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# EPISTEMOLOGY AND METHODOLOGY IN CASE RESEARCH: A COMPARISON BETWEEN EUROPEAN AND AMERICAN IS JOURNALS

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## Abstract

*The case study is an important research method in Information Systems research. It enables us to study contemporary and complex social phenomena in their natural context and is one of the most widely used qualitative research methods in the field. Case studies are used in both the positivist and the interpretist epistemological tradition. Studies on the evaluation of case research tend to focus on only one of these epistemological standpoints and tend to have a North American bias when it comes to journal selection. This study evaluates 62 case studies that have been published in North American and European top journals and that have been conducted from both epistemological stances. In this study I compare papers published in American and European journals on epistemology, methodology and pluralism with respect to other sciences such as sociology, psychology or history. The evaluation is done in the qualitative tradition (because it concerns qualitative studies). In this way it provides IS researchers with a colourful palette with which they can paint their own case study designs and reports.*

*Keywords: Case research methodology, Epistemology, European perspective, Evaluation.*

# 1 INTRODUCTION

Case studies are an important research method in areas where innovations are studied, such as in the field of IS. They enable us to study contemporary and complex social phenomena in their natural context (Yin 1994; Walsham 1995). Case studies are conducted from the positivist as well as from the interpretist epistemological perspective (Cavaye 1996-a). Over the years researchers working from both epistemological perspectives have addressed important methodological issues (Benbasat, Goldstein and Mead 1987; Eisenhardt 1991; Yin 1994; Walsham 1995; Cavaye 1996-a; Darke, Shanks and Broadbent 1998; Nandhakumar and Jones 1997; Klein and Myers 1999) and several studies have evaluated the operational use of the case study method in the IS field (Benbasat et al. 1987; de Vries and Roest 1999; Dubé and Paré 2003).

These evaluative studies tend to include studies from just one epistemological perspective or tend to have a North American bias in their journal inclusion strategy. The studies of Benbasat et al. (1987) and Dubé et al. (2003) only included positivist papers, which has the danger of contributing to the impression that this case study variation is the only or preferable one (Cavaye 1996-a). The studies of Benbasat et al. (1987), Dubé et al. (2003) and De Vries et al. (1999) have a North American bias. Benbasat selected only North American journals and conference proceedings (major European journals and conferences had yet to be launched). Dubé et al. and De Vries et al. based their journal selection on Benbasat et al. and IS journal-ranking studies available at that time, e.g. Hardgrave and Walstrom (1997) or Whitman, Hendrickson and Townsend (1999). These two journal-ranking studies worked with a predefined basket from which respondents could rank journals. These studies have the limitation of being focussed on North American samples (Lowry, Romans and Curtis 2004).

Lowry et al. (2004) have published the largest global scientometric survey to date of IS journal rankings and break with the predefined basket tradition. They used free recall of top journals in their research. Their study indicates that the top five journals in Hardgrave et al.'s (1997) rating are still viewed as the top five by the global IS community (and are the same as the North American top five). However, when they differentiate between journal ratings by North American and European respondents, the top five of European respondents contains two European journals.

This suggests the value of including European journals in an evaluative study of case research to compare these with journals from North American origin. This study does so. I investigate whether there are differences in epistemological perspectives, the application of methodology, pluriformity in reference disciplines or frequency in case research publication. I have included papers from the American and the European top five. These have been published ten and fifteen years later than those included in the first evaluative study (Benbasat et al. 1987). I have included positivist and interpretive studies and I have investigated these on positivist and interpretive criteria respectively. The analysis is primarily qualitative because the study concerns the use of qualitative research. I begin this paper with a review of the literature. In the following sections the study design and the results are presented. I conclude the paper with a discussion of the results, conclusions and recommendations. The length of this paper would have become too long for a conference paper if I would have met the requirement for qualitative research to provide a view on the basic research material (Yin, 1994), in this case the references to all research papers and the findings of the analysis. Therefore, the complete reference list of the 62 analysed papers and the largest data display with the findings of the analysis of 52 papers (table 3) are offered in a working paper (de Vries 2004) on the Internet.

## 2 LITERATURE

### 2.1 Earlier studies on the use of case research in IS

Almost twenty years ago, Benbasat et al. (1987) presented an instrument for the evaluation of case studies. They came to the conclusion that many researchers seem to ignore important methodological issues. They stated: "...we identified a number of problems..Some of these might be alleviated by asking the authors to provide more information about their research objectives and research plans. However, it appears to us that, in many instances, the investigators had not considered some of the methodological issues" (p. 383). In general, the objectives of the studies were not clearly specified; the motives for conducting a single or multiple case study were not explained and the choice of sites was not tied to the research design. In many cases, the data collection method was ambiguous and details were not provided. The researchers rarely used triangulation to increase the reliability of the study.

De Vries et al. (1999) questioned the state of affairs ten years later. They did the same evaluation as Benbasat et al., although they took into consideration the difference between positivistic and interpretive studies and they paid more attention to data analysis techniques. For the bulk of the studies (which were positivist in nature), they concluded that progress had been made but there was still a need for improvement, especially when it came to making the entire chain of evidence explicit, so that the audience could follow the relations between theory, units of analysis, site selection, data sources, data analysis techniques, data and conclusions. On average the chain of evidence was better established in the studies published in the top five journals of Hardgrave et al.'s (1997) rating and in the Proceedings of the International Conference on Information Systems (ICIS).

Dubé et al. (2003) have done an evaluation on almost the same criteria as de Vries et al. and Benbasat et al. (although some of their criteria are more detailed). They have included all case studies published in the Nineties in seven IS journals, but they only have taken positivist case studies into consideration. Dubé et al.'s conclusion is: "While the data clearly show that there has been modest improvement in some areas, actual positivist case researchers in IS often ignored or largely ignored the guidelines provided by experienced case research methodologists.." (p. 626). The amount of studies analysed and the ten years period over which has been analysed in this study is impressive, however this seems to come to the detriment of qualitative data analysis, the primary kind of analysis that is expected in a survey of qualitative studies. They have restricted themselves to counting and they haven't weighted journal ratings in their counting (although the ratings of their selected journals spread considerably in Hardgrave et al.'s (1997) rating: 1, 2, 5, 20 and three non-top 25 journals). One would expect access to the basic material, however Dubé et al. haven't provided data displays like table two and three in this study nor haven't they included the analysed papers in their reference list, as was done by Benbasat et al. (1987) and de Vries et al. (1999). Furthermore, they haven't been very explicit in their journal selection criteria. They have based their selection on Benbasat et al. (1987) and "the evaluations of top-ranked journals by Hardgrave et al. (1997) and Whitman et al. (1999)" (p. 600) and in a footnote they mention to have selected two journals because these were "two most prominent journals publishing qualitative research" (p. 600). How the inclusion of these last two journals relates to the fact that both are not part of the top 25 in the rankings is not discussed. Furthermore, it remains unclear why they have included the European Journal of IS and why they have excluded the ICIS Proceedings, which were part of Benbasat et al.'s study.

### 2.2 Studies on epistemological and methodological issues of case research

Benbasat, et al. (1987) used the following criteria in their evaluation.

- The research themes. The investigator must confirm that the research theme is applicable to case research. This is especially the case when the phenomenon of interest cannot be studied outside its natural setting; the study focuses on contemporary events; the researcher has no control over subjects or events; or the phenomenon under analysis doesn't enjoy an established theoretical base.

- The research objectives. The investigator must show what function the study has in the knowledge building process (exploration or explanation). The case study is an accepted strategy for both objectives (Benbasat, et al. 1987; Yin 1994; Cavaye 1996-a; Darke et al. 1998).
- The amount of cases, the unit of analysis and site selection criteria. This serves to make the research topic explicit and sets the domain for which the conclusions are valid. Furthermore, it indicates the degree to which the theory has undergone falsification. In a multiple case study the researcher should make his replication logic clear, which is basically a choice between literal and theoretical replication (Yin 1994; Cavaye 1996-a).
- Data collection method, including sources of data, triangulation and the establishment of a formal review process, a case study database and a protocol. Multiple data sources make triangulation possible which increases construct validity (Yin 1994). The reliability of case studies can be increased by using review procedures, a case study database and a case study protocol (Yin 1994; Darke et al. 1998).

Since Benbasat et al. (1987), at least two methodological issues have been discussed in the literature, which place their work in a different perspective: the work published on qualitative data analysis techniques and the epistemological debate.

Miles and Huberman (1994) have stated that we lack a bank of explicit qualitative data analysis techniques to draw on and that few conventions and guidelines are in use. Yin (1994) has recommended triangulation between data sources (data triangulation) or among different evaluators (investigator triangulation). Miles et al. (1994) have recommended text analysis, coding and data displaying: "you know what you display". Lacity and Janson (1994) have provided us with an overview of positivistic (content analysis, verbal protocol analysis, script analysis), linguistic (speech act analysis, discourse analysis) and interpretive (hermeneutics, intentional analysis) approaches. Glaser and Strauss (1967) introduced a specific inductive data analysis approach based on open, axial and selective coding in their Grounded Theory (GT) approach.

Case studies can be done from a positivist or interpretist epistemological perspective (Cavaye 1996-a) and the nature and purpose of both perspectives differ (Olikowski et al. 1991; Klein et al. 1999). Positivist belief that the world conforms to laws of causation, which could be objectively tested. Their research approach is hypothetico-deductive and confirmatory (Fitzgerald and Howcroft 1998; Lacity et al. 1994; Orlikowski and Baroudi 1991). Benbasat et al.'s work is positivistic (Walsham 1995; Klein et al. 1999). Interpretist belief that multiple realities exist as subjective constructions of the mind. They see the world as socially constructed. They attempt to understand phenomena through analysing meanings people assign to these phenomena. Their research approach is inductive and concerned with discovering and interpreting social patterns. (Fitzgerald et al. 1998; Klein et al. 1999; Lacity et al. 1994; Orlikowski & Baroudi 1991; Walsham 1995). As both perspectives are incommensurable (Fitzgerald et al., 1998), differentiation in criteria applied to both perspectives should be taken care of (Gummesson, 1991) and scholars need to make their epistemological orientation explicit to inform the reader about how to review the paper (Gummesson 1991; Walsham 1995).

Walsham (1995) has recommended several methodological issues to take care of in interpretive case studies: to make the epistemological stance explicit; to provide a 'thick description' in the anthropological tradition; and to discuss how theory is used: as an initial guide for data collection, as part of an iterative process of data collection and analysis, or as a final product of the research. Researchers have been further advised to discuss their role in data collection: that of outside observer or that of involved researcher. Furthermore, Walsham has recommended to provide details on research sites; site selection criteria; amount of people interviewed and their organisational positions; data sources (including the amount of cases); period of study; and data analysis techniques.

Klein et al. (1999) have proposed a set of principles to conduct and evaluate interpretive case research (see table one) which are based on the philosophical perspective of hermeneutics and which mostly apply to studies of this nature. They have used the word principles to stress that it is incumbent on other people to decide whether and how these principles should be applied in their research project.

1. The fundamental principle of hermeneutic circle	4. The principle of abstraction and generalization
2. The principle of conceptualisation	5. The principle of dialogical reasoning
3. The principle of interaction between researchers and subjects	6. The principle of multiple interpretations
	7. The principle of suspicion

Table 1. Seven principles for interpretive case research (Klein et al., 1999)

### 3 THE STUDY DESIGN

The main criterion throughout this paper is explicitness. I follow Shipman (1982) in that academics can be distinguished from others on the following ground: their methods and research procedures are made public. In table two and three, I differentiate between findings made explicit in the papers and those that are my own interpretation. I have analysed positivist studies by the same definitions and criteria as Benbasat et al., which have become the de facto standard (Klein et al. 1999). I have added two criteria, based on the methodological discussion in the literature since the study of Benbasat et al.: explicitness about the data analysis techniques and about the epistemological orientation. I have analysed interpretivist studies by Walsham's recommendations and Klein et al.'s principles.

I have reviewed 62 research papers published in *Management Information Systems Quarterly (MISQ)* (Vol. 20, 21, 25, 26); *Information Systems Research (ISR)* (Vol. 7, 8, 12, 13); *Communications of the ACM (CACM)* (Vol. 39, 40, 44, 45); *Journal of Management Information Systems (JMIS)* (Vol. 12, no. 3-4; Vol. 13; Vol. 14, no. 1-2; Vol. 17, no. 3-4; Vol. 18; Vol. 19, no. 1-2); *European Journal of Information Systems (EJIS)* (Vol. 5, 6, 10, 11) and the *Information Systems Journal (ISJ)* (Vol. 6, 7, 11, 12).

The first four journals belong to Lowry et al.'s (2004) global top five and were included in the studies of Benbasat et al. (1987) and de Vries et al. (1999) as well. I haven't included the fifth journal out of this top five (*Management Science*) because it isn't a 'pure' MIS journal (Hardgrave et al., 1997) and because it didn't appear in the other two studies. *MISQ*, *ISR* and *JMIS* were part of Dubé et al. (2003) as well. *EJIS* and *ISJ* have been included to compare between European and North American journals and because these belong to Lowry et al.'s (2004) European top five (*MISQ*, *ISR*, *CACM*, *EJIS* and *ISJ*; *JMIS* was sixth). Benbasat et al. and de Vries et al. also included *Information & Management* and the *ICIS Proceedings*. I have excluded these from this study because of constraints on paper length. This study is restricted to analysis of top journals because de Vries et al. have already found that the chain of evidence was better established in the studies published in these journals. The unit of analysis (and data source) in this study are the papers, not the actual research process. It could thus be the case that researchers actually applied methodological techniques in their study but didn't make these visible in their paper.

The intention was not to take a representative sample but rather to get a general overview. I have followed a replication logic, not a sampling logic (Yin 1994). Papers have been included in the review when the authors explicitly mentioned to have applied the case study method. I have excluded action research studies, ethnographic studies, application descriptions and short illustrations, like Benbasat et al. and de Vries et al. did. These are related but different research methods (Cavaye 1996-a).

For data analysis I have used content analysis, a specific method of text analysis (Lacity et al. 1994). I have coded the text with abbreviations of the methodological criteria and principles and summarized these in conceptual ordered data displays (Miles et al. 1994). In the analysis and discussion in this paper the emphasis is on qualitative analysis and on the data displays table two and three. In the description I refer to a mixture of 'following-the-book' practice, extraordinary practice and 'not-conform-the-book' practice to provide other researchers with a colourful palette from which they can draw their own case study design and presentation. To allow for some general overview and basic comparison with earlier studies, I provide some basic figures.

## 4 RESULTS

I begin by splitting papers with an interpretive orientation from the positivist ones. The analysis of interpretive studies is presented in table two and section 4.2. The positivist studies are presented in table three in de Vries (2004) and are discussed in section 4.3 - 4.5. Table three in de Vries (2004) provides the following for each paper: reference, research theme, explorative/explanative, amount of cases, site selection criteria, unit of analysis, data sources, data analysis techniques, and usage of triangulation. The qualitative data in table three in de Vries (2004) has been presented at the same level of detail as in table two in this paper. Papers that have been published in the European Journals *EJIS* and *ISJ* are referred to in italics in table two and three and in the text in section four and five.

### 4.1 Epistemological orientation

In seven papers an interpretive orientation is explicitly stated. All other papers in table two have been interpreted by the author to be interpretive. Analysis of the structure and reasoning of all other papers gives ground to the assumption that these fall under the traditional positivistic orientation of IS research and have been included in table three. Only in one paper a positivistic orientation is explicitly stated (Guha, Grover, Kettinger and Teng 1997). *Huang, Newell and Pan* (2001, p. 163) state in their sub-section on data collection methods: "...the general approach of this study is interpretative in character.." because they found "going into the field" necessary. Except from this phrase, indications of an interpretive orientation have not been found and the research design and the way they describe and discuss their study results rather indicate a positivistic orientation instead of an interpretive one. Therefore this paper has been included in table three.

### 4.2 Interpretive studies

In all interpretive studies the cases and their context are described in a thick description. *Willcocks, Fitzgerald and Lacity* (1996) describe 26 cases on an aggregated level and elaborate on one of these cases by sketching a rich picture. They explicitly place their study in a multi-method research programme on ICT outsourcing.

*Jones and Hughes* (2001) suggest an interpretive approach to IS evaluation based upon situated action and hermeneutics. They recognize the centrality of the hermeneutic circle and the importance of the inclusion of situated social actors in context. Their study is "one in which the subjectivity of the interpretation refers to how the meaning and understanding of the actors is reflected in the final report" (p. 193), thus being sensitive to differences in interpretation (Klein et al.'s principle 6).

*Wastell* (1996) describes a case study in which the SSADM methodology worked out to be a social defence, a set of rituals with the primary function of containing anxiety. The method allowed practitioners to deny feelings of impotence in facing their challenges by withdrawing into the fantasy world of the methodology. He starts his paper right from the case, following with some theory on structured methods and a brief introduction of his research approach. Then he interprets the case by psychoanalytic theory, revisits the case and interprets it again. Theory is used iteratively. His basic point is that methodology might prevent people from getting into the social process and he sees positivist methodologies often function in the same way. It is my interpretation that Wastell gets right into his case and refrains from elaborating on his research method to preclude an accusation of having a research method in between him and social reality in his case.

The paper of Robey and Sahey (1996) seems to take principle 1, 2, 4, 5 and 6 into account. When it comes to principle 5 and the role of theory, their literature review remains restricted to providing an overview on earlier studies and refrains from deriving theoretical preconceptions. In their discussion section new theoretical concepts are introduced to arrive at a general understanding of the two cases. When it comes to principle 3, Robey et al. (1996) state that interpretive research assumes that reality is socially constructed by those studied as well as by the researchers themselves, but they don't discuss

how their research material was socially constructed in the interaction between them and those who were researched.

Many of the interpretive studies seem to be open to other sciences, like Psychology (Wastell 1996); Sociology, mainly structuration theory and the social shaping of technology theory (Nandhakumar 1996; Jones et al. 2001; Wilson and Howcroft 2002), but also political and social processing theory (Nidumolu, Goodman, Vogel and Danowitz 1996); Economics, i.e. innovation theory (Baskerville and Pries-Heje 2001); Organisational Science, i.e. organisational learning (Robey et al. 1996); and Business studies (Janson, Brown and Taillieu 1997); and/or take a more philosophical approach (Wastell 1996; Janson et al. 1997; Jones et al. 2001).

Authors	Theme	Ep	P1	P2	P3	P4	P5	P6	P7	TD	Cases
Baskerville et al. (2001)	Diffusion of innovation	Ex								Yes	1
Janson et al. (1997) <sup>L</sup>	IT enabled organisational form		R	R						Yes	1
Jones et al. (2001)	IS evaluation	Ex	Ex	Ex		Ex		Ex		Yes	1
McBride (1997) <sup>L</sup>	Success/failure of EIS	R <sup>3</sup>								Yes	1
Nandhakumar (1996) <sup>L</sup>	CSF EIS	Ex	R	R		R				Yes	1
Nidumolu et al. (1996) <sup>L</sup>	IS implementation	Ex		R				R		Yes	13
Robey et al. (1996)	ICT and organisational change	Ex	R	R		R	R	R		Yes	2
Wastell (1996)	Structured methodology	R	R	R		R				Yes	1
Willcocks et al. (1996) <sup>L</sup>	ICT sourcing decisions	Ex	R <sup>4</sup>	R <sup>4</sup>		R				Yes <sup>4</sup>	26
Wilson et al. (2002) <sup>L</sup>	Failure explained by SST	Ex	R	R		R		Ex		Yes	1

  

Authors	Role of theory	Role Res	SS criteria	Details site	Period of study	#People	Position	Data sources	Data analysis technique
Baskerville et al.	IG*			Yes				IV, O	
Janson et al. <sup>L</sup>	IP*			Yes	'92-'94		Ex	IV, D	
Jones et al.	IG, Pd*			Yes		6	Ex	IV, D, O	GT: open and axial coding and theoretical sampling
McBride <sup>L</sup>	Pd*			Yes	3 years	2		IV	
Nandhakumar <sup>L</sup>	IG, Pd* Invo			Yes	6 months			<sup>1</sup>	<sup>2</sup>
Nidumolu et al. <sup>L</sup>	IG, Pd*	Ex		Yes	'92-'93		Ex	IV, D	Theme based coding
Robey et al.	Pd*	Ex		Yes		60	Ex	IV, D, A	Theme based coding, comparison of 2 cases
Wastell	IP*			Yes			Ex	IV	
Willcocks et al. <sup>L</sup>	Pd*	Ex		<sup>4</sup>	'93-'95	106	Ex	IV, D	Intentional analysis
Wilson et al. <sup>L</sup>	IG, Pd*			Yes	10 months	20	Ex	IV, D, O	Theme based, inductive and deductive

Ep=Epistemological stance; P=Principle (see table 1); TD=Thick Description; Res=Researcher; # People =amount of people interviewed; Position=Position and role of interviewees; SS criteria=Site Selection criteria; Ex=Explicitly mentioned; R=Recognizable, but not explicitly stated; IG=Initial Guide; IP=Iterative Process; Pd=Product; \* Not explicitly stated / interpretation of reviewer; Invo=Involved; IV=InterView; D=Document; O=Observation; A=Archival records; <sup>L</sup> Longitudinal; <sup>1</sup> Observation, notes and log of team activities; <sup>2</sup> Two steps: how critical factors were seen and the nature of their influence; <sup>3</sup> Recognizable because he explicitly draws on interpretive studies; <sup>4</sup> Limited for the 26 cases; recognizable for the 'rich picture case'.

Table 2. Review of interpretive studies



### 4.3 Positivist studies: research themes and objectives

The research *themes* of the studies are applicable to case research and many authors motivate why they deem case research to be a suitable methodology for their research (50%). *Huang et al.* (2001) provide three reasons for conducting their case study: flexibility in data collection, understanding from an insider's view and a more holistic picture. Henderson and Lentz (1996) and *Peppard* (2001) explicitly place their study in a *research programme*.

Most studies stayed within the IS discipline in their use of theory. Additional *reference disciplines* that were used are: Computer Science, i.e. software engineering and data mining (*Kaasbøll* 1997; Baster et al. 2001; *Bowen et al.* 2002; *Hirje* 2001; *Stamelos, Angelis, Oikonomou and Bleris* 2002); Organisational Science, i.e. organisational learning (*Agarwal, Krudys and Tanniru* 1997; *Guha et al.* 1997; Henderson et al. 1996; Robey, Ross and Boudreau 2002; Stein and Vandenbosch 1997), politics and power (*Cavaye and Christiansen* 1996; Sillence and Mouakket 1997), organisational behaviour (Newmann and Sabherwal 1996), control (Kirsch 1997; Sia and Neo 1997) and work monitoring (George et al. 1996); Economics, i.e. industrial dynamics (Clemons et al. 1996); Decision Sciences, i.e. operations management (*Hipkin* 1996); and Business studies (Brown 1997; Chatfield and Bjørn-Andersen 1997; Clark, Cavanaugh and Brown 1997; Cross, Earl and Sampler 1997; *Guha et al.* 1997).

Most studies are *exploratory* (about 80%), but these are rarely used to *generate testable hypotheses*. *Akkermans and van Helden* (2002) are an exception. They differentiate between three stages in their study: assessment of CSFs, causally interrelating CSFs and the formulation of tentative research propositions as candidates for further research. Ten percent of the studies are *explanatory*. Explicitly stated *hypotheses are tested* in four explanatory studies (*Agarwal et al.* 1996; Clark et al. 1996; *Bowen et al.* 2002; *Hirji* 2001) and two hybrids (Brown 1997; *Cragg* 2002). *Cragg* (2002) explicitly differentiates between an exploratory and explanatory stage. In stage one, he has conducted 4 exploratory case studies from which he has identified IT practices that were suitable for benchmarking. In stage two, he has tested 11 propositions that were based on these practices by interviewing 30 small firms.

### 4.4 Positivist studies: unit of analysis, site selection criteria and the amount of cases

In less than 40% of the papers the *unit of analysis* is explicitly specified, for the other papers the unit of analysis has been determined by interpretation of the reviewer, which is often quite obvious because authors tend to be consistent throughout their paper in denoting the object of their study. In four papers an *embedded design* is explicitly mentioned. *Bowen et al.* (2002) have examined three systems within one government agency. *Murphy and Simon* (2002, p. 310) also seem to have used an embedded design, however, instead of calling it embedded, they state that although the study is presented as a single case study, it "was more a multiple case study conducted simultaneously within a single organisation", because they "collected data from a variety of levels within the organisation and across divisions within levels".

The *site selection criteria* were described in 40 % of the papers. *Shang and Seddon* (2002) selected 233 cases of web-published vendor success stories on ERP out of 470 studies based on 4 site selection criteria. The ERP systems involved in their study were selected on 6 criteria. Part two of their study was on 4 cases selected from the utility industry in Australia on the criterion of having been used for at least 3 years.

Half of the studies have a *multiple case* design. *Guha et al.* (1997), *Peppard* (2001) and *Hipkin* (1996) report their *replication logic*. Yin (1994) proposes that a single case study can be especially suitable in the event of a '*critical*', '*unique*' or '*revelatory*' case. Brown (1997) explicitly mentions such a type of case and although *Akkermans et al.* (2002) don't call it an unique case, their case has the characteristics and they explicitly have justified why they selected just one case. In their case study on critical success factors in ERP implementation project performance was initially low leading to almost complete failure of the project but turned into a successful project, thus enabling the researchers to study both

situations in one case study. *Zinatelli, Cragg and Cavaye* (1996) explicitly mention to have used one of their eight cases as a *pilot* case.

#### 4.5 Positivist studies: data collection and analysis

Most case researchers describe their data collection method, except for six studies. Interviews and documentation are the usual *sources of data*. In twelve studies *review procedures* are mentioned explicitly. *Murphy et al.* (2002) have described their data collection and review procedures at length, consisting of tape recording, transcription by an independent service, verification and confrontation with field notes by both researchers and the company official and follow-on interviewing. In four papers usage of a *case study database* is mentioned and in six papers the use of a *case study protocol* is reported.

The *data analysis technique* is specified in 40% of the studies. The overall picture is pluriform. *Kirsch* (1997) has provided detailed insight into her coding and displaying approach. *Akkermans et al.* (2002) have used a special mapping technique, causal loop diagramming, to interrelate critical success factors inductively. *Counihan, Finnigan and Sammon* (2002) have used tree analysis and meta-matrices. *Huang et al.* (2001) have referred to grounded theory and elaborate on their use of coding techniques. *Shang et al.* (2002, p. 281) however, have provided very limited information when it comes to grounded theory: "The approach to grouping was similar to axial coding in grounded theory". In four studies qualitative and quantitative techniques have been combined. *Akkermans et al.* (2002), *Bowen et al.* (2002), *Clark et al.* (1996) and *Cox and Ghoneim* (1996) have used a *multi-method* approach. During one phase of *Akkermans et al.*'s (2002) longitudinal study of almost three years action research was used. *Bowen et al.* (2002) have combined statistical tests with questionnaires, interviews and document analysis. Thirty percent of the studies reported usage of *triangulation*. *Akkermans et al.* (2002) have mentioned independent interviewers for different research phases and triangulation of data sources.

Eight studies reported to be *longitudinal*. *Akkermans et al.* (2002) have provided a comprehensive timeline and have used different time points for data collection. *Shang et al.* (2002) call their study longitudinal but data was just collected at one point in time (although this data covers ERP benefits over a three years period). The study of *Peppard* (2001) took 30-40 months and data was collected at different time points. *Newmann et al.* (1996) collected data at five points in time over a period of 17 years.

## 5 DISCUSSION

In the two periods studied, the European journals show more openness to non-traditional approaches. These journals tend to publish more interpretive studies than the American ones and the interpretive studies seem to be more open to other sciences and take more often a philosophical approach. Some of the papers are quite 'non-traditional'. *Wastell* (1996) seems to position himself 'above' methodology. *Janson et al.* (2001) have linked the post-modern stance of Mr. Colruyt, the leader of a large supermarket chain in Belgium, and the Catholic and Marxist influences on his life to the management approach and organisational form of his successful business, to learn how to manage in a post-modern society. *Avgerou* (2001) discusses contextual influences on ICT innovation in Cyprus on a meso/macro level. The study of *Currie and Seltsikas* (2001) surprises because of its actuality, studying the supply side of outsourcing through 28 Application Service Provider cases. *Huang et al.* (2001) used a Y2K programme to study cross-functional knowledge sharing. This is somewhat contrasting to the 6 case studies on Business Process Redesign in the '96-'97 period in the American journals. Are Europeans less sensitive to management fashion?

The amount of published case studies stayed stable in the European journals, but the amount in MISQ, ISR and JMIS felt back from 20 in '96-'97 to just 3 in '01-'02 (CACM increased from 2 to 4). Whether this is a trend or coincidence needs to be further investigated. The recent special issue on action

research in MISQ (Baskerville and Myers 2004) however, doesn't indicate a trend away from qualitative research. Case studies published in CACM tend to present less methodological ins and outs, which can be attributed to the journal's practitioner focus and restricted paper size. Hirji (2001) is an exception.

Stating explicitly the epistemological orientation is rarely the case in positivist studies but frequently the case in interpretive studies. It could be argued that there is more need for interpretists to stand their orientation because it differs from the traditional one, however taking a traditional orientation still asks for arguments to do so.

Interpretist studies don't seem to be very explicit about methodological issues although some of Klein et al.'s principles and Walsham's recommendations are recognizable in several studies. It is obvious that Klein et al.'s paper has been published after the '96-'97 period and that the diffusion of their recommendations over the field will take some time, which could be said about Walsham's recommendations as well. However there is little difference noticeable between both periods. Especially principle three and five have not been recognized. Principle three is related to explicitness about the role of the researcher (involved or outside observer) and is important to explain because it shows how the researcher was involved in the social construction of the research data (interpretists believe that research data are their own constructions of other people's constructions (Nandhakumar et al. 1997)). Principle five is related to the role of theory. When theory is used as initial guide to data collection, the researcher might be more vulnerable to theoretical preconceptions and less open to alternative explanations ('the story which the data tell'), leading to a researcher's social construction of data according to theoretical preconceptions. Principle 7 could not be recognized as well. This is probably the case because suspicion asks for some kind of moral or legal standpoint and seems to be a principle that is more of interest in critical research, which is seen as one of the two standpoints that could be taken by interpretists when it comes to socially constructing reality (Walsham 1995). In this study I haven't found an interpretive study taking a critical research perspective.

Most interpretive research reported in this study adopted relatively distant data-gathering methods like interviewing and document analysis instead of observation, action research or consultancy, which limit researchers to access the world of their subjects (Nandhakumar et al. 1997). This observation is in line with Nandhakumar et al.'s study of papers published in the '93-'96 period in MISQ, ISR and EJIS. *Nandhakumar* (1996) is an exception, being based on participant observation.

Positivist studies published in Europe or Northern America do not differ in application of the case study methodology nor on receptivity to other sciences. In comparison with the Benbasat et al. study some progress has been made, but improvements in the design of a complete and explicit chain of evidence still have to be made. Authors more often than fifteen years ago specify the position of the study in the process of knowledge accrual. From a positivistic standpoint the amount of case studies that had the objective of arriving at testable hypotheses or to test hypotheses is somewhat disappointing. The unit of analysis and the site selection criteria are more often stated than fifteen years ago. Half of the positivist studies have a single case study design despite the positive influence of a multiple case study design on external validity (Yin 1994). Probably this could be explained by limitations in resources or funding, which are practical reasons for limitations in amount of cases (Darke et al. 1998). Eisenhardt (1989) suggests at least four but no more than ten cases in a multiple case study. Most of the multiple case studies fall in this range. Most studies use multiple data sources during data collection, but explicitly stating the usage of review procedures, a case study database or case study protocol is still rare. The same holds for triangulation and stating the replication logic. Comparison between Benbasat et al., the '96-'97 period and the '01-'02 period shows that progress is made in explicitly stating data analysis techniques. The overall picture is pluriform, which asks for providing more information and discussion about applied techniques so that conventions might develop. Examples of papers in which the complete chain of evidence could reasonably be followed are: *Akkermans et al.* (2001); *Bowen, Heales and Vongphakdi* (2002); *Brown* (1997); *Counihan et al.* (2002); *Guha et al.* (1997); *Huang et al.* (2001); *Kirsch* (1997); *Newman et al.* (1996); or *Shang et al.* (2002).

## 6 CONCLUSIONS AND RECOMMENDATIONS

The design of this study allows for the evaluation of the multiple types of case studies differentiated by Cavaye (1996-a): interpretive and positivist; exploratory, explanatory or hybrid; single or multiple case studies; and studies with only qualitative data or combinations of qualitative and quantitative data. The criteria applied to positivist studies are the de facto standard (Klein et al. 1999) and the principles and recommendations used for the interpretive studies are based on recent insights (Walsham 1995; Klein et al. 1999). With Lowry et al.'s (2004) free recall inquiry method for journal ranking and its outcomes as a basis, this study is the first study on the operational use of case study research in IS without a North American bias in journal selection.

The four volumes of the six journals included in this study show no difference between papers published in European and North American journals in the application of positivist case study research. The European journals however tend to publish more interpretive studies and the interpretive studies seem to be more receptive to other sciences and more often take a philosophical approach. This might lead to the conclusion that when it comes to case study methodology, the two European journals are included in the top five ranking by European respondents in Lowry et al. (2004) with good reason.

Some papers in the European journals used a non-traditional presentation style. I recommend receptivity to such alternative styles, keeping in mind Yin's (1994) varieties in case study report composition (linear-analytic, comparative, chronological, theory-building, 'suspense' or unsequenced) and van Maanen's (1989, p. 32) suggestion that researchers should try to persuade by "presenting a coherent point of view told with grace, wit and felicity".

For interpretist studies, I recommend explicit discussion of Klein et al.'s principles and Walsham's recommendations. Although it is incumbent on the researcher to decide whether and how these should be applied, it would help the interpretist case study community and paper reviewers if choices were made explicit. Especially principles three, five and seven could inform the community on how issues such as social construction of data is dealt with in practice; on how theory is used and to what extent it influences preconceptions and explanations; and on which moral or legal standpoints are used while being sensitive to suspicion. Critical research could shed some light on this last principle and should be welcomed. Related to principle three and the role of the researcher is the use of engaged data-gathering methods like participant observation, action research or consultancy. Explicit choices and the consideration of engaged methods are recommended.

Although progress has been made in the adherence to positivist case study research criteria, I must largely subscribe to the conclusions of earlier studies. Still it does not appear to be common practice in case research to make the entire chain of evidence explicit so that we can follow the relations between theory, units of analysis, site selection, data sources, data analysis techniques, data and conclusions. Extra attention should be given to stating the epistemological stance, arguments for a single case study design, site selection criteria and data analysis techniques.

I am rather more optimistic than Benbasat et al. (1987) or Dubé et al. (1999) in my overall impression. Several studies made their chain of evidence explicit, in other studies the chain (or important parts of it) could be recognized, but should have been made more explicit and examples of good practice can be found on all components of the chain. This shows an overall picture that is rich enough to conclude that case study research is a vivid part of the qualitative research tradition and is evolving in the right direction. Last but not least, the picture presented in this paper is solid and colourful enough to provide a good basis for research designs and reports.

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\*) References to all 62 papers that have been analysed in this study, are provided in the reference list of de Vries (2004).