001; Walsham, 1995). The need to consider IS issues in an organisational, societal and global context has become more pressing (Trauth, 2001). This is particularly important if more effective use and appreciation of information systems is to be achieved in an era where globalisation and interconnectivity are becoming increasingly significant. These arguments support the need for greater acceptability of interpretive research within the IS discipline.

However, the application of research theory within the interpretive framework in the IS discipline remains somewhat confused. Attempts to label the different stances under headings such as epistemology, ontology, theoretical perspective, methodology and method (Crotty, 1998) can lead to confusion and disguise the real issues being addressed. While underlining the valuable role that a theoretical framework plays in IS research, Walsham cautions against 'using the theory in a rigid way which stifles potential new issues and avenues of exploration. It is desirable in interpretive studies to preserve a considerable degree of openness to the field data, and a willingness to modify initial assumptions and theories' (Walsham, 1995:76). The research design must therefore remain flexible enough to take advantage of an array of techniques and influences. This does not excuse the researcher from providing a comprehensive description of the range of influences on which the research is based and a proposed framework of how the research will be carried out.

The use of case studies in IS research has become more widely accepted in recent years. The in-depth investigation and rich description that can be gained from a single case study (Darke *et al.*, 1998) can be used to inform IS research, as clinical research, the examination of specific cases, informs in other disciplines (Friedman, 2001). Specific case research can be used to inform both basic research, 'the search for fundamental knowledge', and applied research, that focuses 'on adapting principles to kinds of problems', within the IS arena. The use of a case study within an interpretive paradigm can therefore be a powerful research tool. However, the influences that affect an interpretive case study are many and if the research is to maintain validity and rigour a clear explanation of how the research was conducted is essential. This requires the researcher not only to recognise, but also to document the influences that affect the work to maintain clarity for subsequent studies. These influences are now discussed.

RESEARCH INFLUENCES ON THE METHODOLOGY

By taking into account a range of influences that have emerged from the literature (Darke *et al.*, 1998; Denzin and Lincoln, 1994; Jones and Hughes, 2001; Klein and Myers, 1999; Knights, 1995; Lee, 1991; 1999; Mingers, 2001; Myers, 1997; Orlikowski and Baroudi, 1991; Walsham, 1993; 1995; 1999; Yin, 1994), it is possible to conceptualise the research design in a broad fashion while underpinning the study with the vital elements of interpretive research. In this way the reliability and validity of the research can be justified without imposing the restriction of a particular research stance and '...restating comfortable orthodoxies' (Silverman, 2001:xiii).

Context of the Research

The requirement to consider a wider environment in the context of interpretive research is often referred to in the literature, but the importance of the context of the research is often underestimated. In the global, networked environment in which many organisations now

function the influences of the macro environment are strong. The political and legal consequences of operating in a global environment can impact on an information system at regional, national and global levels. Infrastructure, industrial relations, the skills of a workforce and cultural factors will also impact an IS and need to be considered in the research design. In the same way the internal culture or micro environment of an organisation will have an influence on the perspectives and opinions of those that work within it. Consideration of both the macro and micro environments therefore have a central role in the research design.

Theoretical Influences of the Study

The consideration of philosophical, ontological and theoretical issues in Information Systems interpretive case studies is an important underpinning of the researcher's need to reflect on their own philosophical stance (Walsham, 1995) that affects the methodological issues in their work. While it is not the purpose of this research to undertake an in-depth assessment of philosophical and theoretical stances, the influences affecting the methodological issues are important to the outcome of the research and therefore require some explanation.

Dialectic Hermeneutics

The main theoretical underpinning of this research design is dialectic hermeneutics that requires meanings to be set in the context of the micro environment and allows for consideration of macro issues. Dialectic hermeneutics is primarily concerned with the meaning of text or text analogue and seeks to make sense of confused, incomplete or seemingly contradictory meanings to bring out the underlying coherence or sense (Myers, 1994). This is achieved by a reiterative examination of the parts (of the text analogue) through to the whole, until a sense or coherence is achieved. This cycle of re-examination is termed the hermeneutic circle. Dialectic hermeneutics allows the researcher to critically examine conflicts and contradictions within the complexity of social, cultural and political systems from many different perspectives within the organisation. People within the organisation will have personal interpretations that colour their perceptions of any given situation. The resulting differences can be addressed in the reiterative nature of hermeneutics (the hermeneutic circle) that 'fosters comparing and contrasting divergent constructions in an effort to achieve a synthesis of same' (Schwandt, 1994:128). The benefits of dialectic hermeneutics to a study are that it allows for differing subjective and objective opinions both inside and outside the organisation to be expressed.

In addition to divergent constructions, an understanding of the context, social structures and history of the organisation is crucial, as is a perception of the researcher's role within the study (Darke *et al.*, 1998; Lee, 1994; Myers, 1994). Myers explains the difference between pure and dialectic hermeneutics by highlighting the critical nature of the latter and its emphasis that social reality is historically constituted. However, there are few techniques explained for interpreting the wider environment, let alone distinguishing the relevant forces on the case study.

Critical Realism

Although critical realism is an ontology based in the postpositive paradigm it has been included as a research influence. The contradictory nature of including a positivist influence in an interpretive case study is understood (Mingers, 2001), but elements of the theory of critical realism help to address an aspect of the research that is often overlooked.

The epistemological stance of positivism comes from the belief that scientific knowledge consists only of factors or an 'unambiguous and accurate knowledge of the world' (Crotty, 1998:18). Critical realism has an implication of objectivism when it asserts that reality exists outside the mind and reality 'must be subjected to the widest possible critical examination to facilitate apprehending reality as closely as possible.' (Guba and Lincoln, 1994:110). This stance seems consistent with that taken by the business world when evaluating tangible benefits such as an audit report or balance sheet. While the research may not evaluate at this level, tangible benefits are expected to be discernible in any information system evaluation. Using the critical realist ideas of structure and agency, it maybe that some of these benefits are not only tangible but relate to a broader environment (structure) that is not open to interpretive construction by the 'actors' in the organisation. It is not intended that a

positivist stance to the research be taken, but to ignore the influences that may be present would impact on the interpretation of the data collected and the final conclusions reached.

Case Study Theory

Yin defines a case study as 'an empirical investigation that investigates a contemporary phenomenon within its real life context, especially when the boundaries and context are not clearly evident' (1994:13). The use of case study research in IS has become more widespread and is particularly useful where "research and theory are at their early, formative stages" (Benbasat *et al.*, 1987); a situation that applies to many interorganisational information systems. Darke *et al.* (1998) describe case studies as ideal for understanding the interactions between IT and organisational contexts in that they allow for a multitude of sources to be used for data collection to investigate the phenomena at issue. This facilitates the gathering of data relating to the micro and macro environments that address the context of the social, cultural, political and organisational issues within their historical setting.

The case study as a research method has attracted criticism concerning lack of rigour, difficulties of generalisation and of excessive amounts of data (Yin, 1994). However the counter-arguments offered by Yin and others (Benbasat *et al.*, 1987; Darke *et al.*, 1998; Myers, 1994; Stake, 1994) are persuasive and have been incorporated into the considerations of reliability and validity. Yin considers an exemplary case study to:

- Be significant.
- Be complete.
- Consider alternative perspectives.
- Contain sufficient evidence.
- Be composed in an engaging manner (i.e. to be readable and enthusiastic).

Data relating to the following contexts add to the richness of case studies (Stake, 1994):

- The nature of the case.
- The historical background.
- The physical setting.
- Other contexts (micro and macro environments).
- Other cases through which this case is recognised.
- Informants through whom the case can be known.

Further aspects of case study theory that affect the conduct of the research are considered to be integral to the research influences and are therefore included as follows:

- (a) Validity and reliability – The authenticity of interpretive case studies is often questioned because of doubts over reliability and validity. This relates to the perception of a purely 'anecdotal' element to qualitative research and the subjectivity that is evident in it (Garcia and Quek, 1997).

In its simplest form the measure of reliability is whether the study can be replicated by someone else (Yin, 1994). This is a positivist view that still retains some relevance for an interpretive case study. As Kirk and Miller argue for all qualitative research:

Qualitative researchers can no longer afford to beg the issue of reliability. While the forte of field research will always lie in its capability to sort out the validity of propositions, its results will (reasonably) go ignored minus attention to reliability. For reliability to be calculated, it is incumbent on the scientific investigator to document his or her procedure

(Silverman, 2001:226)

Silverman argues that reliability can be addressed by using standardised methods and this is particularly important for interview transcripts. Detailed record keeping, including a study journal, and careful transcribing are essential to achieving reliability and a consistent approach to analysis of the data collected.

Garcia and Quek (1997) argue that validity in qualitative research depends not on the validity of the questions in a questionnaire, but on the interpretations from the questionnaire responses (Garcia and Quek, 1997:456). This requires that the method of data collection is valid, that the research method is valid, and that the analysis is valid. For the validity to be visible it is extremely important that the steps of the research study are carefully recorded and that data records are meticulously kept. While it is not possible for subsequent researchers to replicate the study (given the position of the researcher within the original study) for purposes of validity, they must be able to trace all the steps of the interpretation.

- (b) Relevance and rigour – The continuing argument of rigour versus relevance in the IS discipline (Benbasat and Zmud, 1999; Davenport and Markus, 1999; Hirschheim, 2001; Lyytinen, 1999) should not be used to obscure the fact that both are important in the conduct of an interpretive case study. Academic rigour is maintained by an adherence to properly theorised questions, with clearly defined concepts and using a research method that is appropriate to the questions and the context. Transparency in the research process and reporting is also required so that the research is visible to other researchers. Relevance refers to the need to take account of ‘real world’ people and situations while addressing a significant problem applicable to multiple audiences (Hirschheim, 2001).
- (c) Text and data analysis – The consideration of how the data should be analysed in a single-case, interpretive study is vital to the ultimate interpretation of the data and the outcome of the research itself. The influences of the case study method, together with those of the theoretical perspective of dialectic hermeneutics within an interpretive stance required that a plan of analysis is included in the research design.
- (d) The researcher – The role of the researcher in interpretive research is very different from that of a positivist researcher. The researcher is an integral part of the process (the instrument) and depictions of the researcher’s activities are legitimate (Kvale, 1996). The researcher’s involvement in the study requires a good understanding of the subject matter, a self-questioning approach and a recognition of the bias that the researcher brings to the study (Garcia and Quek, 1997; Klein and Myers, 1999; Trauth, 1997; Walsham, 1995). The subjective role that the researcher has in the collection and analysis of data must be addressed to highlight this bias rather than make assumptions that it does not impact on the study. There is also a question of trust between the researchers and the participants in the study, particularly over a longer period and the social interaction with the subjects will affect the interpretation of data.
- (e) Generalisation – The acceptability of case study research has suffered from a perceived lack of ability to generalise the findings, a clear outcome of positivist research studies. However, drawing on Yin (1994), Walsham argues that case studies are generalisable to theoretical propositions, and extends this to four types from interpretive studies: the development of concepts, the generation of theory, the drawing of specific implications and the contribution of rich insight. In giving examples of these generalisations he states that they should ‘ be seen as explanations of particular phenomena derived from empirical interpretive research in IS settings, that may be valuable in the future in other organisations and contexts’ (Walsham, 1995:79).

Conducting the research

Putting the research design into practice requires a methodical and rigorous approach to both data collection and analysis. An interpretive case study approach underpinned by dialectic hermeneutics requires a wide variety of data sources to be accessed and the data to be interpreted. Details of data collection and analysis are therefore included in the design.

Data collection

The multiple data sources accessed in an interpretive case study ensure that the social, political and organisational issues are set in context, and dialectic hermeneutics requires that an historical perspective be given to this context. Several sources of data will allow an

understanding of the case study organisation and also enable the context of the macro environment within which the organisation is operating to be interpreted. Yin (1994) sees multiple sources of data as a major strength of the case study method and he describes six types of data source all of which should be considered by the researcher:

- (a) Documentation – Access to company reports, e-mails, minutes of meetings and organisational manuals. These documents can be used to corroborate and augment other information and give an insight into the cultural, social and political make-up of the organisation. Searches should also be conducted for documents that contribute to information about the macro environment, such as reports on national and international legislation, industry perspectives and economic analyses.
- (b) Archival records – Organisational records relating to the historical context within which the organisation is operating. This is an important element of dialectic hermeneutics and applies particularly to metadata collection.
- (c) Direct observation versus participant observation – Direct and participant observations represent the seemingly two opposing stances that a researcher could take in an interpretive case study. Walsham (1995) describes these as the involved observer and the outside observer and Trauth (1997) discusses the need for researchers to get near to people while at the same time retaining the ability to question their own assumptions. Direct observation allows for both formal and informal observation of the workplace that will provide additional information on the context of the subject matter within the organisation. Participant observation allows the researcher to observe from the perspective of 'one of the team', which often offers different insights through less guarded, more social interaction with the participants (Trauth, 1997).
- (d) Physical artefacts – This category of evidence includes sources such as videos (for example, promotional videos by companies), computer links and conversation tapes.
- (e) Interviews – Interviews often provide the bulk of the data collected during case study research. The successful conduct of an interview requires much thought and preparation to gain spontaneous, rich and relevant answers. There are various types of interview from highly structured to open interviews with one topic-introducing question (Kvale, 1996) and consideration must be given to the most appropriate format for the case study situation. In a dialectic hermeneutic approach, transcripts of taped interviews are treated as text analogue and contribute significantly to the interpretation of perceptions and opinions.

In addition to the above data sources, a study journal is a valuable source of data for reflection on the researcher's bias. It also serves as a record of less formal influences and as a journal of data records allowing for the tracing and verification of the research trail (Trauth, 1997).

Data Analysis

In interpretive case studies, analysis is not an isolated stage in the research process, but an integral and ongoing part of the data collection process. This is particularly true of the interview method of data collection where meaning, clarification and interpretation are ongoing through the interview and subsequently. The theoretical basis also provides a context for the decisions to be made about the analysis that must draw together the research influences in an appropriate manner. Hermeneutics particularly suggests a way of understanding textual data: 'The object of the interpretive effort becomes one of attempting to make sense of the organisation as a text analogue.... the aim of the hermeneutic analysis becomes one of trying to make sense of the whole, and the relationship between people, the organisation and information technology' (Myers, 1997).

The majority of the data will be in text form, whether from documents and records or from transcripts of interviews. Interview texts need to be distinguished from literary texts in that they are tied to a specific interpersonal situation and are usually not well articulated (Kvale, 1996). They therefore need to be analysed with some in-depth meaning. Silverman (2001) highlights the problems of analysing text and cautions that although content analysis is an accepted method of textual investigation, it can be confining in its use of a set of categories,

which Kvale calls 'categories of meaning'. Kvale suggests that ad hoc methods for generating meaning allows the researcher access to a variety of commonsense approaches to interview text using an interplay of techniques such as noting patterns, seeing plausibility, making comparisons etc.' (Kvale, 1996:204).

Figure 1 shows the steps of data analysis, indicating the two separate but concurrent methods of interviewing and additional data collection, culminating in the reiterative analysis of the hermeneutic circle.

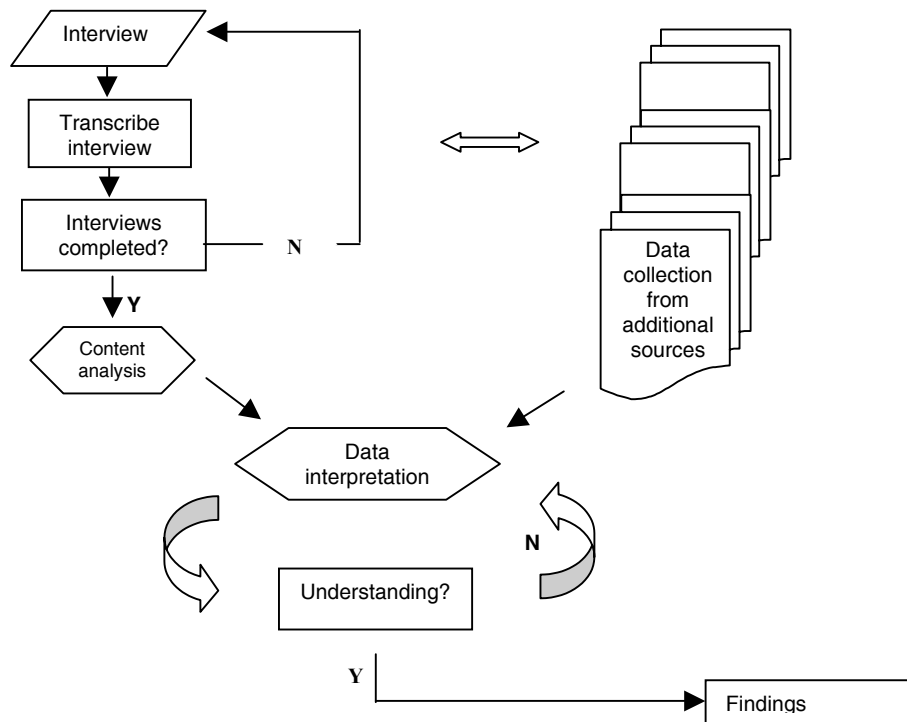


Figure 1: Data analysis steps

THE RESEARCH MODEL

The research model (Figure 2) shows the factors and influences that the researcher is subject to in the conduct of the research. The outer circle shows the position of the research questions as key to any study. It is these questions that will determine the design of the research paradigm and the theoretical influences through which the researcher conducts the research. The researcher is central in an interpretive study and plays an integral role, collecting the data from a range of sources within the context of the theoretical influences, and interacting with both the micro and macro environments. These influences have a powerful effect on the way the researcher arrives at the study findings, which are reached through analysis and interpretation of the data, combined with the reflection that maintains the identification and openness of any bias from the researcher and influence from the micro and macro environments. Considerations of rigour and relevance, validity and reliability are centred around the study findings. Such influences radiate throughout the research study and are an integral and vital element of any interpretive study if such a study is to attain academic thoroughness.

The research model is designed as one method of approaching an information systems case study. It aims to provide awareness of the influences that come into play in a single-case study while maintaining the necessary theoretical design perspectives that are required in the interpretive research paradigm. The research model advocates that due regard is given to the macro and micro forces that form the context within which the research is carried out. This adds to the amount of data that will require interpretation, but the rich insights that are to be gained from the rigorous conduct of such research will contribute much to IS research.

The conducting of more single-case interpretive studies in areas of the information systems discipline, such as detailed in this paper, will enable empirical evidence to be gathered that will provide valuable, in-depth examinations into many different areas of information systems. One example is in the area of IS evaluation where the “positivist, mechanistic paradigm” still dominates the process (Jones and Hughes, 2001) and where research has shown that effective studies are rare with few organisations able to gain meaningful information from the evaluation process (Ballantine and Stray, 1994; Hirschheim and Smithson, 1999; Ward *et al.*, 1996).

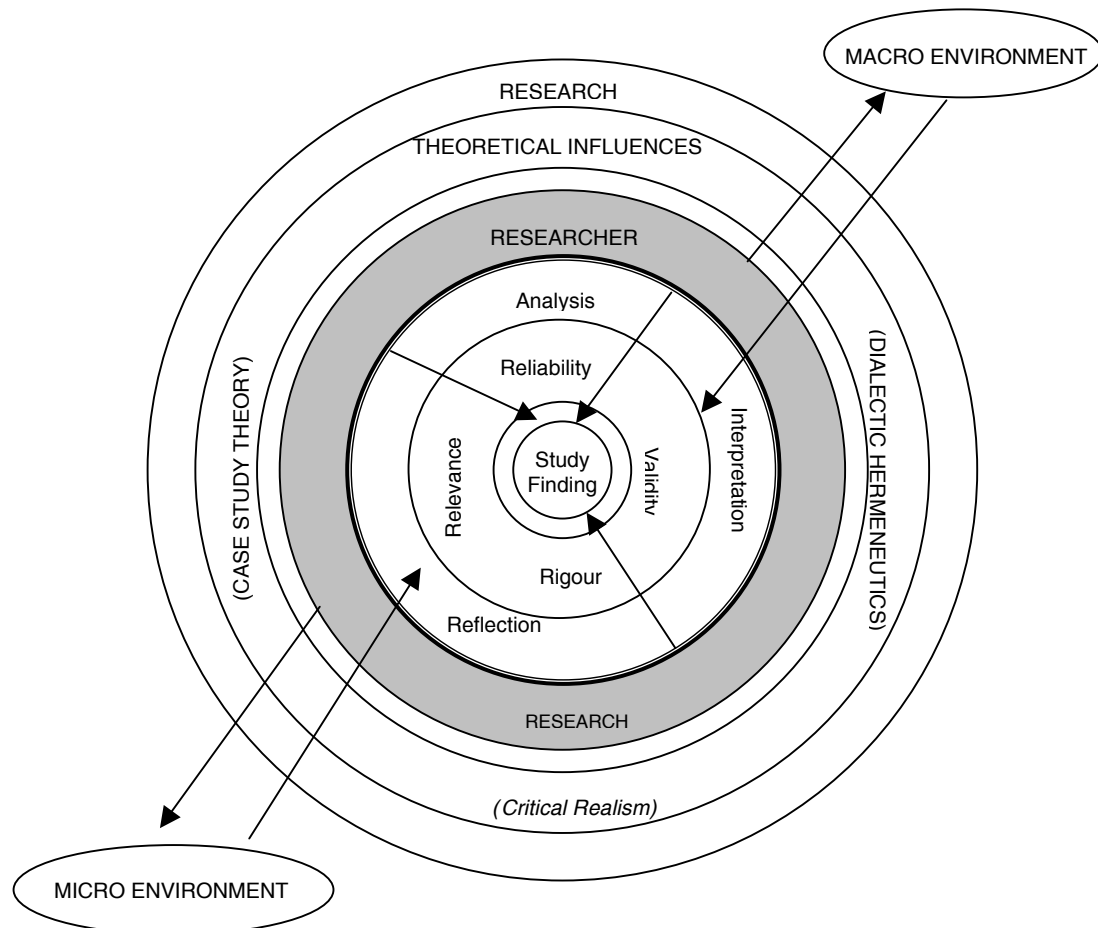


Figure 2: Model of Research Influences

APPLYING THE MODEL: EVALUATION OF IS

Applying the proposed research methodology to one area of IS research, such as evaluation, highlights the advantages of the interpretive paradigm in an area of great complexity where multiple influences require to be identified in the analysis. It also emphasises the importance of extending the research area to include the wider environments. The case study approach allows for ‘an in-depth investigation and rich description’ of an area where the phenomenon is dynamic rather than matured or settled (Darke *et al.*, 1998). This rich description can then inform other organisations operating in the dynamic environment of information systems where empirical evidence of evaluation methods remains very limited (Hirschheim and Smithson, 1999).

The dynamic environment is a result of the rapid developments in information technology that have led to more pervasive and complex information systems becoming a competitive necessity in the fast moving electronic environment of the new century. The network-based, interorganisational systems now available have extensive consequences for an organisation in terms of economic, organisational, social and management terms. These are intertwined with enormous changes in the macro environment where increasing competition, a climate

of acquisitions and mergers, regional legislation and other global pressures are impacting on businesses augmenting the drive towards greater speed, flexibility and responsiveness.

The benefits to be gained from implementing such systems are not anticipated to be definable in simple terms. They are often intangible, uncertain and difficult to quantify, and the interest groups and individuals concerned with the system have different perspectives and goals. These systems are becoming an organisational necessity and to evaluate them in terms of a cost benefit analysis or from a technical viewpoint would overlook the extensive benefits to be gained in strategic and managerial areas as well as the organisational impact. To realise the benefits that are available a rich, encompassing view of the situation is required. The proposed methodology requires multiple sources of data including in-depth interviews and dialectic hermeneutics allows for the divergent perspectives to be analysed and placed in the context of the organisation with due regard to the influences from the external environment affecting benefits, both tangible and intangible. These influences will also be affected by the role of the researcher who will interact with the stakeholders, but who will also be required to analyse and interpret the data through an iterative examination of the texts. Transparency in the research process will show where biases exist and will enhance the rigour and allow the reliability and validity of the evaluation to be visible.

This approach is consistent with the growing support of researchers for a more holistic view of the evaluation process (Farbey *et al.*, 1995; Hirschheim and Smithson, 1988; 1999; Serafeimidis and Smithson, 1994b; Smithson and Hirschheim, 1998; Walsham, 1993; 1999; Willcocks, 1992). Empirical evidence from such studies will then enable the extension of interpretive evaluation processes into the practitioner field and thereby move organisations away from their current adherence to mechanistic methods and promote more effective and holistic approaches to IS evaluation.

SUMMARY

In the current environment where information technology is becoming an integral part of the business environment there is further need to move from the traditional positivist paradigm of information systems research to an interpretive view. Information systems are a combination of technology and social activity and to ignore either of these results in incomplete research. To apply the scientific view of positivists to the social activity inherent in the examination of IS ignores the need for a deeper understanding of individuals' perceptions and beliefs and an understanding of how they are interacting with the technology. Such understanding is facilitated by an interpretive paradigm that allows for an examination of phenomena through the meanings that people assign to them and enables complex, sometimes intangible, issues to be addressed.

However, the conduct of interpretive research requires an adherence to rigorous methodological design, the lack of which has been a long held criticism of positivists. The proposed research model addresses the influences that impact upon an interpretive case study using a theoretical framework of dialectic hermeneutics, underlining the ways that rigour and relevance, validity, reliability and applicability can be address in an interpretive case study. The model also recognises and emphasises the need for the research to be placed in context and this requires that the data gathering and analysis techniques pay due regard to all the influences of the research. The context is defined by the internal organisational culture (micro environment) and the wider external environment (macro environment), which impact on an organisation and affect the way it operates. Due regard to such influences in the research will enable more fruitful and effective understanding of information systems.

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