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The Myth of Multiple Methods

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Abstract

This paper addresses issues surrounding the combining of quantitative and qualitative methods in a single research design. Reference is made to attempts by information systems researchers to combine research methods. It is argued that the four paradigm model of Burrell and Morgan has encouraged researchers to seek cross-paradigmatic research designs. Argument is offered that cross-paradigmatic research is unsound. A different paradigm framework is introduced and used to support a focus on the nature of the phenomenon to be investigated and the questions to be answered rather than the method to be used.

Introduction

Within the information systems (IS) and social philosophy literature much has been written on the relevance of choosing between different research methods. It is not uncommon for an IS researcher to pose the question *when should I combine quantitative and qualitative research methods in my research design?* Researchers in other fields have addressed this question (e.g. Deetz, 1996; Denzin and Lincoln, 1998) and within the IS research community several authors (Kaplan and Duchon, 1988; Lee, 1991; Gable, 1994; Cavaye, 1996) have supported the combining of research methods to investigate a particular phenomenon. Smithson (1991: 368–369) states that “Combining different approaches is an important topic in IS research . . . much more effort should be put into the interaction between approaches with a view to providing guidelines for researchers”.

This paper addresses issues related to the question of combining quantitative and qualitative research methods. We show that such a combination is only possible in certain circumstances. We argue that a change of focus is needed away from research method to the nature of the investigation phenomenon itself and the questions one seeks to answer. First, argument is presented that IS research has traditionally adopted a positivist epistemology, but that there is a growing trend towards an acceptance of research based within different paradigms. Second, evidence is presented to show the pervading influence of Burrell and Morgan’s (1979) four paradigm

model of IS research design. Third, this paper addresses issues related to the question of combining quantitative and qualitative research methods and argues that, in IS research, efforts to achieve this are a direct result of Burrell and Morgan’s paradigm framework. A different paradigm framework is presented and used to show how IS researchers may conceive of and accept different research designs.

IS Research Methodology

Burrell and Morgan (1979:23) use the term *paradigm* to refer to “basic meta-theoretical assumptions which underwrite the frame of reference, mode of theorising and *modus operandi*” of researchers. Paradigms are identified by and associated with four sets of basic assumptions regarding ontology, epistemology, human nature and methodology (Burrell and Morgan, 1979:23). Researchers are “bound within a net of epistemological and ontological premises” (Bateson, 1972:314) This net may be termed a *paradigm*, or an interpretive framework, or a “basic set of beliefs that guide action (Guba, 1990). Researchers need to be clear in their own minds about their own beliefs regarding the nature of the phenomenon under investigation and their relationship to it. Generally, our beliefs and purposes shape our views of the world; they form our paradigms. Guba and Lincoln (1994: 116) state that “Paradigm issues are crucial; no inquirer, we maintain, ought to go about the business of inquiry without being clear about just what paradigm informs and guides his or her approach”. Chua (1986: 604) writes that “The issue of ontology lies prior to and governs subsequent epistemological and methodological assumptions”. Sound research design requires the use of research methods appropriate to the ontology of the research phenomenon and the researcher’s epistemology. Problems occur when these are ignored.

Burrell and Morgan’s Four-Paradigm Model

Burrell and Morgan (1979) document various strands of social thought and philosophy and map them on to a four-paradigm model of philosophical inquiry. The model is founded on four sets of assumptions related to ontology, epistemology, human nature and methodology. Burrell and Morgan suggest that it is meaningful to examine work

in the subject area in terms of these four basic assumptions. They contend that all social theorists can be located within the context of this framework and that the four paradigms are mutually exclusive in that they are based on alternative views of social reality. A synthesis is not possible as they are based on at least one set of opposing meta-theoretical assumptions. The four sets of underlying assumptions can be used to examine research activities for consistency of approach: that is, that the epistemology, theory of human nature and methodology are consistent with the underlying ontological assumptions of the social world.

Burrell and Morgan's model has had a profound effect on the way IS researchers conceive research design. Their discrete paradigms have given rise to considerable debate on the issue of paradigm incommensurability (DeCock et al., 1995; Deetz, 1996; Hassard, 1991; Parker and McHugh, 1991; Weaver and Gioia, 1994; Willmott et al., 1993). This debate has failed to remove the *problem of paradigm incommensurability*, that is, that research based in different paradigms is necessarily based on different ontologies. We believe Burrell and Morgan's model has unnecessarily focused researchers on the incommensurability issue and has dichotomised research design into positivist and others (often referred to as *non-positivist* or *anti-positivist*). This dichotomy marginalizes non-positivist research and masks the differences between and the extent of other paradigms. Burrell and Morgan's use of the term *interpretive* and their juxtaposing of their *interpretive* paradigm with their *functionalist* paradigm has become a standard nomenclature (and therefore limitation) when discussing IS research methodology.

The Long Tradition of Positivist IS Research

The principles of systems analysis generally adopted by IS academics and practitioners were developed from systems theory, giving the emerging field of information systems a strong positivist bias in its approach to the analysis and understanding of business systems. There is much support for this view. Kauber (1986) reports that early American IS research was predominantly quantitative in nature. Orlikowski and Baroudi (1991) found that 97 per cent of American research conformed to a positivist epistemology. Only three per cent of papers were interpretive in nature and there were no critical studies. Orlikowski and Baroudi argue that the results show that a dominant philosophical view of the world is held by those researchers. Orlikowski and Baroudi do not offer reasons for this dominant view, however, they suggest that researchers do not appear to question their philosophical assumptions, rather they seem to take them for granted. Ridley and Keen (1998) suggest that information systems is a relatively new discipline and that its theoretical foundations and methods have been borrowed from reference disciplines. Shanks et al. (1993) found that early IS researchers had transferred from other

disciplines and brought with them their values, beliefs, skills and methods. These early IS researchers migrated from disciplines which have a strong positivist research tradition. Research approaches in information systems were dependent on the mixture of the knowledge and skills of those researchers. Ridley and Keen examined the epistemology of Australian IS research using Chua's (1986) scheme to classify epistemologies. They found 88 per cent of Australian studies were based on a positivist epistemology. This is consistent with the findings of Olikowski and Baroudi (1991) in the United States and with Shanks et al. (1993) in Australia. American and Australian IS researchers appear to have predominantly positivist backgrounds and therefore conduct mainly positivist research.

Limitations of the Quantitative Approach

Quantitative studies tend to neglect aspects of cultural environment and social interaction and negotiation that could affect the systems development outcomes and also the outcomes of the studies in question (Silverman, 1998). It has long been recognized that purely quantitative research may ignore the political, cultural and social construction of the variables studied (Mills, 1959; Cicourel, 1964; Kirk and Miller, 1986; Blumer, 1968; Kaplan and Duchon, 1988). There is a long history of discussion of the relative merits of qualitative versus quantitative research methods (Cook and Reichardt, 1979; Miles, 1979; Downey and Ireland, 1983; Van Maanen, 1983; Ragin, 1987; Glassner and Moreno, 1989; Neuman, 1991). Within the IS literature there have also been ongoing discussions on the merits of non-positivist versus positivist research and the positing of approaches to multi-method research designs (McFarlan, 1984; Goldstein, Markus et al., 1986; Benbasat, Goldstein et al., 1987; Boland and Hirschheim, 1987; Kaplan and Duchon, 1988; Cash and Lawrence, 1989; Hirschheim and Klein, 1989; Lee, 1989; Lee, 1991; Nissen, Klein et al., 1991; Orlikowski and Baroudi, 1991; Gable, 1994; Cavaye, 1996).

Discussions of these limitations have led to changes within the IS research community. There is a slow, but growing acceptance of IS research based on other than functionalist approaches. In 1993, the journal MIS Quarterly changed its editorial policy to actively encourage non-positivist research submissions (Walsham, 1995). Ridley and Keen (1998) found all the interpretive and critical Australian IS studies have been published since 1992. There has been a growing legitimising of this approach (Van Maanen, 1983; Goldstein, Markus et al., 1986; Markus, 1989; King and Applegate, 1997). Keane (1998) reported a general shift in IS research away from technological issues to managerial and organizational issues that has created room and opportunity for a multiplicity of research approaches. Throughout the IFIP TC8/WG 8.2 Working Conferences on Information

Systems, (1984, 1990, 1996), there is a strongly developed theme of evaluating and promoting non-positivist research. The authors of these papers are predominantly from Europe where there is a more-established tradition of non-positivist IS research compared with the United States and Australia.

In the IS field, it is the four-paradigm framework of Burrell and Morgan that has prompted researchers to seek ways to overcome the perceived problem of incommensurability and to seek solutions to this “problem” by attempting to combine qualitative and quantitative research methods. We now evaluate efforts by IS researchers to combine quantitative and qualitative methods in their research designs.

IS Efforts to Combine Quantitative and Qualitative Research

As Burrell and Morgan’s framework and nomenclature have largely informed this debate, we will use their framework and terminology to analyse it. In order to examine the efforts to combine research methods it is convenient to start by dividing IS researchers logically in to four main groups:

- positivists who reject other paradigmatic research outright;
- positivists who combine quantitative and qualitative methods from a positivist perspective;
- positivists who attempt to combine positivist and non-positivist methods;
- researchers whose work is characterized by other than a positivist epistemology

We acknowledge that not all IS researchers are focused primarily on method and thus, for them, it is not sensible to include them in such a categorization. However, if one looks at the historical development of research in IS, such a categorization is not unreasonable for all but a very small minority of researchers. The relevance of this grouping became evident after extensive reading and analysis of much IS literature. We do recognize that researcher values and beliefs may change with time and that this will inform their perspectives and types of research undertaken.

There appear to be few positivist researchers in the IS field who reject outright other research methods. Nevertheless, the IS field suffers because of blinkered views of the nature of IS research. This has resulted in difficulty in obtaining funds for IS research and formal recognition of information systems as a field of inquiry in its own right (Stowell and Mingers, 1997).

The second group can be conveniently labeled *within-paradigm accommodators* and the third group *cross-paradigm accommodators*. Both groups acknowledge that non-quantitative methods can assist researchers to learn of a phenomenon, but we see their approaches as

either limiting or erroneous. The fourth group consists of a small number of researchers who seek to use relativistic or critical approaches to explain or change constructive social phenomena. We do not see evidence of this group rejecting soundly designed and executed positivist research.

Within-Paradigm Accommodators

The genesis of the second group, the *within-paradigm accommodators*, may rest with papers by Jick (1979, 1983). Jick’s work is widely cited as justification for mixing qualitative and quantitative methods. Jick refers to qualitative methods, but only from a positivist perspective. Jick (1983: 136) refers to triangulation as “largely a vehicle for cross-validation when two or more distinct methods yield comparable data”. He is silent on the alternative of methods yielding non-comparable data. An example of Jick’s theme is the reference to “multiple and independent measures” (1983: 136). Many similar statements are to be found in this work. At no time does Jick refer to non-positivist ontological bases for research. Gallivan (1997) uses the term *triangulation* in referring to a mixed method, combining quantitative and qualitative methods, but explicitly excludes mixed methods combining positivist and interpretive epistemologies. Gallivan refers only to within-paradigm research, and supports combining quantitative and qualitative methods within a positivist epistemology.

Researchers in this group frequently combine qualitative and quantitative methods within positivist research designs. There is agreement among researchers that combining methods within a positivist paradigm is a valid approach to research design (e.g. Yin, 1994; Visala, 1991). The main issue here is to recognize properly the nature of the research method being employed.

Cross-Paradigm Accommodators

The research designs of the third group, the *cross-paradigm accommodators*, are problematical, as we believe they are not well founded. Confusion over the meanings of the words *interpretive* and *qualitative* and their multiple and changing meanings may lead researchers to attempt to use cross-paradigmatic research methods without properly considering issues of ontology. Myers (1997: 240) states that “In the IS research community in particular, a common misconception has been to equate qualitative with interpretive research and to confound the differences in methods.”

In this context, researchers often use the term *triangulation*. This term has many meanings and is used by different researchers to mean different things. Denzin (1989) and Patton (1990) each offer similar taxonomies of triangulation. These taxonomies are used in the analysis presented in this paper. Both authors discuss four types of

triangulation: data, investigator, theory and methodological. All four types of triangulation have been criticized as leading to invalid research designs (Patton, 1980 in Denzin, 1989; Cicourel, 1974; Silverman, 1985; Lincoln and Guba, 1985). It is the fourth type, methodological triangulation, that is relevant to this paper.

Methodological triangulation refers to the combination of two or more research strategies in the study of the same empirical unit. Denzin identifies two forms—*within-method* and *between-method*—but does not use the term *cross-paradigmatic* triangulation. He focuses on method without reference to underlying ontology and related epistemology. The validity of cross-paradigmatic methods (or triangulation) is often referred to as the *interpretive / functionalist debate*, or the *paradigm wars*. Silverman (1993) argues that triangulation based on different ontologies is a method without sound foundation. Silverman (1998: 6–7) states that “triangulation . . . is a highly contested research method” and further asserts (1998: 6–7) that “It is inaccurate to assume that quantitative and qualitative research are polar opposites . . . there are no principled grounds to be either qualitative or quantitative in approach. It all depends on what you are trying to do”. Lincoln and Guba (1985) believe that each method yields a different picture and slice of reality.

A number of IS researchers have attempted cross-paradigmatic research designs (*e.g.* Kaplan and Duchon, 1988; Lee, 1991; Gable, 1994). Although these papers are widely cited, we believe they do not achieve their objectives of demonstrating, or providing guidance for achieving, valid cross-paradigmatic research designs. At the time of publishing these papers, this group of IS researchers did not address adequately ontological issues and they subordinated non-positivist methods. Argument to support this contention is presented in Falconer and Mackay (1999).

It is possible to find papers by IS researchers that initially appear to support cross-paradigmatic research but that, on closer inspection, do not. An example is Mingers (1997). Mingers argues in favor of what he terms a *multi-paradigm approach to IS research*. Although appearing to support cross-paradigmatic research, Mingers uses the term *multi-paradigm research* with a meaning that is different from that of other researchers. Mingers asserts that real-world situations encompass diverse and rich material that will be best understood and explained by using diverse methods suitable to the various phenomena under investigation and builds a model to illustrate his approach. Mingers’ paper actually supports within-paradigm inquiry, as it emphasizes that research based in different paradigms is necessary to understand different types of phenomena.

Attempted cross-paradigmatic triangulation at the individual phenomena level causes serious problems with research design. This *level* must be differentiated from the multi-phenomena designs to which Mingers refers. These problems are, in themselves, cause for concern. Of greater concern is that some researchers feel a need to construct such methods in relation to individual phenomena. Neo-positivist researchers often see the difference in qualitative and quantitative research as being different ways to collect data and believe they are achieving the goal of triangulation as if different research programs simply provide additive insights into the same phenomenon. This masks the real issue. Some researchers do not acknowledge that each method achieves something different. Deetz (1996) believes Burrell and Morgan’s work has caused researchers to focus unproductively on paradigmatic differences, rather than on the purposes of their research and the nature of the phenomena they are researching. This has led to the continuation of rather misleading conflicts and equally misleading presumed relations between so-called qualitative and quantitative research.

A Change of Focus

The nature of research and what constitutes good research has evolved over many years and continues to change (Denzin and Lincoln, 1998). Equally, terminology associated with research evolves. For example, Denzin and Lincoln (1998) document the many different meanings of the word *qualitative* throughout the twentieth century. Currently, there are different meanings ascribed to the word *interpretive*. In the IS field, *interpretive* has been used extensively as being synonymous with *non-positivist*. Also, many researchers have used the terms *interpretive* and *qualitative* interchangeably. Much of this confusion can be traced to some researchers’ continued reference to Burrell and Morgan’s (1979) four-paradigm model while others seek new directions and paradigms.

Denzin and Lincoln (1998) have shown that research paradigms need not be construed and constrained by Burrell and Morgan’s (1979) four-place model. They discuss paradigms using a quite different framework. They use the term *interpretive* in a subtly different way from Burrell and Morgan (1979). Denzin and Lincoln (1998) ascribe the quality *interpretive* to all research: that is, all evidence, no matter how gathered, requires interpretation. Interpretive is not used as a synonym for *non-positivist*. Denzin and Lincoln (1998:26) write that “all research is interpretive, guided by a set of beliefs and feelings about the world and how it should be understood and studied”. They suggest that some of these beliefs may be well accepted and understood, while others may be highly controversial. Each interpretive paradigm makes particular demands on the researcher, including what questions may be asked and how interpretations may

be made. Each paradigm is effectively a lens through which a subject may be viewed.

Denzin and Lincoln's paradigm framework is open-ended. This allows for recognition of the many different paradigms adopted by researchers with different interests and beliefs. Many diverse groups within the social sciences fields conduct research from within their own paradigms. Denzin and Lincoln (1998) identify four major paradigms: positivist and postpositivist, constructivist, critical and feminist. They further identify specific versions of feminist as well as specific ethnic, Marxist and cultural studies paradigms. This taxonomy treats all paradigms as philosophically and logically equal. It does not prescribe a limit on the number of paradigms that may be identified and adopted. We believe this removes the emphasis on paradigm incommensurability that has surrounded the Burrell and Morgan's framework.

Acceptance of an open-ended paradigm framework and a recognition of the relevance and philosophical equivalence of different research paradigms frees researchers to design their research in ways that most properly meet the needs of the situation. Knowledge gained through interpretive or critical research alone does not need to be verified by positivist methods, nor can it be verified. The findings stand on their own. Cavaye (1996) argues that the method chosen should depend on what one is trying to do rather than a commitment to a particular paradigm. We agree that researchers should focus on the nature of the phenomenon to be investigated and select the method that can best illuminate the phenomenon.

Conclusion

This paper has addressed an issue that has been previously the subject of intense debate within many fields of research, including information systems: the combining of quantitative and qualitative research methods. This issue has been dealt with in two ways.

First, an analysis of multiple-method research designs proposed or undertaken by information systems researchers was made with reference to the four-paradigm model of Burrell and Morgan (1979). Information systems researchers were divided into four groups. The group labeled *within-paradigm accommodators* was shown to combine qualitative and quantitative research methods within a positivist paradigm. The genesis of this group was traced to a paper by Jick (1979). The research designs of this group generally do not exhibit ontological or epistemological problems as they are sited within a single paradigm. The research designs of another group, labeled *cross-paradigm accommodators*, are problematical as they do not recognize properly the ontological conflicts inherent in such research designs. There is no need to attempt to combine multiple-paradigmatic research within a single design.

We do agree with Mingers (1997), however, that the results of investigations of different phenomena by different methods may accumulate to provide rich understandings of complex real-world situations.

Second, we considered more broadly the issue of paradigm incommensurability that arises from the Burrell and Morgan (1979) framework. We agree with researchers who believe this framework has artificially limited the development and acceptance of different research methods. We believe IS research would benefit from universal acceptance of various research paradigms as philosophical equals. This requires a mind shift by researchers wed to a positivist epistemology. We believe the different paradigm framework offered by Denzin and Lincoln (1998) provides a way forward and allows researchers to let the paradigm incommensurability "problem", and the search for solutions to it, rest. Support was drawn from several authors for a different focus. Denzin and Lincoln's (1998) open framework admits of many paradigms. This allows researchers to align their methods more easily with the ontological and epistemological assumptions of other researchers who share their beliefs and values. To identify the paradigm within which they wish to conduct an investigation, researchers should address the nature of the investigation phenomenon itself and the questions they seek to answer, rather than the research method itself. A research method can then be selected that suits the investigation.

Mingers (1997) suggests that few IS researchers have developed competencies that span two major paradigms. We expect most IS researchers will continue to select phenomena to investigate based on their own skill-sets. Given the predominance of IS researchers with positivist traditions, most IS research will continue to come from within that paradigm. That notwithstanding, researchers should be encouraged to make the journey to new paradigms and develop wider views and skills. Past prejudices of researchers from different traditions can be removed by encouraging the questioning and understanding of the philosophical foundations of research design.

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