Are We Using the Right "Paradigms?" Comparing Metaphysical, Sociological and Conceptual Paradigms

Completed Research Paper

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ABSTRACT

This essay proposes an alternative to how paradigms are viewed in the information systems (IS) field. Tracing the development of the paradigm concept from Kuhn's classic *Structure of Scientific Revolutions* to the educational sciences and the organizational sciences, it finds the IS field adopting metaphysical paradigms over sociological and conceptual paradigms to the detriment of the progress of the field. The appropriation of metaphysical paradigms ignited unnecessary and time consuming "paradigm wars" in these fields as well as in the IS field. This essay describes how the metaphysical paradigm differs from the sociological and conceptual paradigm and the problems the field will face if it continues adopting the same view. Finally the essay explains the advantages of adopting the primary meaning of Kuhn's paradigm concept and proposes how this approach to research may be undertaken.

Keywords
Information systems (IS) research methods, disciplinarity, IS theory, paradigms, Kuhn, normal science, epistemology

INTRODUCTION

The goal of this essay is to propose an alternative to how the paradigm concept is applied in the IS field. It argues that the IS field has essentially adopted an organization science view of paradigms that takes the field away from what Kuhn (1970) had originally envisioned. The organization science view of paradigms favors an abstract metaphysical version of paradigms, which often obscures the primary goals of the research, over the more concrete sociological and conceptual views of paradigms. The essay proceeds in the following manner. First, the essay traces the development of the paradigm concept and how it was appropriated within the educational and organization sciences. Examples of how this metaphysical view of the paradigm differs from the other forms of the paradigm concept are provided. Second, the essay will show how the IS field adopts this view of paradigms from the organization science via various classical works. Finally, the essay will propose why and how the IS field should and can reclaim the original paradigm concept to its advantage.

KUHN'S MODEL AND THE METAPHYSICAL, SOCIAL AND CONCEPTUAL PARADIGM

For Kuhn, scientists perform and evaluate research in reference to rules, exemplars and models that are acquired during their training. This conduct of "normal science" reflected the social practice of scientific work, which although carried the progress of science forward, often obscured the scientists from seeing beyond their existing world-views. This state of "normal science" continues until it faces crisis as a result of anomalies encountered in its practice, requiring the community to question or revise their shared assumptions, beliefs, values and rules and to adopt different vocabulary, concepts and assumptions that will allow them to progress further. This conceptual shift and assimilation involves the best-known part of Kuhn's theory—the paradigm. It is this paradigm shift, resembling a revolution, that takes place when the field is overtaken by a growing sense that the existing paradigm or set of paradigms have ceased to function adequately for the exploration of the core concerns of the field. It is the nature of that paradigm, especially for the IS field, that is the focus of this study.

Right from the start, the nature of the paradigm became a contested issue. But as Kuhn had repeatedly emphasized in *Structure* and in his later writings, the difficulty of pinning down the exact meaning of the paradigm term should not diminish its usefulness as it is applied in different fields. The social sciences were the among the earliest to welcome the ideas propounded by *Structure*, and even though they were unable to agree on many fronts within their own fields, quickly declared respectability under the protection of their own unique paradigms. In spite of the generally accepted opinion, Masterman (1970) was among the earliest to acknowledge the usefulness of the paradigm concept, especially as a guide by which scientists are still able to perform their research in the period in which theories are absent (the pre-paradigm period). Kuhn’s critics who selectively choose parts of evidence that only support their contention often omit Masterman’s (1970) positive evaluations of the paradigm concept that form the bulk of her commentary on Kuhn's work. Masterman (1970) elaborates favourably on the "originality of Kuhn's sociological notion of a paradigm … paradigms as a puzzle-solving
device … paradigm as a way of seeing” (p. 59). As Masterman (1970) puts it, “we are not going to be able to go back to where we were before Kuhn” (p. 87). After listing all twenty-one meanings of paradigms, concludes that they can be grouped into three main categories: (1) metaphysical paradigms, (2) sociological paradigms, and (3) construct (conceptual) paradigms.

The metaphysical paradigms are philosophical in the sense of being a notion that combines paradigms with epistemology or ontology. Metaphysical paradigms include sets of beliefs, myths, speculations, standards, ways of seeing, organizing principles that govern perception, map or something that determines reality. Examples of metaphysical paradigms given in Structure include Aristotelian dynamics (e.g. the notion of "natural" downward motion), phlogistic chemistry, beliefs about fundamental entities of the universe, Descartes epistemological viewpoint of extreme scepticism, and the "lightning flash" that comes to the scientists allowing them to see what was previously not seeing. In the IS field, the metaphysical paradigms take the forms of epistemology, the theory of knowledge and "how we know what we know," as paradigms. IS researchers discuss and compare positivist versus interpretivist epistemologies, and quantitative versus qualitative approaches (Lee, 1991; Mingers, 2003) like they are paradigms of research. The discussion surrounding such metaphysical paradigms are rather mature in the IS field and has developed into a slow but general acknowledgment of the benefits of pluralism and multi-method research (Mingers, 2001; Venkatesh et al., 2013)

The sociological paradigms include universally recognized scientific achievements, scientific achievements that are not universally agreed but nevertheless concrete, bases that hold a political institution together, and an accepted judicial decision or grammatical usage. Examples of sociological paradigms provided in Structure include Benjamin Franklin's paradigm of "conservation of charges" in which electricity is never created but "collected," achievements in corpuscular or wave optics, persuasive argumentation between communities of scientists fighting for political priority, and legal decisions that take the form of legal precedence or an accepted device in common law (e.g. a lien or a trust). Research on sociological paradigms are rare in IS; however, historically IS research adopted several sociological paradigms in the past including the decision-making paradigm, and the strategic management paradigm.

The construct or conceptual paradigms is a most concrete view of paradigms, which include classical textbooks, standard illustrations and analogies, standard procedures, applications and techniques, standard tools and the sources of these standard tools and psychological gestalt figures. Examples of conceptual paradigms provided in Structure include classical works that expound the general body of theory usually in the form of textbooks of the field (e.g. Ptolemy’s Almagest and Newton’s Opticks), the standard procedures used prior to the discovery of oxygen, instrumentation and machine-factory tools. The common threads that bind all of these different paradigms are their shared nature, the agreement required for their adoption and application, the commitment shown to them by the community, often their obscurity, and their temporality. Although the IS field had adopted a classic text in the past (Davis and Olson, 1985), generally conceptual paradigms are rare as there are yet no IS-specific standard procedures, techniques, or tools that are generally accepted by the IS community.

TRACING THE PARADIGM CONCEPT TO THE EDUCATIONAL, SOCIAL, AND ORGANIZATIONAL FIELDS

Education were among the first to embrace the Kuhnian paradigms when Nathaniel Gage (1963) applied it to define a scientific basis for research in teaching in the first Handbook of Research on Teaching. In it he describes the process-product paradigm that focus on teachers and how they organized instruction, the methods and materials that made a difference in their interaction with students. The organizational sciences were closely behind the educational fields. Friedrichs (1970) recognized two major paradigms in sociology, the priestly and the prophetic. The priestly paradigm is akin to Parson's (1949) functionalist view of sociology that sees sociology as devoted to explaining order and stability in society. The prophetic paradigm represented largely by critical theory focuses on conflict and is devoted to social change.

By that period, some sociologists began concentrating more on the metaphysical paradigm as opposed to the paradigm's other forms (Eckberg and Hill Jr., 1979). In other words, instead of adopting the more concrete forms of paradigms, some sociologists prefer the more abstract form viewing paradigms as presuppositions, worldviews (Weltanschauung) or epistemological assumptions. For example, sociologists began writing saying their field follows positivist or phenomenological paradigms (Walsh, 1972), while others say they are nomological, interpretive and critical (Sherman, 1974). IS researchers will be familiar with these terms because they refer to epistemological worldviews that the field had grappled with in its own history (Lee, 1991; Orlikowski and Baroudi, 1991). It is not surprising that the organizational sciences, which depend much on sociology, embraced the epistemological version of the paradigm. The most famous of these formulations is Burrell and Morgan's (1979) Sociological Paradigms and Organisational Analysis, which describes four paradigms, (1) functionalist, (2) interpretivist, (3) radical structuralism, and (4) radical humanism.

As can be seen in Lincoln and Guba's (1985) Naturalistic Inquiry, the tendency of taking up the metaphysical version of the paradigm spread back to the educational fields. Battles ensued between the positivists in education, those looking to improve the state of education using "objective” measures and to lay down a scientific basis for the art of teaching and those that saw
these "positivistic" methods encourage an authoritarian, manipulative and bureaucratic system (Gage, 1989). The interpretivists charged the positivists of ignoring the meaning perspectives in the action of teachers and students. The critical theorists added an additional divide between the existing two views, claiming that both ignore the relationships between teaching and schools to society, and with them, the political and economic powers that define social reality. These collections of battles were known as the "paradigm wars."

Unlike the organizational sciences and perhaps even IS, the consequences of these "paradigm wars" in education were severe (Gage, 1989). Researchers abandoned courses in tests and measurement and statistics. Research grants for objective-quantitative research dried up. Journals in education filled up with ethnographic studies. It was only in the late 1980s social researchers realized that the "paradigm wars" were completely unnecessary. They came to the conclusion that the opposition and incompatibility between the paradigms was invalid (Gage and Needels, 1989; Howe, 1988) and proposed a more pragmatic approach towards research. In the end, researchers realized that these differing epistemological views were not antagonistic to each other but provided opportunities to examine specific aspects of teaching in more detail. Each view highlighted a particular landscape, but left the others unexplored so it made sense that all these views were complementary in some way.

<table>
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<tr>
<th>Articles</th>
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<tr>
<td>Alavi and Carlson (1992)</td>
<td>&quot;the dominant positivist MIS research paradigm&quot; (p. 57)</td>
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<td>Robey (1996)</td>
<td>&quot;Even the frequently-lamented domination of the positivist paradigm seems to have weakened … [T]hus, in their earlier assessment of articles in mainstream IS journals, Orlikowski and Baroudi (1991) concluded that IS was dominated by positivist research and that interpretive studies and critical theory were underrepresented.&quot; (p. 402)</td>
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<td>Mingers (2001)</td>
<td>&quot;Rather than advocating a single paradigm, be it interpretive or positivist&quot; (p. 240) … &quot;Orlikowski and Baroudi (1991) considered three broad research paradigms—positivist, interpretivist, and critical&quot;</td>
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<td>Mingers (2003)</td>
<td>&quot;Underlying paradigm: in general, research methods develop within a particular paradigm … there has been a tendency to link quantitative methods with a natural science (positivist) approach, and qualitative methods with a social science (interpretive) approach (p. 236) … only 15% of instances used ‘nontraditional’ methods (p. 248)</td>
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<td>Chen and Hirschheim (2004)</td>
<td>&quot;In summary, we suggest that the field has been dominated by the positivist paradigm, despite calls to the contrary&quot; (p. 197)</td>
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<td>Venkatesh et al (2013)</td>
<td>&quot;… there is limited research that has employed methodological pluralism in the IS literature … Mixed methods research has been termed the third methodological movement (paradigm), with quantitative and qualitative methods representing the first and second movements (paradigms)&quot; (p. 22)</td>
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Table 1: Use of the paradigm term in IS Research

Evidence of the same kind of problems occurring in the IS field, albeit to a lesser degree, can be found in the extensive literature surrounding the discussion on paradigms (Goles and Hirschheim, 2000). The hegemony of the positivistic paradigm was felt through the many years the IFIP community struggled to introduce the IS field to alternative epistemological and methodological approaches (Nissen et al., 1991). Even though segments of the IS community embrace these alternative approaches, little change is seen in the majority of research undertaken in IS (Chen and Hirschheim, 2004). A sampling of the evidence showing that the IS field generally adopts the metaphysical version of the paradigm, in particular, the traditional positivist paradigm is provided in Table 1. After much struggle, the paradigm wars in IS (Mingers, 2004; Venkatesh et al., 2013) may have encountered a ceasefire, but at the cost and opportunity cost of at least 40 valuable years and thousands of man-hours of research. The IS field remains largely fragmented, still searching for an identity, lacking a common body of knowledge and struggling to develop its own theories.
PROBLEMS WITH THE METAPHYSICAL PARADIGMS

To what extent has the metaphysical paradigm been useful to IS research? For the natural sciences, the positivist philosophy is credited for all the progress modern science accomplished. Arguably, viewing IS research through epistemological and methodological lenses has provided IS researchers with a systematic guide for deciding what kind of research should be undertaken. Doctoral students are often asked, "What kind of research would you like to focus on?" Positivist research? Interpretivist? Subjectivist? Constructivist? Critical realist? The decision taken often provides a choice of data collection methods available to the researcher (e.g., positivist – survey research; interpretivist – interviews) followed by equally clear data analysis methods. This script of performing research is the staple of any IS researcher. However, as this section argues, this seemingly convenient recipe comes fraught with problems.

Although the paradigm wars are apparently coming to an end (Mingers, 2004), it raises the question why it took so long (longer than the education field) for the IS field to reach this conclusion, and what implications the continued application of metaphysical paradigms might have for the future. We argue that part of the answer lies in the IS field following the lead of their organizational science reference disciplines in adopting metaphysical paradigms that obscure and limit the naturally rich potential of an inter-disciplinary field like IS. The use of paradigms shown in the sampling of references in Table 1 differs substantially from the original definitions for the paradigm in Kuhn's *Structure*. As Hirschheim and Klein (1989) note, the understanding of paradigms in IS is similar to Burrell and Morgan's (1979, p. 36) definition of paradigms as "meta-theoretical assumptions about the nature of science and society," which is a much broader meaning that what Kuhn (1970, p. vii) had originally intended when he defined them as “universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners." In contrast to Burrell and Morgan's (1979) formulation of the paradigm, other studies on Kuhnian paradigms are more faithful to the original meaning. For example, in the philosophy of science, Gutting (1980) ascribes to paradigms being "universally recognized scientific achievements" while Bloor (1976, p. 57) defines a paradigm as "an exemplary piece of scientific work which creates a research tradition within some specialized area of scientific activity".

The question at issue is therefore, not about the lack of alternative approaches or research methods in IS research, as is commonly lamented by various authors (Chen and Hirschheim, 2004; Mingers, 2001; Mingers, 2003). This lack of alternative approaches, we will argue, is symptomatic of a larger underlying issue of a disproportionate focus on viewing IS research through the metaphysical paradigm. Because they are fraught with problems, even with guidelines (e.g., Venkatesh et al., (2013)), it is unlikely that metaphysical paradigms, however diverse they may be, will rescue IS research from its current fragmented state.

**Confabulation with Epistemology**

The problem with metaphysical paradigms is not epistemology or ontology, which are critical foundations for any effective research; it is the adoption of epistemology or ontology as the paradigm. By exclusively adopting the metaphysical paradigm, researchers run the risk of conflating paradigms with epistemology and reducing both the paradigm as well as the epistemological view. For example, the positive philosophy of Comte is very different from that of Durkheim, which is turn different from that of Von Mises. At the same time, although they differ in goals and core concerns, elements of these philosophies can be found in anti-positivist, post-positivist and qualitative approaches. The depth of this analysis is lost when all of them are lumped into one paradigm called positivism. Another difference lies in what can be done to paradigms that are not usually done to epistemology. For example, as Kuhn (1970) explains, paradigms can be acquired and abandoned by a community as the result of anomalies and achievements in research, whereas a researcher cannot abandon their positivistic, interpretive, critical or other research perspectives.

By focusing on the metaphysical paradigm, the core concerns of the field risks becoming obscured. An example of this phenomenon can be seen in the education field. After the educational research community embraced the metaphysical paradigm, the real paradigm that was at work shaping educational reform after the 1980s went unnoticed. Mehta (2013) argues that the "Nation at Risk" paradigm shaped political policies surrounding educational reform that culminated in the abandoned standards-based "No Child Left Behind" policy of the Bush Administration. The best example of this confabulation with epistemology in the IS field is the paradigm of design science. This paradigm was constructed based on finding a bridge to the metaphysical paradigm of the behavioral sciences (Hevner et al., 2004). In doing so, the design science community introduces a sociological paradigm—the design paradigm—that they hope IS researchers will rally around. To develop this paradigm, they construct components that would make up theoretical (Gregor and Jones, 2007) and artifactual elements (e.g., constructs, models, methods and instantiations) that fit this new paradigm. However, the overarching metaphysical behavioral paradigm in the form of evaluation, research contribution and rigor, take up the attention of the research and may be holding back the progress of design science. The core concerns of design and the accomplishments from the designed artifacts are obscured by the emphasis on finding the fit with the behavioral metaphysical paradigm. As a result, with the exception of
Hevner et al's (2004) and Gregor's (2007) foundational works, the rest of design science appears to be struggling to build cumulative tradition (Lee et al., 2012).

**Squeezing out alternative views**

The common complaint against the positive philosophy is its narrow and limited outlook in studying life's complexities and meaningful dimensions. Clearly, alternative philosophies provide a greater breadth of options for the researcher. However, peering only through philosophical lenses comes with their own limitations. As critics of Burrell and Morgan's (1979) four paradigms argue, surely, the rich potential of sociological studies cannot be just limited to four views that Burrell and Morgan proposed (Deetz, 1996). Folding the dozen or more philosophies into a quadrant labeled interpretive sociology does not do justice to those traditions. And at the same time, it obscures the emergence of new traditions such as that of the postmodernists, which are missing from the four paradigms model. Any similar attempts to repeat what Burrell and Morgan did will fail into the same trap. Such is the result of conflating paradigms with epistemology.

An example of this squeezing out of alternative philosophies is demonstrated in the IS field with the case of critical research. For many years, the IFIP community promoted the critical IS research agenda (Kaplan et al., 2004; Lytinen and Klein, 1985). Nevertheless, critical research is generally ignored even in paradigmatic surveys of IS research (Chen and Hirschheim, 2004), such that there exists "a widespread view that IS researchers face a methodological choice between positivism and interpretivism as the two fundamental ways of researching and understanding the world" (Richardson and Robinson, 2007, p. 252). Research therefore becomes less about the core concern of the study, and more of whether it is say, positivist or interpretive, quantitative or qualitative, "Weberian" or "Habermasian," as if these epistemological considerations trump the goals of the research.

**A Misplaced Focus on Methodology**

Relying on the metaphysical paradigm diverts the attention of the researcher from the "context of discovery" to the "context of justification." The appeal of this model is in its intuitiveness and simplicity, yet, it masks two faulty assumptions. The first is already appearing among researchers in IS about what methods need to be applied in specific circumstances, and why is it that case studies, which have traditionally been a qualitative method can be a positivist method (Dubé and Paré, 2003; Lee, 1991). Second, this model does not question the merit of the object of study, it merely assumes the researcher knows of its value and only requires the right method. Roszak (1972, p. 202) succinctly describes this over-emphasis on method:

> The methodologies of a Max Weber or a Freud yield brilliant insights only in the hands of a Weber or a Freud; in the hands of lesser talents, they yield what may be less worth having than the blunders of a great mind. One might almost suspect that methodology is the preoccupation of mediocrity, the dullard's great hope of equalling the achievements of the gifted.

Why then do researchers in the sociological and educational sciences, and our own, tend to gravitate to the metaphysical paradigm to seek research ideas? Masterman (1970, p. 71) says it is because these researchers do not take Kuhn's account of normal science seriously. What she means by this is the tendency to depend on the metaphysical and cognitive so much that they have forgotten to allow for the material and practical that are a large part of normal science, and have somewhat passed over the nature of the scientific system as "a marriage between metaphysics and technology."

**ADVANTAGES OF THE ORIGINAL PARADIGM VIEW**

In sociology, Eckberg and Hill (1979) argue against appropriating only the metaphysical paradigm and consider it a misuse of what Kuhn originally intended to mean "exemplars." As a result, ignoring the sociological and conceptual paradigms (Masterman, 1970) leaves the IS field with a limited choice.

**A balance between unified view and the pluralist view**

Using the more concrete version of the paradigm, the IS field is free from the time-consuming and debilitating debates surrounding unified versus diverse, monist versus pluralist arguments allowing the field to work on creating its own native theories. Since there is no longer any unified theory for anyone to defend, the IS community is free to invent its own theories. Because a paradigm can be as simple as a piece of technology, it is free from any philosophical and epistemological baggage but pregnant with its own rich conceptual foundations. The presence of a paradigm does not mean that the research is entirely determined by any specific set of rules necessarily. The error in stating that paradigms rigidly determine a specific direction (Banville and Landry, 1989) assumes that researchers are somehow tied to certain rules. Kuhn (1970, p. 42) rejects this view by emphasizing on shared paradigms not shared rules as a source of coherence for normal research: "Rules, I suggest, derive from paradigms, but paradigms can guide research even in the absence of rules." Hence the paradigm achieves this balance between the unified and the diverse, the monist and the pluralist.
IS is neither organization science nor computer science

The IS field is unique because it sits within this gap between the organization sciences and the technical sciences. It is not wholly in either fields, but straddles both. Unfortunately, the paradigm that has been adopted by the IS field in the past has been one or the other, mostly those from the organizational sciences, but not one of its own. A field that depends on the paradigms of its reference disciplines can never be expected to go beyond the limits and blinders imposed by those paradigms. For example, the history of the IS field can basically be organized into several paradigmatic phases representing the objects of study beginning with the decision making paradigm of the early 1970s to the strategic management (or competitive advantage) paradigm of the 1980s and the organizational (or business process) paradigms of the 1990s. They were useful, allowed IS to bask in the glory of their original authors, but never to escape and create its own concepts and theories. The original Kuhnian paradigm allows the IS field to escape these blinders to find its own concepts, models and theories.

Asking the right questions

A large part of the way forward for the IS field in adopting its own paradigms lies in asking the right questions and returning to the context of discovery rather than testing foreign theories in the context of justification. The reason why fields like Women Studies are established is not because there are no concepts or theories about women. They are certainly addressed in other fields such as psychology and sociology and even biology. The reason why it is established is because the right questions about women concerning gender issues, race, class and sexuality in the multicultural context were not being asked by these other fields. Previously, such questions, if at all, were asked from the specific methodological lens of the other fields—their own paradigms—rather than what the stakeholders of women studies were asking for.

CONCLUSION

A paradigm is the result of the scientific practice and hard work of the community, not an overarching epistemological or ontological philosophy. Uncovering and discovering paradigms are critical because doing so means that the field is progressing forward. What is urgently needed is for the field to begin reaching an agreement and if possible a consensus on its most basic notions and concepts because without this minimal level of agreement, not only will the field lack paradigms; worse, it will continue to flounder in the quagmire of paradigms inherited from its reference disciplines unable to engage its core concerns. Any attempt that involves merely laying a methodological layer, or an epistemological sheen over a pre-paradigmatic field is unlikely to produce results. The IS field need not perpetually be in the state of fragmentation as some may conclude. The genie is not yet out of the bottle. The field's destiny lies in the hands of its scholars.

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