Useful Products in Theorizing for Information Systems

Completed Research Paper

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Abstract

Recent years have seen a growing interest in theory building within the information systems (IS) field and debate is continuing on what constitutes theories in IS. This study extends Weick's recommendation to focus instead on theorizing rather than on the theories themselves as a way of progressing forward. It focuses on the products of theorizing that only approximate theories but are critical to their development including discursive formations, questions, analogies, myths, metaphors, paradigms, concepts, constructs, statements, propositions, models and frameworks. These terms can be found scattered in various treatise on theories but are not sufficiently elaborated in a cohesive manner as products of theorizing. This study defines these terms, describes their characteristics and how they enhance theorizing.

Keywords: IS theory, theory building, discursive formation, metaphor, myth, concepts, propositions, conceptual model, theoretical framework

Introduction

Although the question of IS theory has been discussed since the inception of the field (Markus and Robey 1988; Orlikowski and Iacono 2001; Weber 1987), these past few years have seen a growing interest in theory building within the IS community. Triggered by Benbasat and Zmud's (2003) provocative proposal to establish the field's organizational identity and intellectual core, numerous responses from the community debated whether IS needs a distinguishable "theoretical core" (Gray 2003). Some argue that such a fixed core is unnecessary and logically indefensible (King and Lyytinen 2004; Lyytinen and King 2004) while others point to the necessity for theories (Weber 2006). Several studies lament the phenomenon of excessive borrowing of theories (Hassan 2011; Markus and Saunders 2007) while others describe how theories could be faithfully adapted from other disciplines (Truex et al. 2006). Much progress has been made in describing the nature of IS theory (Gregor 2006; Gregor and Jones 2007), but the debate continues with discussions on whether or not IS actually has developed native theories (Grover et al. 2012; Straub 2012) or even need theories in its formal sense (Avison and Malaurent 2014). This issue has certainly struck a sensitive chord and continues to be discussed from various perspectives (Weber 2012).

Much of the controversy surrounding theories can be traced to the problem of defining what "theory" means, something that is unlikely for everyone to agree on. As Weick (1995, p. 386) notes, “theory belongs to the family of words that includes guess, speculation, supposition, conjecture, proposition, hypothesis, conception, explanation, [and] model.” He continues to observe that, “if everything from a ‘guess’ to a general falsifiable explanation has a tinge of theory to it, then it becomes more difficult to separate what theory is from what isn't.” Accordingly, attempts to define what theory is or is not are often difficult and are made even harder by the fact that theory is approximated more often than it is realized, which suggests that theory is a continuum rather than a dichotomy (Runkel and Runkel 1984; Weick 1995). Acknowledging this difficulty, Sutton and Staw (1995) chooses a reverse approach to describe what is not theory. Included in this list of pre-theoretical structures are references to prior work, mere empirical data, lists of variables and constructs, diagrams, as well as hypotheses (and predictions) by themselves.

In the interest of moving the discussion on IS theories forward, this study extends Weick's (1995) proposal to focus instead on theorizing rather than argue about whether or not our contributions constitute theories. Weick (1995) views theorizing as a balance between addressing theories as product and as process. While Weick (1995) focuses on the process, this study sheds light on the products of theorizing, those forms that not only approximate theory, but more importantly are critical elements in the steps towards strong theory. This study argues that such pre-theoretical structures are an essential part building theories because without them, no mature theory would ever see the light of day. Literature on theory and theory development are plentiful (Bacharach 1989; Dubin 1969; Eisenhardt 1989; Mohr 1982; Reynolds 1971) and the IS field is building its own tradition as well (Gregor 2006; Gregor and Jones 2007; Markus 2001; Markus et al. 2002; Walls et al. 1992; Weber 2012); however, literature on the pre-theoretical structures and how to work with them are scattered in different publications and not coherently organized, especially for the young researcher. As Sutton and Shaw (1995) notes, lists of constructs and variables are not theories, but when those constructs take the shape of a parsimonious framework that describes complex organizational forms capable of explaining outcomes (Doty and Glick 1994), they go a long way in developing strong theory. With this in mind, the goal of this study is to elaborate in detail the nature of the products of theorizing, how they closely intertwine and show how they contribute towards developing strong theory. Using the example of the phenomenon of cloud computing, this study demonstrates the different products of theorizing relate to the object of study and how they operate at various levels of abstraction.

Products of Theorizing

Historically, the vast majority of IS research has been positivistic in nature (Orlikowski and Baroudi 1991). Positivistic or quantitative-type research and qualitative research differ in how they treat concepts and measurements. Quantitative research rely more on their data, measurement and statistical models to derive conclusions. Accordingly, they focus attention on the nature of the data and quality of quantitative measures. Although these studies contain theory and perform various forms of theorizing, more focus is placed on operationalizing and analyzing datasets rather than on analyzing models, constructs and concepts. These products of theorizing tend to be taken for granted in quantitative research; while in qualitative research, they are a major concern (Goertz and Mahoney 2012). It is therefore not surprising that the IS field spends less time on the products that are the result of theorizing than on testing and validating theories. Emphasizing the need for better theorizing, Weick (1989, p. 516) notes:

> Theory cannot be improved until we improve the theorizing process, and we cannot improve the theorizing process until we describe it more explicitly, operate it more self-consciously, and decouple it from validation more deliberately.

Subsequently, Weick (1989) proposes that the process of theorizing follows closely the process of artificial selection, where theorists choose both the research questions and select the solution that best survives their experiments. To accomplish this task theorists will generate a diverse set of conjectures considered most plausible to address the problem, inquire about their interestingness, distill relevant past experience, find connections with elements of the problems and search for answers that are believable. Throughout this process of theorizing, various different forms of theory that are not yet theory are invented, dreamed of, constructed, examined and applied as scaffolding or instruments to complete the process. They may be as abstract as metaphors, or as concrete as measurable concepts or constructs. They may take the form of questions that triggered the investigation, or models used to connect constructs relevant to the phenomenon of interest. As they are refined, they will eventually be formalized into different types of theories (e.g., Gregor 2006). The following sub-sections describe different forms of products from theorizing that are helpful to researchers. They have not been formally validated and are by no means exhaustive, but should represent a major part of the work of theorizing. The scope of this study is to define and elaborate on the products and where they operate within the process of theorizing. The evaluation of each product (e.g. adequacy, expressiveness, etc.), which is a worthy undertaking on its own, is only hinted on briefly for each product, as they are outside the scope of this study.

Discursive Formation

Theorizing differs from everyday guesswork because it is a form of controlled inquiry that takes place in the context of a field of study or discipline. Therefore, the underpinning rules of that disciplinary activity, which Foucault (1972) calls the "discursive formation," establish various relations that operate to define the nature and essence of the field. The operation of these rules creates statements that belong to a specific discourse such that it is possible to recognize economic discourse from psychological discourse, biological discourse from medical discourse, and computer science from IS discourse. Toulmin (1972) calls this "discursive formation" the field's intellectual ideals that exist beyond any specific period of time and are not owned by any particular scholar.

Theorizing therefore takes place within a particular discursive formation and abides to the rules set by that discursive formation. The discursive formation operates at the disciplinary level and becomes the precursor to all other products of theorizing as it sets down the various different directions in which the theorizing is likely to proceed. In this sense, the discursive formation is the engine that generates the products rather than a product itself. It is listed here as one of the products because of its significance in theorizing and its implications on the products themselves. As Foucault (1972) notes, the discursive formation of a discipline is what "is required for the construction of new statements. For a discipline to exist there must be the possibility of formulating— and of doing so ad infinitum—fresh propositions" (p. 223).

Because of the diversity in the content of IS research (Benbasat and Weber 1996), the issue of what discursive formation is in operation during theorizing becomes problematic. This issue is also pertinent to the question of relevance (Benbasat and Zmud 1999) since theorizing can only take place in a field if it is relevant to that field. Often, the question raised with respect to relevance is "relevant to whom?" Instead of arguing whether or not it is relevant to practitioners or academicians, the question that is more important to theorizing is whether or not it is relevant to the field itself. Most theorizing in established fields are relevant to its discursive formation, making clear how its objects of study contribute to the field. Consequently, the domain of the research can be mapped such that it is possible to draw a definitive hierarchy from its root, its discursive formation, to its different branches and enunciations. For example, the discursive formation of biology is based on the set of rules surrounding the organic structure of life. Thus, when Darwin introduced his notion of evolution, a new branch grew from this tree representing the field of biology. It remains subordinated to its roots, but it provides an original and valuable contribution to the discursive formation of the field. In the IS field, the case of the Technology Acceptance Model (TAM) is instructive (Davis 1989). How much TAM contributes to theorizing in IS as opposed to contributing to social psychology, from which it originates, becomes a valid question (Benbasat and Barki 2007).

The phenomenon of cloud computing offers an instructive case of how theorizing could be undertaken by applying different discursive formations. There are few, if any, scholarly articles in the "pure" disciplines (e.g. history, law, economics and finance, psychology, political science, anthropology) on cloud computing outside the allied fields of computer and information sciences, business and engineering. Within these interdisciplinary fields, theorizing on cloud computing can be found within different discourses besides that of computer science and engineering. For example, economic discourse is applied to analyze impact of cloud computing on businesses (Etro 2009). Political science and legal discourse discusses issues pertaining to the jurisdiction and control surrounding the use of cloud computing (Jaeger et al. 2009). A comparison of studies in both computer science journals and IS journals highlights their distinct discursive formations. Historically, the discursive formation of computer science concerns "computing techniques and appropriate languages for general information processing, for scientific computation, for the recognition, storage, retrieval, and processing of data … and … automatic control and simulation of processes" (Revens 1972, p. 486). The symbolic processing theories belonging to this discourse (Hassan and Will 2006), ranging from algorithmic theories, automata theory and parallel and distributed computing theories, make possible the combination of centralized control with distributed access within the phenomenon of cloud computing.

In IS, different enunciating functions apply. The adoption of cloud computing is a common research topic for IS research (Behrend et al. 2011; Low et al. 2011; Oliveira et al. 2014; Park and Ryoo 2013; Yang and Tate 2012). Various theories including the theory of enablers and inhibitors, diffusion of innovation theory (DOI) and the technology acceptance model (TAM) are applied in this area of research. Brynjolfsson et al. (2010) and Marston et al. (2011) examine the business model underlying cloud computing using various perspectives such as stakeholder theory and the utility model. And drawing from the industry's software-as-a-service (SaaS) depiction of cloud computing, Benlian et al. (2011) and Chou and Chiang (2013) develop ways of evaluating the service quality of cloud computing services using theories surrounding perceived usefulness, trust and user satisfaction. These studies illustrate how the discursive formation underlying IS research is distinct and complements the works undertaken by other disciplines. At the same time, this analysis of discursive formations highlights the directions, foci and emphases of specific research studies in IS allowing researchers to evaluate the originality and distinctiveness of their research.

Question

During theorizing, typically a researcher is often asked to articulate research questions. This is probably the most important product of the research, even more than the results, because if the wrong questions are asked, the results may not address the target problem, resources may be wasted, and the whole research program heads in a less productive maybe even harmful direction. Evidence from linguistic and philosophical studies (Bal 2002; Bromberger 1992; Meyer 1995) suggest that what is fundamental to disciplines is the set of questions they ask. Disciplines necessarily have disciplinary-specific questions. And these disciplinary-specific questions are what are being asked within inter-disciplinary practices as new fields of study fuse elements from the contribution of their "reference disciplines." Good theorizing can be said to be about asking questions that are not being asked, or which other disciplines are incapable of asking. Science, if understood as a set of propositions, is essentially a set of principles and devices for establishing the answers to questions. And "when questions are deemed answered, new propositions are established" (Bromberger 1992, p. 101). Philosopher Michel Meyer (1995) suggests questioning as the first principle in philosophy, and in his discussion with and critique of Heidegger, places questions before even ontology.

What defines a discipline is not necessarily its theory, its methods, its practitioners, or the particular canons that it holds—what defines a discipline is the particular set of questions that it asks. An example of this is the field of women's studies. It emerged as an academic field because there was a strong sense on the part of many people that there were many aspects of the human experience that were not being given sufficient attention. It did not mean that women were not being studied in the sciences. The object of women is studied in sociology, psychology, and even political science. And yet, women's studies still emerged. Why? Because there was a need to study the object of women not as a by-product of social forces as in sociology, or a kind of mental object as in psychology, or the center of feminist political activity, much less as a confounding or ignored variable in scientific studies, something which also happened. Women's studies are asking the questions that nobody else is asking.

Related to the issue of the field's discursive formation, among the first products of theorizing in IS therefore is a list of questions that the management, computer science, social psychology, sociology or any of its purported reference disciplines have not satisfactorily addressed. These questions circumscribe the IS field's contribution to other fields, and if there are theories to be got, it will be in answering or addressing such questions. This does not mean that we should stay away from researching other pure disciplines because such research enriches our understanding and the most interesting research has always been at the boundaries between disciplines; rather, it is important for us to expend our field's scarce intellectual resources on enhancing our own field rather than other disciplines.

The case of cloud computing illustrates how questions are raised as a result of the emergence of this technology. Numerous questions ranging from technological and infrastructural questions (Foster et al. 2008), resource allocation and scalability (Zhang et al. 2010), cost and pricing (Walker 2008), service provisioning issues, IT management and governance, alignment of cloud computing services with business strategy and mission critical functions, data lock-in and proprietary considerations, ethical-legal-security-privacy issues, to opportunities for developing nations to leverage cloud computing (Kshetri 2010) are relevant to IS research. However, the first two categories, which are essentially technical in nature, are perhaps best addressed by computer science and engineering disciplines. The rest falls squarely on the shoulders of IS researchers because no other disciplines appear to be addressing them satisfactorily. The vast majority of studies that raise these questions merely list them as challenges and offer few original solutions or theoretical discussions. Theorizing by interrogating and asking IS-specific questions demonstrates how the IS field complements and contributes to the work done by other disciplines.

Analogy

At the most abstract end within a particular field, but also potentially the most potent of the products of theorizing, are analogies. Foucault (1970) describes analogies, similitudes and resemblance as playing the most constructive role in the development of Western knowledge up to the Age of Enlightenment, replaced later by forms of representation, ordering and classification. Various methods of resemblance such as juxtaposition, emulation, analogy, and sympathy generated the bulk of medieval and pre-scientific knowledge (e.g. Aristotelian mechanics and physics comparing the rise and fall of objects based on their components of light or heavy elements, fire, air, water or earth). The same process of scientific modeling with the help of analogies continues to the modern age. Norman Campbell (1920, p. 119) emphasizes the critical role of analogy in theory construction:

> … the value of the theory is derived largely, not from the formal constitution, but from an analogy displayed by the hypothesis. This analogy is essential to and inseparable from the theory and is not merely an aid to its formulation.

As Mary Hesse (1966) explains, analogies are always in use in scientific theorizing as was the case with the wave and corpuscular theories of light. Within the context of discovery, analogies allow for demonstrative inferences to be made which are difficult or impossible in purely positivist schemes of explication and justification. For instance, Darwin applied the analogy between artificial and natural selection to argue for the plausibility of natural selection.

The IS field's application of analogical reasoning is sparse. A recent study (Kuechler and Vaishnavi 2012) suggests that the field is realizing its importance in theorizing, especially in the context of discovery. This design science article briefly proposes using analogical reasoning as the means of translating from theoretical domains to design domains in discovering workable solutions. Implicit reasoning by analogy in IS can be found in most studies but the reasoning and theorizing process is not explored in detail. For example when IS scholars study "systemic change," analyze "systemic failures" or discover a "contagion" of system risks, they are applying analogies from biology to inform and explain their research. In cloud computing, the most common analogies compare it to resources (e.g. general purpose technologies) and innovations (e.g. grid computing). These analogies do not take theorizing far because the analogies are themselves too close, too common or overused. Comparing cloud computing to services takes theorizing further and as shown in Chou and Chiang (2013), enables the researchers to apply measures and concepts from a different domain. The more descriptive the services, as in comparing computing services with utilities, the more likely the researcher will be able to use what Hesse (1966) describes as horizontal and vertical relations, similarity relations, causal relations and other analogical tools between the two phenomena.

Myth

Myths are defined as "A dramatic narrative of imagined events, usually used to explain origins or transformations of something … an unquestioned belief about the practical benefits of certain techniques and behaviors that is not supported by demonstrated facts" (Trice and Beyer 1984, p. 655). Although myths are usually referred pejoratively, they can perform the role of uncovering unquestioned assumptions within existing belief systems and theories. Myths as products of theorizing perform multiple functions (Hirschheim and Newman 1991; Mousavidin and Goel 2007): they provide a means of explanation and have become a major source of theory in anthropology, a language for studying symbols and are valuable in sense making (Cohen 1969). Levi-Strauss considers myths as precursors to science especially in the science of relations (Lévi-Strauss 1963; Lévi-Strauss 1966). Cassirer developed a theory of symbolic forms inspired by his study of myths (Bidney 1955; Cassirer and Verene 1979).

The study of myths in IS produced several classics rich in theory. Robey and Markus' (1984) "Rituals in Information System Design" uncovers rituals that enable system designers to remain overtly rational while preserving private interests. Davenport and Stoddard (1994) "demythologize" aspects of business process reengineering that rely more on hype than research and are less helpful to bringing improvements in business processes. There are hardly any studies in computer science or IS that mythologizes cloud computing, so not surprisingly, studies that describe the frailties and outlandish claims related to it are few and far between. Myths and metaphors, described next, are closely related and have been applied together in several IS studies as products and tools of theorizing (Behrens 2007; Hirschheim and Newman 1991; Kaarst-Brown and Robey 1999).

Metaphor

Metaphors, the product of theorizing that has been in use at least from the time of Aristotle (Schön 1963), are the linguistic form of analogies. In Poetics 21, Aristotle defines metaphora as a "carrying over" from one to another, from *phor* meaning "carrying" and *meta* meaning "beyond" (Kirby 1997). "Metaphor consists in giving the things a name that belongs to something else" (McKeon 1941, p. 1476). In crafting good metaphors, Aristotle emphasizes the skill of finding likeness or analogies in dissimilar things:

> The observation of likeness (*homoiou theoria*) is useful with a view both to inductive arguments and to hypothetical deductions, and also with a view to the production of definitions (Aristotle, translation cited in Kirby, 1997, p. 536)

What makes a metaphor valuable in theorizing is not only its ability to transfer meaning, but also to impress, clarify, enrich and enlighten. That is why the source of the metaphor is usually something elegant, beautiful, impressive or respected in its own way (Kirby 1997). Thus when a computer scientist uses a metaphor of the brain to describe the computer's central processing unit (CPU), the computer scientist is not only carrying over or transferring the meaning and functions that are familiar to most people about the brain to explain something unfamiliar at the time, the computer's CPU; the metaphor also was intended to impress and enlighten the audience concerning the capabilities of the computer.

The nature of the metaphor provides sought-after characteristics of good theory such as originality, economy, consistency, elegance, perspicuity and form. Since knowledge is known as something and construed from some point of view, all knowledge is perspectival and therefore all knowledge is metaphoric (Brown 1976). This point of view extends the view that metaphors are primarily rhetorical devices to becoming products and tools for theorizing. With these characteristics, metaphors are valuable for early stages of theorizing, inductive and deductive theorizing, retroductive and abductive reasoning as well as extending existing theories.

Explicit use of metaphors in IS is limited, inspired mostly from management studies (e.g. (Morgan 1986)) and usually undertaken together with myths (Hirschheim and Newman 1991; Kaarst-Brown and Robey 1999). An early application discussed alternative metaphors to the war metaphor that dominated strategic thinking at the time proposing instead organismic, sports team and city states metaphors (Mason 1991) for IS strategic planning. Using Schön 's (1979) notion of "generative metaphor," IS scholars apply it to the planning and development of systems to accommodate a multiplicity of interests and relationships (Atkinson 2003). Several articles explored the use of metaphors to theorize about system development (Kendall and Kendall 1993; Oates and Fitzgerald 2007).

In the case of cloud computing, the name itself applies a metaphor, and is likely one of the reasons for its appeal, in the same way the "brain" of the computer communicated the capabilities of the early computer to the public. Brynjolfsson et al. (2010) applies the metaphor of electricity to describe the kinds of services that's expected of cloud computing as a utility, and with the help of this metaphor, theorizes several dissimilarities between electricity and cloud computing. This allows researchers to explore those similarities and empirically test them.

Paradigm

As a result of the many criticisms against Kuhn's (1970) notion of the paradigm, and varied interpretations of the paradigm from outside (Popper 1970) and inside the IS field (Banville and Landry 1989), the role of the paradigm in theorizing has been placed in the background. Early attempts to theorize using paradigms met with resistance. Right from the start, the nature of the paradigm became a contested issue. Except for several notable exceptions (Chen and Hirschheim 2004; Goles and Hirschheim 2000; Iivari et al. 1998; Khazanchi and Munkvold 2003; Mingers 2004; Moody et al. 2010;

Richardson and Robinson 2007), the IS field has abstained from actively engaging in a healthy debate on the subject of paradigms, at least in the concrete forms that Kuhn envisioned. In addition to the earlier evidence provided (e.g. "recent disrepute into which this word has fallen" (Ein-Dor and Segev 1981, p. vii)), further evidence suggests that for the IS field, the Kuhnian paradigm remains a dubious undertaking. Citing Banville and Landry (1989), authors in the IS field "question whether such a paradigm is feasible, or, indeed, desirable" (Adam and Fitzgerald 2000) and opine that "[T]he concept of paradigm, as Kuhn defines it, is derived from research in the physical sciences. This perspective may not serve well in the social sciences, where pluralistic models are more appropriate as the basis for understanding and analysis" (Larsen and Levine 2008, p. 25).

This state of affairs is unfortunate because the paradigm concept has been applied in theorizing successfully in many other fields both natural and social sciences. Marvin Minsky (1975), among the pioneers of artificial intelligence, admits his debt to Kuhn for his frame theory. Minsky (1975) writes “The basic frame idea itself is not particularly original–it is in the tradition of the ‘schema’ of Bartlett and the ‘paradigms’ of Kuhn” (p. 113). Theorizing in the form of Merton's (1973) sociology of science, Berger and Luckmann's (1966) social construction of reality, science and technology studies, and Ritzer's (1980) sociology, all were inspired by Kuhn's paradigm concept. In the IS field and in the social and educational sciences in general, this productive work of theorizing is hampered by a move to redefine "paradigm" not as a product of theorizing, but as an epistemology (Hassan 2013). Consequently, much of today's conceptualization are what Masterman (1970) calls the "metaphysical paradigm" in the sense of seeing or worldviews, whereas, the majority of examples given by Kuhn (1970) of paradigms were sociological and conceptual paradigms. Paradigms, as Kuhn (1977) describes in his later response to his critics, are really exemplars, or concrete solutions to particular problems that can serve as the basis for solving other problems. Tying back to the earlier concepts of analogies and metaphors, paradigms are concrete version of these analogies and metaphors that have received the acceptance of the community of scientists and researchers. This view is supported by Abbot (2001; 2004), who argues that unified sets of premises, like Kuhnian paradigms, can function as research heuristics. These kinds of paradigms that take the form of scientific achievements, widely agreed political bases and legal precedence, standard classical textbooks, illustrations and analogies, have historically been accepted as products of theorizing, whereas metaphysical paradigms are really epistemological approaches that guide theorizing.

The IS field has followed the organizational sciences and the education field in conflating paradigms with epistemology (Hassan 2013). As a result, so-called incommensurable approaches in research developed into "paradigm wars" (Mingers 2004) and products of theorizing are obscured. As a result of this conflation, the use of paradigms as research heuristics is limited. Cloud computing is too recent a phenomenon to have established paradigms. But that should not prevent researchers from using exemplars as paradigmatic heuristics for cloud computing research. The agnostic nature of the paradigm allows both quantitative and qualitative elements to work together. So there is no reason why different paradigms cannot be combined to enhance creative theorizing. For example, Schön (1983) describes using the metaphor of the pump to generate new ideas on how to design a paintbrush. Despite being two different products with two different paradigms of delivery, they share developmental lines of thought in delivering paint, such that the already familiar processes of one can be creatively transferred to another. This "generative metaphor" (Schön 1979) is an example of the use of paradigms to generate perceptions of new features and therefore gives rise to a new view of the problem. Thus, in the area of cloud computing design and use, the delivery of services paradigm (Benlian et al. 2011) could be combined with the delivery of utilities paradigm (Buyya et al. 2009) and the outsourcing paradigm (Kakabadse and Kakabadse 2000) to explore novel possibilities for delivery of cloud computing (Benlian and Hess 2011).

Concept

Working with the more abstract products of theorizing such as questions, analogies, myths, metaphors and paradigms produces core concepts of that branch of study. Concepts are the mainstay of progress in knowledge. As Nobel Laureate, Sir George Thomson (1961, p. 4) notes, "science depends on its concepts. These are the ideas that receive names. They determine the questions one asks, and the answer one gets. They are more fundamental than the theories which are stated in terms of them." Concepts can take the shape of a child's notion of his mother to Newton's notion of mass. They are given a certain generality and are superimposed on our experience as a way of us coping with the world. Many concepts put together provides us with a gestalt that enables certain expectations. Thus a newly discovered liquid may be transparent, viscous and corrosive at the same time allowing us to conclude that it might be an acid (Schön 1963). Such conceptual development are few and far between in the IS field, therefore holding the field back from researching the IT artifacts that are part of our core concerns (Orlikowski and Iacono 2001; Weber 1987; Weber 2003).

The search for new concepts has been the preoccupation of scholars, philosophers and scientists since before the Age of Enlightenment. However, the process of theorizing concepts has been a mystery. Schön (1963) suggests that the production of new concepts is closely related to understanding how to work with metaphors and analogies. He notes that, "The new concept grows out of the making, elaboration and correction of the metaphor" (p. 53). He calls this process, the "displacement of concepts," where words undergo transposition (applying an old concept to a new situation), interpretation (the assignment of that concept to a specific aspect of the new situation), correction (an adjustment as a result of adaptation and modification), and spelling out (working out commonalities and differences) as a way of copying with a problem or an attempt to understanding. Sartori (1984) defines "concept" as the basic unit of thinking. "It can be said that we have a concept of A (or of A-ness) when we are able to distinguish A from whatever is not-A" (p. 74). A concept needs to named, its meaning specified, and even though it may denote the same slice of the world, it can be interpreted differently. Consider the term "organization" which takes a different meaning in biology than it does in management and organization sciences. In this case, the term slices up different aspects of the world. However, when the term is used in an information system that no longer exhibits the characteristics of a traditional organization in management (e.g. in the case of social media), a different interpretation is required, which may invalidate the theories of the organization sciences when applied in the context of IS.

One of the ways of producing concepts is by inductively deriving them from data in methods such as grounded theory. The process of coding in grounded theory is the process of conceptualizing data (Strauss and Corbin 1990), so codes are forms of concepts. Foucault (1972) suggests using the objects' "surfaces of emergence," their "authorities of delineation" and analyzing the "grids of specifications" that classify and organize the objects, to discover conceptual differences in how these objects occur, and lead to the formation of new concepts. Following Kaplan (1964) and other theorists, Fawcett (1998) defines different types and abstractions of concepts. Depending on the concept's observability, a concept could be directly observable, which makes it similar to Foucault's "object of study," or, indirectly observable, which is Foucault's "concept." If the concept is neither directly nor indirectly observable, it is called a construct.

Concepts applied in cloud computing research are mostly taken from discursive formations of computer science and engineering. Many of these concepts are borrowed from practice and are sometimes rigorously defined in order to enable research. The term SaaS was allegedly coined by the Software & Information Industry Association (Hoch et al. 2001) while the term "cloud computing" itself is traced back to 1996 by several Compaq Computer executives who presented a business plan to provide servers to Internet service providers (Regalado 2011). From these terms, other concepts including Infrastructure as a service (IaaS), Platform as a service (PaaS) and associated characteristics such as cloud architecture, on-demand broad access, resource pooling, are rapid elasticity commonly attributed to cloud computing, are now formally defined by the National Institute of Standards (Mell and Grance 2011). Most of these terms fall within the discursive formation of computer science and engineering, whereas in IS, most of its concepts, such as ease-of-use/usefulness (social psychology), trust (social psychology), quality (psychology), self-efficacy (psychology) are borrowed from its reference disciplines. There is a need to make these concepts our own (Markus and Saunders 2007), whether they are invented from scratch or critically adapted into our field.

There are scant studies about which concepts are the most important to IS. A notable exception is Furneaux and Wade (2009), which identified 690 distinct "constructs" that were researched in *MIS Quarterly* and *Information Systems Research* between 1999 and 2007. The results show a preponderance of research undertaken that are related to the concepts of technology acceptance, adoption, trust and organizational performance. Studies on these concepts of interest provide insights into not only the nature of the IS field, but also its progress in relation to other disciplines, its identity and its future direction. An earlier effort to define IS concepts was by IFIP in their series of FRISCO reports (Falkenberg et al. 1998; Stamper 2000; Verrijn-Stuart 2001), which, in part because of its formalisms, did not capture the imagination of the IS community.

Construct, Variable and Theoretical Term

The importance of constructs is well known in research. However, for the purposes of this study, the significance of constructs will be developed. Two characteristics of constructs will be discussed, (1) its clarity, and (2) its distinctiveness. Concerning the former, Suddaby (2010) proposes focusing on four areas that will enhance the clarity of constructs: (1) definition of the construct, (2) scope conditions under which it applies, (3) offer conceptual distinctions and semantic relationship to other constructs, and (4) coherence and logical consistency. Constructs are "postulated attribute of people, assumed to be reflected in test performance" (Cronbach and Meehl 1955, p. 283) or abstractions used to explain more observable phenomenon (Morgeson and Hofmann 1999). They help researchers make sense of such observations by acting as heuristic devices, and together with other observables and constructs, form what is known as the "nomological network," defined as the " the interlocking system of laws which constitute a theory" (Cronbach and Meehl 1955, p. 290). On the question of distinctiveness, if the IS field considers the development of native theories as an important goal, unique constructs therefore will be critical since theories are essentially a system of constructs (Bacharach 1989). If the theories are to be considered native, at least some of those constructs will also need to be native. To be relevant, these constructs should be those in which society is interested in and an understanding of their underlying concepts contributes to the individual, business or society as a whole. Ideally these concepts should not be the same concepts that are already the purview of other fields, or at the very least, not viewed in IS in exactly the same way as it is viewed in other fields.

A variable is a concept or construct that can take various values (Stinchcombe 1987). Another way of looking at the variable is as diverse forms, categories or fluctuations of the concept (Fawcett 1998). Numerical scores are often assigned to the categories of the concept in order to relate that concept to other concepts and therefore form a statement or proposition. This is where confusion often sets in as to what constitutes "quantitative" research as opposed to "qualitative" research. The fact that the variables are quantified does not mean that they are part of "quantitative research" and nor does any lack of numbers imply they are necessary qualitative. A more useful classification of variables is Dubin's (1969) schema defining enumerative, associative, relational, statistical and summative concepts and how they can be transformed into variables. MacCorquodale and Meehl (1948) distinguishes between two kinds of constructs, those that merely abstracts the empirical relationships (often called intervening variables) and those that are hypothetical, which involves supposing some non-observables. Both are concepts with different characteristics and both require different approaches to research.

At the abstract end of continuum of concepts is what Kaplan (1964) calls the theoretical term, similar to Dubin's (1969) summative unit. This grand concept refers to a complex, possibly global, phenomenon that combines or summarizes multiple less abstract concepts in one term. It is impossible to observe directly or indirectly but can be interpreted through its relation to constructs. Examples of such summative theoretical terms in IS includes IS success and user satisfaction; referred historically as examples of IS dependent variables. Strictly speaking IS success and user satisfaction are not variables and viewing them as variables may detract researchers from more significant constructs and variables. For example, in the case of cloud computing, concepts of value co-creation makes possible various novel constructs such as "value-in-use" that can be measured (Grönroos and Ravald 2010) and when incorporated into the IS construct of "use" (Burton-Jones and Straub 2006) might offer novel areas for research.

Statement/Sentence/Proposition

To the non-theorist, a "proposition," for all intents and purposes, is similar to a "sentence" and a "statement." To the theorist, their nature and functions are different. The table of elements in Chemistry contains no sentences, but contains numerous statements about chemical elements. The two sentences "No other element besides gold has the atomic number 79" and "It is true that gold has 79 protons in its atom" has the same logical proposition, but describe two different sentences grammatically and different statements modally. In this example, the proposition and the statement closely applies concepts that can only be understood if situated within chemistry and by following the rules set by its discursive formation. The sentence only loosely applies the concepts if any. When taken out of its discursive formation, as in the sentence "Time is golden," this proposition and statement bears little relation to chemistry but would make sense in English literature. This is the reason why connecting the theoretical concept to the discursive formation of the field is so important. Concepts are tied to their discursive formation. For instance, the concept of "acceptance" in TAM (Davis 1989) originated from the concept of "attitude" in social psychology (Fishbein and Ajzen 1977), and any attempt to formulate statements without reformulating the discursive formation limits the concept to its "home" field, thereby limiting knowledge growth (Benbasat and Barki 2007).

These distinguishing features of the statement have major implications for theorizing. In Foucault's (1972) terms, a statement is considered the elementary unit of discourse, formulated from concepts and can be defined as an enunciative function that enables groups of signs to exist and make sense. The references made in the statement become the objects of study of the field. It is in this sense that Foucault (1972) defines the statement as "the modality of existence proper to that group of signs" (p. 107), making it more than just a series of traces, objects on their own but closely related to a specific domain of objects. Any statement made will necessarily belong to a discursive formation (and therefore a particular field of study). So the statement that "user participation enhances the quality of a system" can be argued to belong to the IS field because its related concepts ("participation," "system quality") are IS-specific concepts and theoretical terms which have been theorized as such. Therefore, we can say that a major part of theorizing is to produce as many meaningful statements directly related to the discursive formation of IS that carry truth-values and can become useful to society. For example, in describing the benefits of cloud computing, the concept of "Sourcing Independence" is described by the statement "This capability of cloud computing enables a company to control access to services and to switch service providers easily and at low cost" (Iyer and Henderson 2010). The truth-value of this statement can be put to the test in various ways, including using formal propositions or testable hypotheses.

Formal Proposition/Hypothesis

Meaningful statements take different forms and tie together concepts in different ways. When statements take logical forms, they become propositions. Fawcett (1998) defines two kinds of propositions: nonrelational propositions and relational propositions. Nonrelational propositions can either be existential propositions or definitional propositions. Existential propositions exert the existence or level of existence of a concept. For instance, three common applications of the theoretical term "knowledge management" are found in practice as: (1) the coding and sharing of best practices, (2) the creation of corporate knowledge directories, and (3) the creation of knowledge networks (Alavi and Leidner 2001). The extents to which they are applied reflect their level of existence. Definitional propositions would describe the characteristics of these practices either in a constitutive definition, representational definition or operational definition. Representational and operational definitions are inputs into causal theories (Fiss 2011). According to Doty and Glick (1994) and Gregor (2006) when these kinds of nonrelational propositions take the form of typologies and taxonomies, they already qualify as explanatory theory.

When propositions express an association, connection, patterns of covariance or correlation between two or more concepts they become relational propositions. Numerous kinds of relationships can be hypothesized including the existence, direction, shape, strength, symmetry, necessity or sufficiency or contingency of the relationship, each on its own or in combination can be applied to build the model for the research. In more positivistic research, when these propositions take the form of conjectures that can be empirically tested, they are called hypotheses. Derived from propositions usually by linking operational-defined concepts, they represent expectations about the way the world works, if the assertions of the model (described below) are empirically adequate. In these kinds of research, it is the numerical scores from the operational definitions that are compared using statistical tests to arrive at conclusions. Fawcett (1998) also describes hierarchical orderings of propositions as part of the process of formalizing them, either by level of abstraction, inductively or deductively in order to provide a concise justification for the existence of a phenomenon or an explanation of why the relations exists. These hierarchies can then be used as part of conceptual framework (discussed below). Continuing the previous example of cloud computing offering the benefit of sourcing independence, alternative hypotheses could be raised concerning the dangers of vendor lock-in and operational definitions for both concepts could be constructed to test the hypothesis.

Model

A model combines all the products that are discussed above into a system that is pre-theoretical and has only a partial interpretation of observables. Using notions of positive analogy (common property between two different objects), negative analogy (different properties), and neutral analogy (neither positive or negative), Hesse (1966) defines the model as the pre-theoretical imperfect copy of the phenomenon of interest consisting of positive and neutral analogies. Another useful feature of the model is the existence of horizontal relations, which refer to how similar properties of models are to the phenomenon, and vertical relations, which are causal relations within the model. All these pre-theoretic analogies are what Hesse (1966) calls material analogies to distinguish them from formal analogies used in theories. Biologists and paleontologist apply these principles of modeling every time they attempt to predict what role structures of animals (or dinosaurs) play in their habitat.

Questions related to these relations need to be answered before we can arrive at a "conceptual model" which is a "wholly imaginary ... not realized in any existing ... physical system" (Hesse 1966, p. 67). Such conceptual models should ideally incorporate causal relations, but during initial theorizing can begin without knowing any causal relations. As theorizing proceeds, properties that are causally related to known positive analogies should be incorporated as essential elements of the model. Thus in the case of using billiard balls for atomic theory, certain properties such as mass and other mechanical properties are part of the model, while color and absolute size, which are part of its negative analogies can be excluded without hurting the model. As Harré (1970) explains, a model is no more than a putative analogue for the real mechanism and modeled on things, materials and processes we understand.

Harré (1970) describes different kinds of models depending on whether the subject of the model is also the source of the model. Weber's ideal types are examples of where the subject of the model is also the source of the model, and so are model airplanes used in wind tunnels. Harré (1970) calls them homoeomorphs and they differ in terms of scale, purity and details. Abstractions such as those used in statistics (e.g. the "average family has 2.5 children) are also of this type of models. If the subject is not the same as the source of the model, they are called paramorphs. Different forms are used in order to usually model the process that is unknown or to be investigated. The corpuscular theory of gases, thought of from sheer imagination, is an example of a paramorph model that applies the principles of one science, mechanics, to another, kinetics. Economic models that demonstrate how the economy "expands" and "contracts" as a result of flows of activity is another example of paramorphs. Much of the sciences consist of modeling and imagining paramorphs, which provides the necessary grounding for new concepts and theoretical terms.

Walsham (2006), in describing how to do interpretive research, and Fawcett (1998), in explaining how models guide research, both agree that research always begins with a conceptual model, explicitly or implicitly. It is this assertion that lies beneath the differences between Glaser's and Strauss's versions of grounded theory. Glaser accuses Strauss of relying too much on the theoretical model in conceptualizing data and recommends developing what he calls "theoretical sensitivity," which he defines as essentially distancing oneself from having any predetermined ideas. Strauss defines theoretical sensitivity as using experience and knowledge to the advantage of theorizing without letting it limit the theorizing (Strauss and Corbin 1990).

Understanding the underlying model is critical in theorizing because its coherency and efficacy depends on how well its elements work together to explain or predict the phenomenon of interest. Since models are by definition imperfect representations of its subject, any further imperfection may have unpredictable results on theorizing. In addition to the fit that a model may have to the phenomenon of interest, the historical context of the model (Truex et al. 2006) and the agenda (Rose et al. 2005) are equally critical. Problems emerge when theories are uncritically imported from outside into the IS field. As Hanseth (2005, p. 162) notes:

> [T]he IS community has a tendency to jump on the latest fashion. We tend to be ‘theory consumers.’ We import theories from other fields and then apply them. This ‘applying’ often focuses on just demonstrating how we by means of the theory can describe various IS related phenomena. And then we move on and pick another one while forgetting what we could have learned from applying the previous one—almost like we as TV consumers move from one realty show to the next.

The tendency to cherry-pick elements of some theory or several theories and integrate them into a new "IS theory" is tempting, relatively easy to accomplish and often yields superficially excellent results. At minimum, the researcher should instead invest time to understand the imported theory in its native environment, be very familiar with its vocabulary, underlying assumptions, possibly conflicting epistemologies and its limitations (Holmström 2005; Truex et al. 2006). Viewing those candidate theories as models can help researchers uncover many of these conflicting epistemologies.

For example, two of the most popular theories in the social sciences, the Diffusion of Innovations Theory (DIT) (Rogers 1983) and the Theory of Reasoned Action (TRA)(Fishbein and Ajzen 1977), are also among the two most applied theories in assessing the impact of IT on individuals (Lim et al. 2009). They describe two different models of innovation. DIT comes from the communications field and models innovation in terms of flow of information. Consequently, flow-related analogies such as channels that carry the information flows, time taken for the rate of adoption, and the social system that is engaging the flow provides a rich set of concepts and constructs that can be researched. TRA is a theory of behavior predicated on the person's behavioral intention, which in turn is affected by the person's attitude. Because DIT includes a time element, it is able to describe the logistic curve of innovation, which is not possible using TRA. On the other hand, TRA's focus on attitude is only tangentially addressed by DIT. Before applying or mixing and matching elements from such theories, it behooves the IS researcher to see if there are strong positive analogies that warrants the use of those theories because mixing elements from different models may produce unpredictable results.

In the case of cloud computing, the utility model is probably the most perfect of the many possible imperfect models that could be used to model it. However, as Brynjolsson et al. (2010) argues, despite its popularity, the utility model is wholly inadequate and may even obscure cloud computing more significant attributes and hence, its true potential. The utility model does not represent the rapid pace of innovation present in cloud computing. Meanwhile, the measure of scalability present in the utility model is missing or at least limited in comparison in cloud computing. What's even more profound is the absence of the co-creation of value, mentioned earlier, that is available in cloud computing, that are no longer available with utilities. All of these negative analogies make the utility model highly suspect.

Framework

In research, the framework is often found with many qualifiers: conceptual framework, research framework, theoretical framework and is sometimes conflated with the conceptual model. Miles and Huberman (1994) describes the conceptual framework as the researcher's map of the territory being studied, which consists of the main concepts, constructs and variables and their related propositions. It can take the forms of diagrams or narratives; it may be "simple or elaborate, commonsensical or theory driven, descriptive or causal" (p. 18). Maxwell (2013, p. 39) considers the framework a theory and broadens its scope to include "system of concepts, assumptions, expectations, beliefs, and theories that support and informs" the research. The framework helps the researcher assess and refine goals, develop questions, select appropriate methods and identify potential validity threats.

The inputs to the framework are what really distinguish quantitative from qualitative research, positivist from interpretive research. Typically, researchers associate methods with the category of research (e.g., quantitative methods with positivist philosophy) whereas it is entirely possible for qualitative research methods to be positivist. For example, because of Durkheim's influence on Malinowski, his ethnography is considered positivist (O'Reilly 2009). A researcher who collects quantitative data is not necessarily a positivist. A researcher who collects qualitative data is not necessarily a phenomenologist. Certain social psychological theories are phenomenological because they aim at understanding behaviors and beliefs from the perspectives of the subjects. But this research can be conducted in a laboratory with quantitative methods (Cook and Reichardt 1979). Similarly, ethnography is a method and may involve the technique of participant observation, which if informed by the epistemology of constructionism, will involve lengthy involvement with subjects and immersion in the research environment (Gopal and Prasad 2000). At the same time, ethnography may be informed by positivistic assumptions, and may involve administering surveys to collect quantitative data to infer about the population. The mix of techniques determines whether the method is inspired by positivistic or interpretive or both.

A better way of deciding what methods are suitable is by examining the inputs to the framework and the propositions associated with them. The term "quantitative" refers to the nature of measurement that is additive, which is capable of representing the actual property of the object of study (Hempel 1965). On the other side of the coin, "qualitative" refers to measures that are not additive, and do not represent the actual property when compared, even if it is converted into numbers. The nature of the inputs and their relationships determine the nature of the framework and what can be done with it. If the data collected is supposed to directly represent the data in the framework (rule of correspondence), and the sources of the data are purely empiricist (no value judgment), then, the framework is likely positivist. If the inputs into the framework are descriptions of people's lived experience which are then used to understand the richness of the individual's intentions, emotions and complete psycho-physical history including the individual's hoping, fearing, wishing and wanting, and they include subjective value judgment of the subjects as well as the researcher, then, the framework is more likely to be interpretive (Dilthey 1883/1989), critical (Habermas 1988) or some other non-positivist category. Both opposing categories of frameworks are capable of organizing concepts and producing explanatory theory as well as predictive theory.

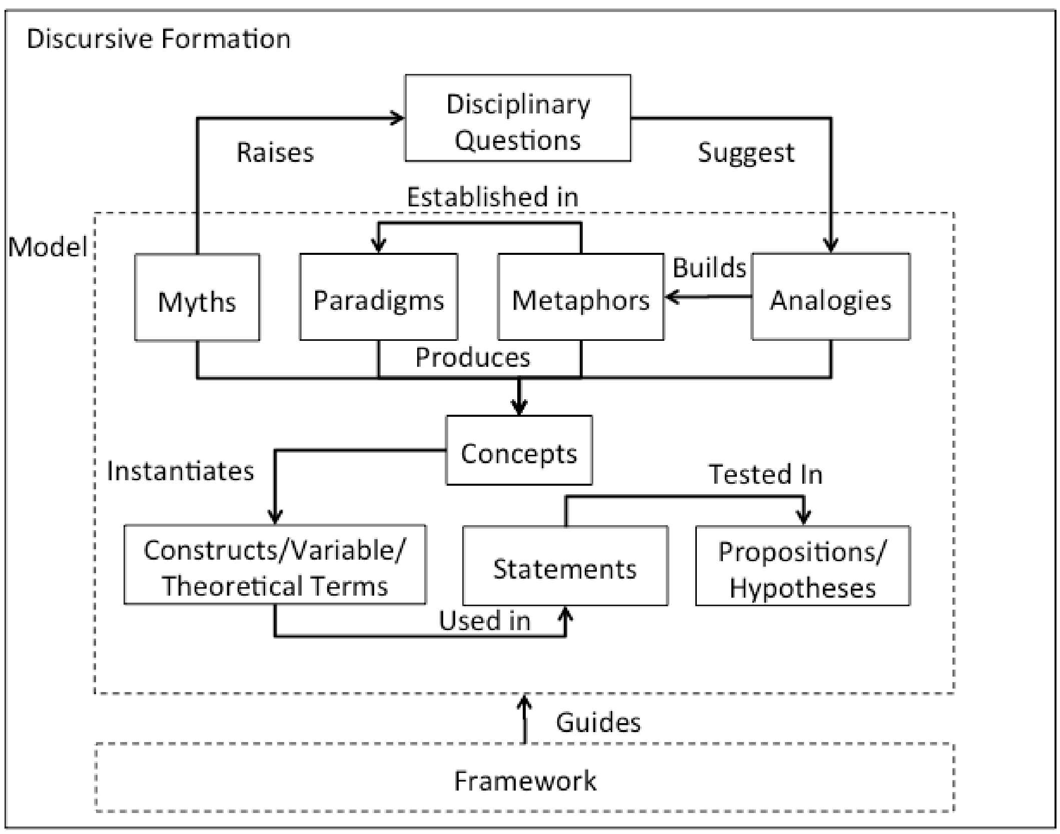

Figure 1. Stages of theorizing

As far as cloud computing is concerned, the options for conceptual frameworks are endless. Technology and engineering-based frameworks may be happy with their operational definitions of the cloud's attributes and architecture, and will continue to improve the cloud's technical performance and reliability. IS researchers may be interested in other societal concerns related to the cloud such as its ethical, legal and privacy issues that are apparently not satisfactorily addressed by the technology and engineering-based frameworks. Such alternative conceptual framework may involve the users' goals for using the cloud, and their emotions and fears and desires as they negotiate the technology and the need to guard their rights to privacy and security. This framework will require elements that are not even imagined by current models, especially the utility model. It will require the IS researcher to be inventive and creative in asking hard questions, finding analogies and metaphors that more accurately represent the technology, perhaps even mythologizing models in order to uncover hidden assumptions. These efforts may include working in multiple paradigms, developing concepts that straddle different discursive formations, and synthesizing constructs to be used in bold propositions that can be empirically tested.

Stages in Theorizing

The example of cloud computing used to illustrate each product of theorizing provides brief glimpses of when and how each of the products are constructed or applied. The products of theorizing are described roughly in descending order of abstraction with the former possibly feeding into the latter (Figure 1). First, it would make sense for the researcher to assume a home (e.g. the IS field) in which the theorizing is undertaken by subscribing to a particular discursive formation before even proceeding in the study. A discursive formation by definition engenders a discourse that will be unique and distinctive versus those from other fields. A field of study that is vibrant will have questions pertinent to that field of study and to the topic at hand that society needs answered. Many of those questions might come from myths within the field, or appear as metaphors in real life.

For instance, the attempt by President Obama to enroll millions of people who don't have healthcare insurance is referred to as a "train wreck" (Cohen 2013). What solutions does the IS field offer for systemic failures that resemble such a metaphor? Some of those questions, myths and metaphors might already exist as paradigms. Perhaps the paradigm of "Project Escalation" (Keil 1995; Keil and Robey 1999) for system failures does not work for post-facto events such as the Obamacare Website crash (Young 2013) and needs to be reexamined. What core concepts might be useful for this new approach to system failure? What statements do those concepts imply for alleviating problems associated with systemic failures? And how can those concepts and propositions be organized into a potent model and framework that will provide solutions? During this process of theorizing, a rich matrix of products can be expected to be developed that will lead to better theories.

Such a logical order may not be necessary or warranted. If we apply Feyerabend's (1978) principle of anything goes, theorizing can begin from any product and not proceed in any particular order. Similarly, there are no requirements for any product to necessarily agree with another because it is plausible that existing models or frameworks may be incorrect. In this case, a proliferation of alternative concepts, statements, propositions and models are always beneficial. As Feyerabend (1978) admits, science is messy, anarchic and closer to myth than what most would care to admit. Nevertheless, because the products of theorizing intertwine closely with each other, they will ensure that a certain level of coherency is maintained.

Conclusion

This study highlights important characteristics of the products of theorizing that will help improve ongoing efforts of theory building in IS. The survey of the products of theorizing suggests that a lot of work is still required. The study began by emphasizing the importance of being relevant to the IS field's discursive formation so that the products of theorizing will contribute to IS theories as opposed to those of other fields. One early product of theorizing that supports such a goal is the question. Asking questions that are not being asked or which other disciplines are incapable of asking contributes to theorizing in IS. The study highlights the importance of explicit applications of the analogy and its ilk, myth and metaphor, given the powerful role they play can play in constructing theory. The Kuhnian paradigm, which is successfully applied in theorizing in many fields of study, have unfortunately taken a back seat as a result of the IS field conflating it with epistemology. Therefore, the IS field needs to reclaim back paradigms as potent products of theorizing. Finally, the study emphasized the critical task of conceptual formation rooted in the developing of the "IS concept" which is the prerequisite to any IS theory (Markus and Saunders 2007). By focusing on the notion of the "IS concept" we can build effective IS models and frameworks and move our theorizing efforts forward.

References

Abbott, A.D. 2001. *Chaos of Disciplines*, Chicago, IL: University of Chicago Press.

Abbott, A.D. 2004. *Methods of Discovery: Heuristics for the Social Sciences*, New York, NY: W. W. Norton & Co.

Adam, F., and Fitzgerald, B. 2000. "The Status of the IS Field: Historical Perspective and Practical Orientation," *Information Research* (5:4).

Alavi, M., and Leidner, D.E. 2001. "Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues," *MIS Quarterly* (25:1) pp. 107-136.

Avison, D., and Malaurent, J. 2014. "Is Theory King?: Questioning the Theory Fetish in Information Systems," *Journal of Information Technology* (doi:10.1057/jit.2014.8), May 6 pp. 1-10.

Atkinson, C.J. 2003. "The Nature and Role of Generative Systemic Metaphor within Information Systems Planning and Development," in *Global and Organizational Discourse About Information Technology*, E.H. Wynn, E.A. Whitley, M.D. Myers and J.I. DeGross (eds.). New York, NY: IFIP/Springer, pp. 323-343.

Bacharach, S.B. 1989. "Organizational Theories: Some Criteria for Evaluation," *Academy of Management Review* (14:4) pp. 496-515.

Bal, M. 2002. *Travelling Concepts in the Humanities: A Rough Guide*, Toronto, CA: University of Toronto Press.

Banville, C., and Landry, M. 1989. "Can the Field of MIS Be Disciplined?," *Communications of the ACM* (32:1) pp. 48-60.

Behrend, T.S., Wiebe, E.N., London, J.E., and Johnson, E.C. 2011. "Cloud Computing Adoption and Usage in Community Colleges," *Behaviour and Information Technology* (30:2) pp. 231–240.

Behrens, S. 2007. "Information Systems Diversity: Metaphor, Meaning and Myth," International Conference on Information Systems (ICIS 2007), Dec 9 - 12, Montréal, Québec, Canada from http://aisel.aisnet.org/icis2007/9, Paper 9.

Benbasat, I., and Barki, H. 2007. "Quo Vadis TAM?," *Journal of the Association for Information Systems* (8:4) pp. 211-218.

Benbasat, I., and Weber, R. 1996. "Rethinking Diversity in Information Systems Research," *Information Systems Research* (7:4) pp. 389-399.

Benbasat, I., and Zmud, R. 2003. "The Identity Crisis within the IS Discipline: Defining and Communicating the Discipline's Core Properties," *MIS Quarterly* (27:2) pp. 183-194.

Benbasat, I., and Zmud, R.W. 1999. "Empirical Research in Information Systems: The Practice of Relevance," *MIS Quarterly* (23:1) pp. 3-16.

Benlian, A., and Hess, T. 2011. "Opportunities and Risks of Software-as-a-Service: Findings from a Survey of IT Executives," *Decision Support Systems* (52:1) pp. 232-246.

Benlian, A., Koufaris, M., and Hess, T. 2011. "Service Quality in Software-as-a-Service: Developing the Saas-Qual Measure and Examining Its Role in Usage Continuance," *Journal of Management Information Systems* (28:3) pp. 85-126.

Berger, P.L., and Luckmann, T. 1966. *The Social Construction of Reality*, New York: Anchor Books.

Bidney, D. 1955. "Myth, Symbolism, and Truth," *The Journal of American Folklore* (68:270) pp. 379-392.

Bromberger, S. 1992. *On What We Know We Don't Know: Explanation, Theory, Linguistics, and How Questions Shape Them*, Chicago: University of Chicago Press.

Brown, R.H. 1976. "Social Theory as Metaphor: On the Logic of Discovery for the Sciences of Conduct," *Theory and Society* (3:2) pp. 169-197.

Brynjolfsson, E., Hofmann, P., and Jordan, J. 2010. "Cloud Computing and Electricity: Beyond the Utility Model," *Communications of the ACM* (53:5) pp. 32-34.

Burton-Jones, A., and Straub, D.W. 2006. "Reconceptualizing System Usage: An Approach and Empirical Test," *Information Systems Research* (17:3) pp. 228–246.

Buyya, R., Yeo, C.S., Venugopal, S., Broberg, J., and Brandic, I. 2009. "Cloud Computing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the 5th Utility," *Future Generation Computer Systems* (25:6) pp. 599-616.

Campbell, N.R. 1920. *Physics the Elements*, Cambridge, UK: Cambridge University Press.

Cassirer, E., and Verene, D.P. 1979. *Symbol, Myth, and Culture : Essays and Lectures of Ernst Cassirer*, 1935-1945, New Haven: Yale University Press.

Chen, W., and Hirschheim, R. 2004. "A Paradigmatic and Methodological Examination of Information Systems Research from 1991 to 2001," *Information Systems Journal* (14:3) pp. 197-235.

Chou, S.-W., and Chiang, C.-H. 2013. "Understanding the Formation of Software-as-a-Service (Saas) Satisfaction from the Perspective of Service Quality," *Decision Support Systems* (56) pp. 148-155.

Cohen, P.S. 1969. "Theories of Myth," *Man* (4:3) pp. 337-353.

Cohen, T. 2013. "Rough Obamacare Rollout: 4 Reasons Why." Atlanta, GA: CNN Politics, Retrieved Oct 26, 2013, from http://www.cnn.com/2013/10/22/politics/obamacare-website-four-reasons/

Cook, T.D., and Reichardt, C.S. (eds.). 1979. *Qualitative and Quantitative Methods in Evaluation Research*. Beverly Hills: Sage.

Cronbach, L.J., and Meehl, P.E. 1955. "Construct Validity in Psychological Tests," *Psychological Bulletin* (52:4) pp. 281-302.

Davenport, T.H., and Stoddard, D.B. 1994. "Reengineering: Business Change of Mythic Proportions," *MIS Quarterly* (18:2) pp. 121-127.

Davis, F.D. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly* (13:3) pp. 318-340.

Dilthey, W. 1883/1989. *Introduction to the Human Sciences*, Princeton, N.J.: Princeton University Publishers.

Doty, D.H., and Glick, W.H. 1994. "Typologies as a Unique Form of Theory Building: Toward Improved Understanding and Modeling," *Academy of Management Review* (19:2) pp. 230-251.

Dubin, R. 1969. *Building Theory*, New York: The Free Press.

Ein-Dor, P., and Segev, E. 1981. *A Paradigm for Management Information Systems*, New York: Praeger Publishers.

Eisenhardt, K.M. 1989. "Building Theories from Case Study Research," *Academy of Management Review* (14:4) pp. 532-551.

Etro, F. 2009. "The Economic Impact of Cloud Computing on Business Creation, Employment and Output in Europe," *Review of Business and Economics* (54:2) pp. 179–208.

Falkenberg, E.D., Hesse, W., Lindgreen, P., Nilsson, B.E., Han Oei, J.L., Rolland, C., Stamper, R.K., Van Assche, F.J.M., Verrijn-Stuart, A.A., and Voss, K. 1998. "A Framework of Information Systems Concepts: The Revised Frisco Report." IFIP, Retrieved Jan 10, 2007, from http://www.mathematik.uni-marburg.de/~hesse/papers/fri-full.pdf

Fawcett, J. 1998. *The Relationship of Theory and Research*, Philadelphia: F. A. Davis Company.

Feyerabend, P. 1978. *Against Method*, London, U.K.: Verso.

Fishbein, M., and Ajzen, I. 1977. *Belief, Attitude, Intention and Behavior*, Reading, MA: Addison-Wesley.

Fiss, P.C. 2011. "Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research," *Academy of Management Journal* (54:2) pp. 393-420.

Foster, I., Zhao, Y., Raicu, I., and Lu, S. 2008. "Cloud Computing and Grid Computing 360-Degree Compared," Grid Computing Environments Workshop (GCE '08), Austin, TX: IEEE pp. 1-10.

Foucault, M. 1961/1965. *Folie Et Déraison (Madness and Civilization: A History of Insanity in the Age of Reason)*, New York: Pantheon Books.

Foucault, M. 1970. *The Order of Things: An Archeology of the Human Sciences*, New York: Pantheon Books.

Foucault, M. 1972. *The Archaeology of Knowledge and the Discourse on Language*,Translated by A.M.S. Smith, New York: Pantheon Books.

Furneaux, B., and Wade, M. 2009. "Theoretical Constructs and Relationships in Information Systems Research," in *Handbook of Research on Contemporary Theoretical Models in Information Systems*, Y.K. Dwivedi, B. Lal, M.D. Williams, S.L. Schneberger and M. Wade (eds.). Hershey, PA: IGI Global, pp. 1-17.

Goertz, G., and Mahoney, J. 2012. "Concepts and Measurement: Ontology and Epistemology," *Social Science Information* (51:2) pp. 205-216.

Goles, T., and Hirschheim, R. 2000. "The Paradigm Is Dead, the Paradigm Is Dead...Long Live the Paradigm: The Legacy of Burrell and Morgan," *Omega* (28:3) pp. 249-268.

Gopal, A., and Prasad, P. 2000. "Understanding Gdss in Symbolic Context: Shifting the Focus from Technology to Interaction," *MIS Quarterly* (24:3) pp. 509-546.

Gray, P. 2003. "Introduction to the Debate on the Core of the Information Systems Field," *Communications of the AIS* (12:1) p. Art. 42.

Gregor, S. 2006. "The Nature of Theory in Information Systems," *MIS Quarterly* (30:3) pp. 611-642.

Gregor, S., and Jones, D. 2007. "The Anatomy of a Design Theory," *Journal of the AIS* (8:5) pp. 312-335.

Grönroos, C., and Ravald, A. 2010. "Service as Business Logic: Implications for Value Creation and Marketing," *Journal of Service Management* (22:1) pp. 5-22.

Grover, V., Lyytinen, K., and Weber, R. 2012. "Panel on Native IS Theories," Special Interest Group on Philosophy and Epistemology in IS (SIGPHIL) Workshop on IS Theory: State of the Art, Orlando, FL, Dec 16-19.

Habermas, J. 1988. *On the Logic of the Social Sciences*, Cambridge, MA: MIT Press.

Hanseth, O. 2005. "Beyond Metaphysics and Theory Consumerism: A Comment to Rose, Jones, and Truex “Socio-Theoretic Accounts of IS: The Problem of Agency”," *Scandinavian Journal of Information Systems* (17:1) pp. 159–166.

Harré, R. 1970. *The Principles of Scientific Thinking*, Chicago, IL: University of Chicago Press.

Hassan, N.R. 2011. "Is Information Systems a Discipline? Foucauldian and Toulminian Insights," *European Journal of Information Systems* (20:4) pp. 456-476.

Hassan, N.R. 2013. "Are We Using the Right "Paradigms?" Comparing Metaphysical, Sociological and Conceptual Paradigms," Americas Conference on Information Systems (AMCIS 2013), Aug 15-17, Chicago, IL pp. 1-7.

Hassan, N.R., and Will, H.J. 2006. "Synthesizing Diversity and Pluralism in Information Systems: Forging a Unique Disciplinary Subject Matter for the Information Systems Field," *Communications of the AIS* (17:7) pp. 152-180.

Hempel, C.G. 1965. *Aspects of Scientific Explanation and Other Essays in the Philosophy of Science*, New York: Free Press.

Hesse, M.B. 1966. *Models and Analogies in Science*, Notre Dame, IN: University of Notre Dame Press.

Hirschheim, R.A., and Newman, M. 1991. "Symbolism and Information Systems Development: Myth, Metaphor and Magic," *Information Systems Research* (2:1) pp. 29-62.

Hoch, F., Kerr, M., and Griffith, A. 2001. "Software as a Service: Strategic Backgrounder," Software & Information Industry Association (SIIA), available from http://www.siia.net/estore/ssb-01.pdf, Washington, DC.

Holmström, J. 2005. "Theorizing in IS Research: What Came before and What Comes Next?," *Scandinavian Journal of Information Systems* (17:1) pp. 167–174.

Iivari, J., Hirschheim, R., and Klein, H.K. 1998. "A Paradigmatic Analysis Contrasting Information Systems Development Approaches and Methodologies," *Information Systems Research* (9:2) pp. 164-193.

Iyer, B., and Henderson, J.C. 2010. "Preparing for the Future: Understanding the Seven Capabilities of Cloud Computing," *MIS Quarterly Executive* (9:2) pp. 117-131.

Jaeger, P.T., Lin, J., Grimes, J.M., and Simmons, S.N. 2009. "Where Is the Cloud? Geography, Economics, Environment, and Jurisdiction in Cloud Computing." *First Monday*, (14:5), from http://pear.accc.uic.edu/ojs/index.php/fm/article/view/2456/2171

Kaarst-Brown, M.L., and Robey, D. 1999. "More on Myth, Magic and Metaphor: Cultural Insights into the Management of Information Technology in Organizations," *Information Technology & People* (12:2) pp. 192-217.

Kakabadse, N., and Kakabadse, A. 2000. "Critical Review – Outsourcing: A Paradigm Shift," *Journal of Management Development* (19:8) pp. 670 - 728.

Kaplan, A. 1964. *The Conduct of Inquiry: Methodology for Behavioral Science*, San Francisco: Chandler Pub. Co.

Keil, M. 1995. "Pulling the Plug: Software Project Management and the Problem of Project Escalation," *MIS Quarterly* (19:4) pp. 421-447.

Keil, M., and Robey, D. 1999. "Turning around Troubled Software Projects: An Exploratory Study of the Deescalation of Commitment to Failing Courses of Action," *Journal of Management Information Systems* (15:4) pp. 63 - 87

Kendall, J.E., and Kendall, K.E. 1993. "Metaphors and Methodologies: Living Beyond the Systems Machine," *MIS Quarterly* (17:2) pp. 149-171.

Khazanchi, D., and Munkvold, B.E. 2003. "On the Rhetoric and Relevance of IS Research Paradigms: A Conceptual Framework and Some Propositions," Hawaii International Conference on System Sciences (HICSS-36), Hawaii, Jan 6-9.

King, J.L., and Lyytinen, K. 2004. "Reach and Grasp," *MIS Quarterly* (28:4) pp. 539-552.

Kirby, J.T. 1997. "Aristotle on Metaphor," *The American Journal of Philology* (118:4) pp. 517-554.

Kshetri, N. 2010. "Cloud Computing in Developing Economies," *Computer* (43:10) pp. 47-55.

Kuechler, W., and Vaishnavi, V. 2012. "A Framework for Theory Development in Design Science Research: Multiple Perspectives," *Journal of the Association for Information Systems* (13:6) pp. 395-423.

Kuhn, T. 1970. *The Structure of Scientific Revolutions*, (2nd ed.) Chicago: University of Chicago Press.

Kuhn, T.S. 1977. *The Essential Tension: Selected Studies in Scientific Tradition and Change*, Chicago: University of Chicago Press.

Larsen, T.J., and Levine, L. 2008. "Ciation Patterns in MIS: An Analysis of Exemplar Articles," in *Open IT-Based Innovation: Moving Towards Cooperative IT Transfer and Knowledge Diffusion*, G. León, A.M. Bernardos, J.R. Casar, K. Kautz and J.I. DeGross (eds.). Boston: Springer, pp. 23-38.

Lévi-Strauss, C. 1963. *Structural Anthropology*, New York: Basic Books.

Lévi-Strauss, C. 1966. *The Savage Mind*, London: Weidenfeld & Nicolson.

Lim, S., Saldanha, T., Malladi, S., and Melville, N.P. 2009. "Theories Used in Information Systems Research: Identifying Theory Networks in Leading IS Journals " International Conference on Information Systems, Dec 15-18 Phoenix AZ pp. 1-10.

Low, C., Chen, Y., and Wu, M. 2011. "Understanding the Determinants of Cloud Computing Adoption," *Industrial Management & Data Systems* (111:7) pp. 1006 - 1023.

Lyytinen, K., and King, J.L. 2004. "Nothing at the Center? Academic Legitimacy in the Information Systems Field," *Journal of the AIS* (5:6) pp. 220-246.

MacCorquodale, K., and Meehl, P.E. 1948. "On a Distinction between Hypothetical Constructs and Intervening Variables," *Psychological Review* (55:2) pp. 95-107.

Markus, M.L. 2001. "Toward a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success," *Journal of Management Information Systems* (18:1) pp. 57-93.

Markus, M.L., Majchrzak, A., and Gasser, L. 2002. "A Design Theory for Systems That Support Emergent Knowledge Processes," *MIS Quarterly* (26:3) pp. 179-212.

Markus, M.L., and Robey, D. 1988. "Information Technology and Organizational Change: Causal Structure in Theory and Research," *Management Science* (34:5) pp. 583-598.

Markus, M.L., and Saunders, C.S. 2007. "Editorial Comments: Looking for a Few Good Concepts...And Theories...For the Information Systems Field," *MIS Quarterly* (31:1) pp. iii-vi.

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., and Ghalsasi, A. 2011. "Cloud Computing — the Business Perspective," *Decision Support Systems* (51:1) pp. 176–189.

Mason, R.M. 1991. "Metaphors and Strategic Information Systems Planning," Proceedings of the 24th Hawaii International Conference on System Sciences, Kauai, HI IEEE pp. 231 - 240.

Masterman, M. 1970. "The Nature of a Paradigm," in *Criticism and the Growth of Knowledge: International Colloquium in the Philosophy of Science* (Bedford College, 1965), I. Lakatos and A. Musgrave. (eds.). London: Cambridge University Press, pp. 59-89.

Maxwell, J.A. 2013. *Qualitative Research Design*, (3rd ed.) Los Angeles, CA: SAGE.

McKeon, R.P. 1941. *The Basic Works of Aristotle*, New York, NY: Random House.

Mell, P., and Grance, T. 2011. "The NIST Definition of Cloud Computing," National Institute of Standards and Technology, available from http://csrc.nist.gov/publications/PubsSPs.html - 800-145, Gaithersburg, MD.

Merton, R.K. 1973. *The Sociology of Science: Theoretical and Empirical Investigations*, Chicago, IL: The University of Chicago Press.

Meyer, M. 1995. *Of Problematology : Philosophy, Science, and Language*, Chicago: University of Chicago Press.

Miles, M.B., and Huberman, A.M. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*, Thousand Oaks, CA: Sage Publications.

Mingers, J. 2004. "Paradigm Wars: Ceasefire Announced Who Will Set up the New Administration," *Journal of Information Technology* (19:3) pp. 165-171.

Minsky, M. 1975. "A Framework for Representing Knowledge," in *Mind Design* Ii, J. Haugeland (ed.). Cambridge MA: MIT Press, pp. 111-142.

Mohr, L.B. 1982. *Explaining Organizational Behavior*, San Francisco CA: Jossey-Bass Publishers.

Moody, D., Iacob, M.-E., and Amrit, C. 2010. "In Search of Paradigms: Identifying the Theoretical Foundations of the IS Field," European Conference on Information Systems, June 6-9, Pretoria, South Africa.

Morgan, G. 1986. *Images of Organization*, Beverly Hills Sage Publications.

Morgeson, F.P., and Hofmann, D.A. 1999. "The Structure and Function of Collective Constructs: Implications for Multilevel Research and Theory Development," *Academy of Management Review* (24:2) pp. 249-265.

Mousavidin, E., and Goel, L. 2007. "Seeking Dragons in IS Research," Americas Conference on Information Systems (AMCIS 2007), Aug 9-12, Keystone, CO from http://aisel.aisnet.org/amcis2007/170, Paper 170.

O'Reilly, K. 2009. *Key Concepts in Ethnography*, London: SAGE.

Oates, B.J., and Fitzgerald, B. 2007. "Multi-Metaphor Method: Organizational Metaphors in Information Systems Development," *Information Systems Journal* (17:4) pp. 421-449.

Oliveira, T., Thomas, M., and Espadanal, M. 2014. "Assessing the Determinants of Cloud Computing Adoption: An Analysis of the Manufacturing and Services Sectors," *Information & Management* (51:5) pp. 497-510.

Orlikowski, W.J., and Baroudi, J.J. 1991. "Studying Information Technology in Organizations: Research Approaches and Assumptions," *Information Systems Research* (2:1) pp. 1-28.

Orlikowski, W.J., and Iacono, C.S. 2001. "Research Commentary: Desperately Seeking the 'IT' in IT Research--a Call to Theorizing the IT Artifact," *Information Systems Research* (12:2) pp. 121-134.

Park, S.C., and Ryoo, S.Y. 2013. "An Empirical Investigation of End-Users' Switching toward Cloud Computing: A Two Factor Theory Perspective," *Computers in Human Behavior* (29:1) pp. 160-170.

Popper, K.R. 1970. "Normal Science and Its Dangers," in *Criticism and the Growth of Knowledge: International Colloquium in the Philosophy of Science* (Bedford College 1965), I. Lakatos and A. Musgrave. (eds.). London: Cambridge University Press, pp. 51-58.

Regalado, A. 2011. "Who Coined 'Cloud Computing'?," *MIT Technology Review*, Cambridge, MA: MIT, p.

Revens, L. 1972. "The First Twenty-Five Years: ACM 1947-1962," *Communications of the ACM* (15:7) pp. 485 - 490.

Reynolds, P.D. 1971. *A Primer in Theory Construction*, Boston: Allyn & Bacon.

Richardson, H., and Robinson, B. 2007. "The Mysterious Case of the Missing Paradigm: A Review of Critical Information Systems Research 1991–2001," *Information Systems Journal* (17:3) pp. 251-270.

Ritzer, G. 1980. *Sociology: A Multiple Paradigm Science*, Boston: Allyn and Bacon, Inc.

Robey, D., and Markus, M.L. 1984. "Rituals in Information System Design," *MIS Quarterly* (8:1) pp. 5-14.

Rogers, E.M. 1983. *Diffusion of Innovations*, (3rd ed.) New York: The Free Press.

Rose, J., Jones, M., and Truex, D. 2005. "Socio-Theoretic Accounts of IS: The Problem of Agency," *Scandinavian Journal of Information Systems* (17:1) pp. 133–152.

Sartori, G. (ed.) 1984. *Social Science Concepts: A Systematic Analysis*. Beverly Hills, CA: Sage Publications.

Schön, D.A. 1963. *The Displacement of Concepts*, London: Tavistock Publications.

Schön, D.A. 1979. "Generative Metaphor: A Perspective on Problem-Setting in Social Policy," in *Metaphor and Thought* A. Ortony (ed.). Cambridge: Cambridge University Press, pp. 254-283.

Schön, D.A. 1983. *The Reflective Practitioner: How Professionals Think in Action*, New York: Basic Books.

Stamper, R.K. 2000. "Information Systems as a Social Science: An Alternative to the Frisco Formalism," in *Information Systems Concepts: An Integrated Discipline Emerging*, E.D. Falkenberg, K. Lyytinen and A.A. Verrijn-Stuart (eds.). Boston: Kluwer Academic Publishers, pp. 1-51.

Stinchcombe, A.L. 1987. *Constructing Social Theories*, Chicago, IL: University of Chicago Press.

Straub, D. 2012. "Editorial: Does MIS Have Native Theories," *MIS Quarterly* (36:2) pp. iii-xii.

Strauss, A., and Corbin, J. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*, Newbury Park, Calif.: Sage Publications.

Suddaby, R. 2010. "Editor's Comments: Construct Clarity in Theories of Management and Organization," *Academy of Management Review* (35:3) pp. 346-357.

Sutton, R.I., and Staw, B.M. 1995. "What Theory Is Not," *Administrative Science Quarterly* (40:3) pp. 371-384.

Thomson, G.P. 1961. *The Inspiration of Science*, London: Oxford University Press.

Toulmin, S. 1972. *Human Understanding: The Collective Use and Evolution of Concepts*, Princeton, NJ: Princeton University Press.

Trice, H.M., and Beyer, J.M. 1984. "Studying Organizational Cultures through Rites and Ceremonials," *Academy of Management Review* (9:4) pp. 653-669.

Truex, D.P., Holmström, J., and Keil, M. 2006. "Theorizing in Information Systems Research: A Reflexive Analysis of the Adaptation of Theory in Information Systems Research," *Journal of the AIS* (7:12) pp. 797-821.

Verrijn-Stuart, A.A. 2001. "A Framework of Information Systems Concepts: The Revised Frisco Report (Draft January 2001)." IFIP, Retrieved Jun 9, 2004

Walker, E. 2008. "The Real Cost of a CPU Hour " *Computer* (42:4) pp. 35-41.

Walls, J.G., Widmeyer, G.R., and El Sawy, O. 1992. "Building an Information Systems Design Theory for Vigilant EIS," *Information Systems Research* (3:1) pp. 36-59.

Walsham, G. 2006. "Doing Interpretive Research," *European Journal of Information Systems* (15:3) pp. 320-330.

Weber, R. 1987. "Toward a Theory of Artifacts: A Paradigmatic Base for Information Systems Research," *The Journal of Information Systems* (1:2) pp. 3-19.

Weber, R. 2003. "Editor's Comment: Still Desperately Seeking the IT Artifact," *MIS Quarterly* (27:2) pp. iii-xi.

Weber, R. 2006. "Reach and Grasp in the Debate over the IS Core: An Empty Hand?," *Journal of the AIS* (7:10) pp. 703-713.

Weber, R. 2012. "Evaluating and Developing Theories in the Information Systems Discipline," *Journal of the AIS* (13:1) pp. 1-30.

Weick, K.E. 1989. "Theory Construction as Disciplined Imagination," *Academy of Management Review* (14:4) pp. 516-531.

Weick, K.E. 1995. "What Theory Is Not, Theorizing Is," *Administrative Science Quarterly* (40:3) pp. 385-390.

Yang, H., and Tate, M. 2012. "A Descriptive Literature Review and Classification of Cloud Computing Research," *Communications of the Association for Information Systems* (31:2) pp. 35-60.

Young, J. 2013. "Obamacare Website Failure Threatens Health Coverage for Millions of Americans." *Huffington Post*, Retrieved Oct 26, 2013, from http://www.huffingtonpost.com/2013/10/18/obamacare-train-wreck_n_4118041.html

Zhang, Q., Cheng, L., and Boutaba, R. 2010. "Cloud Computing: State-of-the-Art and Research Challenges," *Journal of Internet Services and Applications* (1:1) pp. 7-18.