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ON THE RESEARCH APPROACHES EMPLOYED AT RECENT EUROPEAN CONFERENCES ON INFORMATION SYSTEMS (ECIS 2002 – ECIS 2004)

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Abstract

European Information Systems research is reflected in the papers presented at the European Conference for Information Systems (ECIS). It seems that we employ a number of different approaches for research in the IS community. There has been a debate on methodological appropriateness and choice of research approach over the years. This paper adds to that debate by presenting a snapshot of what research approaches have been employed at recent ECIS. This paper presents a classification scheme for discussing research approaches and applies that scheme to analyse the papers presented at the three most recent ECIS. The results show that the proportion of studies employing qualitative interviews in combination with document studies has increased. The proportion of studies employing prolonged organisational engagement is relatively stable, while experimental studies where artefacts are constructed and/or tested are decreasing.

1. INTRODUCTION

The field of Information Systems research in Europe is reflected in the papers presented at the European Conference on Information Systems (ECIS). ECIS is the leading conference for European IS researchers with a record of having papers from all the major countries in the area accepted, as well as representation from international researchers outside Europe (Galliers and Whitley 2002). In 2002 Galliers and Whitley presented a study of the first ten ECIS with a focus on what countries and authors were represented and what sources of citations that have been used over the years. This paper takes its start in the study presented in 2002 and discusses what research approaches have been in use at recent ECIS, from 2002 to 2004. This is an interesting issue since it tells us something about the way in which we pursue our studies within the IS research field. We will also get a better understanding of the principles that guide the research efforts presented at ECIS. The term research approach will be used throughout the paper to denote the way that the authors of the papers analysed describe their way of work. Ethnographic studies, qualitative interview studies, and quantitative studies are examples of approaches.

According to Russo and Stolterman (2000) there is a bias in information systems development (ISD) research towards conceptual/normative studies as opposed to in-depth studies of the actual development process. This bias could be dealt with by carrying out studies of the actual use of ISD methods in empirical settings (Iivari and Maansaari 1998, Iivari 2002, and Mustonen-Ollila and Lyytinen, 2003). This statement forms a call for a thorough discussion and analysis of the type of research approaches we use. Continuing the example of ISD method research, Russo and Stolterman (2000) give a further argument for the importance of empirical studies of method use in their claim that research on IS development cannot provide ready-made methods or guidelines. The purpose should rather be to create conceptual tools that allow us to reflect on and analyse the competencies and skills necessary in practice. That is, researchers should play the role of commentators and critics of prevailing practice, rather than providers of normative structures (Russo and Stolterman 2000). In order to achieve this, researchers must increase focus on analysing existing practice.

The aim of this paper is to enter the discussion about how research is pursued in the IS field, more specifically what research methods have been employed in the papers presented at ECIS over the last three years. The analysis presented in this paper is based on a scanning of what research approach the authors describe in their papers. This is a good starting point for further discussions on what might be the future trends in IS research. The remainder of the paper is organised as follows: first, there is a background discussion about research methods in general. Second, the classification scheme is elaborated and motivated. Third, the classification scheme is applied to analyse the papers presented at the three most recent ECIS and finally there is a concluding discussion.

2. BACKGROUND

There has been a trend in information systems (IS) research towards an interpretative paradigm (Myers, 1997). This is a result of the opinion that IS research is as much a social science as a computing science. Furthermore, according to Myers (1997) the social and organisational contexts of information systems design, development, and application (i.e. information systems engineering) have led to substantial practical problems. Myers (1997, p. 242) cites Walsham (1993) and describes interpretative methods in IS research as aimed at: “[...] producing an understanding of the *context* of the information system, and the *process* whereby the information system influences and is influenced by the context.” Furthermore, “The goal of interpretive field research is to understand human thought and action through interpretation of human actions in their real-life context.” (Myers 1997, p. 242).

Finding empirical data is essential if we want to understand a social phenomenon such as an information system in its organisational context. Bunge (1967) describes the data collection process in terms of data finding, which includes: observing, counting, and measuring. There is a difference in the perception of empirical research between Bunge and e.g. Darke, Shanks and Broadbent (1998) and Gummesson (2001) in that the latter two promote the view there is not always a need for quantitative measurements. We should rather adopt the notion of methodological appropriateness. Different types of research problems call for different research approaches. Since there has been an increasing interest in organisational and social issues within the IS research community there has been a growing need for qualitative research methods such as, e.g. action research, case study research, as well as interpretivist approaches to ethnographic studies.

There has been a traditional division between qualitative and quantitative approaches to research. The pragmatic approach taken to this classification by e.g. Hoepfl (1997), and Silverman (1993) is a useful one: methodological appropriateness is the primary criterion for judging methodological quality. Patton (2002) argues that any research inquiry depends on the answers to several questions such as: what information is needed and how is it to be used. Qualitative research can be defined as using qualitative data to understand and explain social phenomena. Quantitative research is oriented towards statistical analysis of the data collected. According to Hartman (1998) analytical induction is characterised by essentially the same phases as a quantitative investigation, i.e. a planning phase, a data collection phase, and an analysis phase. The differences lie in how the investigation is carried out and how data is analysed. For example, since there is no aim to make any statistical generalisations we may choose to involve fewer objects for investigation and also choose to make a purposeful sampling of the subjects for investigation.

The quality of quantitative research approaches are judged by reliability and internal and external validity (Shaughnessy and Zechmeister 1994). The reliability of an instrument is indicated by its consistency. Validity refers to the truthfulness of a measure. Hence, a valid measure of a concept is one that measures what it claims to measure. In order to ensure the above mentioned quality criteria a number of statistical techniques are employed (Shaughnessy and Zechmeister 1994) in order to guarantee the validity of the results.

Reliability and validity in qualitative studies is described by Lincoln and Guba (1985) in terms of a set of quality assessment criteria:

- *Credibility* is enhanced by prolonged engagement, triangulation of sources and methods, and peer debriefing.
- *Dependability* can be shown in relation to the application of the techniques for ensuring credibility. Hence credibility and dependability are closely related. However, Lincoln and Guba (1985) discuss ways of further ensuring dependability, e.g. by using overlap methods.
- *Transferability* concerns the applicability of the results in other empirical settings. According to Lincoln and Guba (1985) the burden of proof for transferability lies less with the original investigator than with the person seeking to transfer the results to other domains or situations.
- *Conformability* refers to the extent to which the results presented conform to the data collected. Since conformability refers to the traceability of the results from the data collected it can be strengthened by careful descriptions of how the data collected have led to the claims made. Lincoln and Guba (1985) describe techniques for ensuring this, e.g. conformability audit.

3. A CLASSIFICATION SCHEME FOR ANALYSING ECIS PAPERS

This section will present and discuss the classification scheme used in the paper. There are numerous potential ways of classifying research approaches, e.g. Galliers (1997). Galliers (1997) classifies IS research approaches in terms of observation (case studies, and surveys for gathering data), review (literature and experience), and experiments (field experiments, e.g. action research and laboratory experiments) for gathering data. The analysis of the collected material can be quantitative, qualitative, or conceptual.

The classification presented here emerged during the study. However, it matches the classification proposed by Galliers (1997) well. The reason for letting the classification scheme emerge is that it suits its purpose well (i.e. to analyse ECIS papers) and that it is subsumed by the classification scheme of Galliers (1997). Some of the labels are obvious, e.g. action research, since it is used by the authors themselves to describe their research.

The method for classifying the papers is to scan each paper for the section where the research approach is discussed. This way of work is feasible since the interest is in the way that the authors describe and classify their own work. The coding of the paper was made by the author alone, which may constitute a weakness of the paper. Furthermore, some papers are a bit more problematic to classify. Especially those where there is no or very little discussion about the research approach used. Such papers were more carefully scanned in order to decide on how to label them. In some cases it was impossible to decide at all. Those papers have been classified as “other”, meaning that they were not possible to classify within the scope of this investigation. In order to give the reader an understanding of the classification each label will be described and exemplified with some ECIS papers which are claimed to represent it.

3.1. Qualitative Interviews

Qualitative interview studies are common. There are papers presenting pure interview studies as well as those combining interviews with document studies. The reason for classifying these types of studies by themselves is that they present the view of a problem domain through the eyes of an interviewee. In those cases where there is also a document study there are complementary data sources. In this context document study refers to revising secondary sources from the organisation under study, e.g. internal documentation and process descriptions. Hence, the term documentation does not refer to background material and other literature concerning the topic under study. This will, for example, cater for source triangulation (Patton 2002, Williamson 2002, and Lincoln and Guba 1985).

Dawson and Darke (2002) serve as an example of this kind of study. They describe their research approach as follows:

“The research approach used was based on multiple case studies which involved taped semi-structured interviews with individual practising professional requirements engineers. Each participant was interviewed several times, providing empirical data which is interpretive and descriptive rather than normative or quantitative as found in many of the studies described by Wynekoop and Russo (1997). This approach provided rich, qualitative data which produced similar results to the studies discussed above.” (Dawson and Darke 2002, p. 408).

Munkvold, Päivärinta, Hodne and Stangeland (2003) serve as an example of an interview + document study:

“The semi-structured interviews focused on existing practices, experiences and challenges [...]. The interviews lasted from 45-60 minutes and were taped and transcribed. [...] We gained access to extensive Statoil documentation, including existing standards for document management in Statoil, survey and analysis of their existing use of collaboration technologies and related practices, reports and presentation material on the new e-Collaboration strategy [...] The researchers then conducted individual categorizations of these issues, which finally were compared and merged into a set of common categories. The identified categories are all grounded in the data collected from the case organization, although affected by the researchers’ previous knowledge of the field. The next section presents the results of this categorization.” (Munkvold et al. 2003, p. 4).

3.2. Ethnographic Approaches

Williamson (2002) describes interpretive ethnographic study as an approach to study and analyse the actions of people in their *natural environments*. Traditionally, the primary method in ethnography has been participant observation (Patton, 2002), which is often further characterised by a prolonged engagement. Ethnographic approaches have also become common in organisational studies. The aim of such research is therefore to characterise and understand a phenomenon in its setting. This can only be achieved by first-hand contact with events, individuals, and social groupings. There is an ongoing discussion about the validity of ethnographic research. One important issue in this discussion is that the term validity is not used in the positivist sense (e.g. statistical generalisation) but rather is complemented by the notions of trustworthiness and authenticity (Williamson 2002). There are examples of studies which are explicitly termed as ethnographic:

“This paper is an ethnographic study of virtual communities. It is a study in which the researchers participated in people’s daily lives over a period of time watching what happens, listening and recording what is said, asking questions and collecting data to try and explain social interaction throughout policy implementation (Hammersley and Atkinson 1983). However it was done in people’s virtual lives and in the virtual environment of communities online.” (Nguyen, Torlina, Peszynski and Corbitt 2004, p. 5).

Other articles, e.g. Nandhakumar, Rossi and Talvinen (2004) and Ng and Tan (2004) pursue similar types of studies with prolonged on-site engagement which are also classified as ethnographic approaches.

3.3. Action Research

Action research in the IS research area has been characterised as an approach which makes it possible to solve a specific problem in an organisation at the same time as the researcher can make a knowledge contribution to the research community (Iversen, Mathiassen and Nielssen 2004, Mumford 2001, and Stowell, West and Stansfield 1997). An action research process can be briefly described in terms of identifying a research theme and setting up a theoretical framework within which the research project shall take place. Then the research methodology is decided. According to Iversen et al. (2004) it is fruitful to use multiple research methodologies in an action research project. When these

preparations have been carried out the real world problem situation is assessed and researchers and practitioners work together to improve the situation. Following the problem solving phase comes a phase of reflection. This is when the researchers make sense of the data collected and publish their results. Vidgen and Madsen (2003) may serve as an example of an action research project:

“Action research is a way of building theory and descriptions within the context of practice itself. Theories are tested through intervention in an organizational setting and bear a double burden of testing hypotheses and effecting some desirable change in the situation (Argyris and Schön, 1991). Action research was deemed suitable in this situation because the aim is to build theory (how can a socio-technical perspective be incorporated with traditional systems development methods?) and to make an intervention in a real-world development project.” (Vidgen and Madsen 2003, p.3).

3.4. Quantitative Approaches

Quantitative studies early emerged as one potential label. There is an ongoing debate concerning quantitative vs. qualitative research approaches in the IS community (Hoepfl 1997), as well as concerning positivist vs interpretative approaches (Galliers 1997). The classification utilised in this paper refers to those discussions and thus label studies where there is a statistical analysis of the results, see e.g. Holme and Solvang (1997) and Shaughnessy and Zechmeister (1994) as quantitative. Furthermore, there is some sort of empirical element in the papers classified using this label. These papers include both descriptive and comparative statistics. Three typical examples are experiments, surveys and questionnaires:

“While action research was an appropriate research method when the method was in its developmental phases, it was clearly less suitable in evaluating the method once it had become stable this is similar to the difference between theory building (exploratory research) and theory testing (evaluation research). A controlled experiment provides the most effective way to evaluate the effectiveness of the proposed method because:

- It allows direct comparisons to be made between different methods under controlled conditions through manipulation of experimental treatments.
- It enables the method to be evaluated using objective and quantitative data.
- It enables the method to be evaluated using independent participants.
- It is possible to establish that the attainment of the objectives was attributable to the use of the method, by factoring out all other variables which may have contributed to the outcomes.” (Moody, 2002a p. 485).

3.5. Formalistic Approaches

A formalistic approach is characterised in terms of using logical or mathematical models for reasoning and simulation. In some senses the formalistic approach is similar to the quantitative approach described above in terms of its rigour. Galliers (1997) labels these types of studies using the term theorem proof. We have decided to make a distinction between the two in our classification since we view the quantitative approach in terms of a more survey and experiment based way of work, typically with an empirical element.

Hoppen, Beimborn and König (2003) utilise a mathematical model to simulate various effects of patent protection: “The model encompasses *I* actors, representing software manufacturers in a special segment of the software market (e.g. text processing). Therefore they compete against each other for the same innovation in a period. The model considers three different company sizes. Based on the topological data of the German software market the actors are determined as small (80%), medium-size (15%) and large companies (5%). The planning horizon of the model is *T*. Based on assumption 1 and 2, we assume, that all actors have to decide for investment in development in every period anew and then are able to find the innovation. [...] In each generation one or several parallel innovations

lead to the economic profit $t v$ which is assumed to be constant over time and will be split to the successful actors (analogous to the model of Bessen & Maskin (2000)).” (Hoppen et al. 2003, p. 9-10).

3.6. Construction and Building Approaches

The construct and build approach may be characterised as an engineering approach in terms of focusing on the information systems’ artefacts and their construction. The approach typically focuses on building an artefact as some sort of proof of concept.

Svensson and Sørensen (2002) take a construct and build approach when constructing a web-application: “Students and teachers from two different classes of the distance education programme constituted the user-communities in the interventions reported in this paper. Both interventions involved the implementation of a web-based application, called the Barometer1, addressing the loss of informal feedback in the virtual classroom. The first trial (the Alpha-Barometer) was conducted in the spring of 1999, and involved three teachers and 52 students located at six learning centres. The second trial (the Beta-Barometer) was conducted in the fall of 2000, with two teachers and 41 students within five learning centres. Both student groups were in their first semester at UTU. Each experiment was concluded with a survey of student perceptions of the prototype.” (Svensson and Sørensen 2002, p. 1356).

3.7. Conceptual and Theoretical Approaches

Conceptual/theoretical studies include papers in which concepts are formed and discussed in, e.g., the form of frameworks and models. One characteristic is thus that there is no need for first hand empirical material in such studies. This means that secondary analysis of case studies are rather to be classified as theoretical studies than empirical studies. Using the terms of (Galliers, 1997): the mode of analysis is conceptual as opposed to quantitative or qualitative.

Sammon and Frederic (2004) serve to exemplify a theoretical/conceptual study “*This paper lays the foundation for a model of organisational prerequisites for enterprise-wide integration projects. The model is aimed at the ‘Intelligence’ phase of managerial decision making for such projects and should help managers assess their organisation’s readiness for ERP and data warehousing projects. The main objective of the paper is to present a literature-based model which lists the key prerequisites that organisations should assess prior to undertaking these expensive projects.*” (Sammon and Frederic 2004, p. 1)

The classification scheme is summarised in Table 1. It may be noted that qualitative interviews (3.1) have been further divided between pure interview studies and interviews in combination with document studies, i.e. access to various documents from the organisation.

Research approach	Characteristic	ECIS example paper
Interview study (INT)	Qualitative, open ended interviews.	(Dawson and Darke 2002) (Harindranath 2004)
Interview + document study (INT+DOC)	Qualitative, open ended interviews complemented by secondary sources in the form of, e.g. documentation.	(Munkvold et al. 2003) (Bansler and Havn 2002)
Ethnographic study (ETHNO)	Participative studies. The researcher spends time in the organisation. Observation.	(Nguyen et al. 2004) (Nandhakumar et al. 2004)
Action research (AR)	Studies explicitly labelled AR by the researcher. Close organisational involvement where the researcher helps the organisation to solve a problem.	(Vidgen and Madsen 2003) (Moody 2002b)
Quantitative study (QUANT)	Studies employing some type of statistical analysis of surveys or questionnaires. Empirical quantitative studies.	(Moody 2002a) (Gonzales, Gasco and Llopis 2004)
Formalistic study (FORMAL)	Studies using mathematical models or logical reasoning for simulation and analysis of a problem.	(Hoppen et al. 2003) (Villanova-Oliver, Gensel and Martin 2002)
Construct and build/engineering (CONSTRUCT)	Engineering approaches, where something is constructed to form a proof of concept.	(Svensson and Sørensen 2002) (Heine and Kim 2004)
Theoretical/conceptual study (CONCEPT)	Studies of various kinds where concepts are formed and discussed in, e.g., the form of frameworks and models using an interpretative approach.	(Sammon and Frederic 2004) (Stanoevska-Slabeva 2003)

Table 1 A summary of the relevant research approaches and some characteristics.

4. RESULTS OF THE PAPER SCANNING

The document scan in this study comprises the papers presented at ECIS 2002, 2003, and 2004. The scanning does not include the papers presented at the tracks for IS research methodologies since the aim of the study is to investigate the application of research methods in IS research papers. That is, the focus is not on the discussion on research methods in IS as pursued in this type of track. In all, 467 papers were scanned (Table 2). Most of these had an explicit record of the research method employed and were thus quite easy to classify. However, there are some papers each year in which research methodological issues are not explicitly described and discussed. Some of these papers have been classified according to their overall content (primarily in the theoretical/conceptual class), whereas others have been sorted under other, alongside research in progress papers.

Classification	2002	2003	2004	Total
AR	7 (5%)	6 (4%)	3 (2%)	16
INT	13 (9%)	20 (12%)	17 (11%)	50
INT+DOC	9 (6%)	11 (7%)	18 (11%)	38
ETHNO	8 (6%)	17 (10%)	18 (11%)	43
CONCEPT	31 (23%)	36 (21%)	38 (24%)	105
QUANT	22 (16%)	26 (15%)	29 (18%)	77
FORMAL	5 (4%)	9 (5%)	2 (1%)	16
CONSTRUCT	20 (14%)	13 (8%)	5 (3%)	38
OTHER	24 (17%)	30 (18%)	30 (19%)	84
Total	139	168	160	467

Table 2 Number of papers scanned.

A comparison between the three years shows some interesting trends. From Figure 1 we see that the number of papers presenting action research projects is decreasing, whereas papers employing an ethnographic approach are increasing. Both approaches imply prolonged engagement and participatory techniques for data collection, but the ethnographic approach does not necessarily mean that specific organisational problems are solved. The researcher is rather an observer and commentator of a phenomenon. We may also note that the number of papers employing a combination of interviews and document studies has increased and in 2004 there were actually more such papers than pure interview studies.

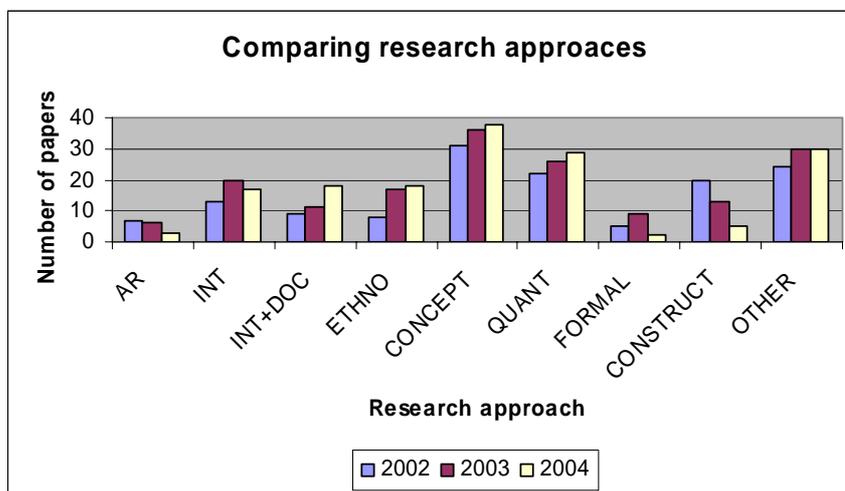


Figure 1 The distribution of papers according to research approach, a comparison over three conferences.

The number of QUANT studies shows a slight increase in number (Figure 1) but the proportion is relatively stable (Table 2). From Table 2 we also see that the proportion of INT+DOC studies has increased its proportion. We may cluster AR and ETHNO studies to form a research effort characterised by prolonged organisational engagement. Doing so, we see that these types of studies keep a relatively stable proportion during the three years analysed (11%, 14%, and 13% respectively), but with a trend towards more ETHNO studies and fewer AR studies.

Furthermore, it is noteworthy that the proportion of CONSTRUCT papers has decreased dramatically during the three years analysed. If we cluster CONSTRUCT together with AR to form some sort of experimental way of work (Galliers, 1997), we see that such papers are dramatically decreasing: 19% 2002, 12% 2003, and 5% 2004.

Further analysis of the collected material reveal the differences in what type of analysis that is employed, compare Galliers (1997). A clustering the papers presenting empirical qualitative studies (AR, INT, INT+DOC, ETHNO, CONSTRUCT) and a comparison with those using a quantitative analysis mode (QUANT) reveals that the number of papers using the two clustered approaches remains relatively stable over the three years analysed (Table 3).

Cluster	2002	2003	2004
Quantitative	22 (28%)	26 (28%)	29 (32)
Qualitative	57 (72%)	67 (72%)	61 (68%)

Table 3 Comparing the number of papers with respect to quantitative or qualitative analysis.

A comparison between qualitative and quantitative empirical studies shows a slightly increased proportion of quantitative papers in 2004 (Table 3).

However, in the distinction between qualitative and quantitative studies we must be careful to see that some studies employ combinations of the both. In those cases papers were classified into the category deemed most appropriate based on the overall impression.

5. DISCUSSION AND FUTURE WORK

The major results are summarised as follows:

- The proportion of studies employing qualitative interviews and document studies (INT+DOC) has increased.
- The proportion of studies employing prolonged organisational engagement (AR and ETHNO) is relatively stable but with an increase of ETHNO studies at the expense of AR studies.
- Experimental studies where artefacts are constructed and/or tested (AR and CONSTRUCT) are decreasing.
- The proportion of empirical studies employing quantitative analysis is stable with a slight increase in 2004.

The trend towards a combination of qualitative interviews and document studies can be seen as a way to strengthen pure interview studies. This can be viewed as triangulation of methods as proposed by Patton (2002) and Williamson (2002). In general combination of methods and sources enhance credibility (Lincoln and Guba 1985). Quality assessment of qualitative research has been an issue but Lincoln and Guba (1985) propose credibility, dependability, transferability, and conformability as means for ensuring it.

Methodological appropriateness, as discussed by e.g. Gummesson (2001) and Hoepfl (1997) can serve as a guiding principle when selecting research approach. The papers scanned in this investigation shows that a variety of research approaches is in use in the IS community. Although it is not within the scope of this paper to analyse what approaches are used at what tracks; the track for which a paper is submitted may well have an impact on the choice of research approach. If this is the case, we should view the variety of approaches employed as a sign of strength within the field. Furthermore Mathiassen (2002) advocates collaborative practice research based on close collaboration between

researchers and practitioners. Mathiassen (2002) also gives an example of the use of pluralist research methodology by combining action research with experiments and conventional practice studies.

How do the trends identified here affect research efforts in the IS field? According to Russo and Stolterman (2000) researchers should serve as commentators of current practice as opposed to providing normative results. In this sense we may interpret the trend towards studies with prolonged organisational involvement as positive. The ethnographic research approach can provide researchers with the time for reflection on current practice for which practitioners may find limited time. The use of ethnographic approaches has a potential to strengthen the researchers' potential as commentators on current practice. However, it may well be the case that the decrease of action research decreases the research community's potential to influence current practice in terms of solving practitioners' problems in organisations. The major problem associated with both approaches is that we need close access to organisations in order to carry out such studies.

This paper shows the recent trends in what research approaches are utilised in papers presented at ECIS, which has been characterised as the leading IS conference in Europe (Galliers and Whitley 2002). The results from this investigation could be interesting to compare to recent trends at other regional conferences, such as Americas Conference on Information systems (AMCIS), the Australasian Conference on Information Systems (ACIS), or the Pacific Asia Conference on Information Systems (PACIS) in order to identify possible differences between these regions. However, when doing such a comparison one must be aware of the international character of the field; there are numerous authors who publish themselves at more than one of these conferences. The majority of authors will probably come from the region in question, thus giving some indication of regional differences.

The document scanning undertaken in this paper has focused on how the researchers themselves characterise their research. This fact raises a call for other studies of research methods. One such investigation might be to more carefully examine a subset of papers in order to more carefully analyse *how* the research method has been applied. Such studies would contribute to the debate concerning rigour versus relevance, see e.g. Mathiassen (2002). Furthermore, a more detailed examination of papers would allow us to analyse the mapping between research problem and choice of research approach, thus adding to the understanding of what types of problems our field focuses on and how they are solved. Should the field of IS research strive for more empirical work? Is it a problem that the proportion of papers with a construction/engineering approach is decreasing?

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