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# Utilizing Philosophical Critical Realism and Actor Network Theory to Develop the Construct Internet

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# UTILIZING PHILOSOPHICAL CRITICAL REALISM AND ACTOR NETWORK THEORY TO DEVELOP THE CONSTRUCT INTERNET

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## **Abstract**

*IS researchers utilize a variety of philosophical and cognitive positions to interpret the world and issues in the field of Information Systems. The paper suggests that without mediation, two opposing philosophical perspective positions at a meta level, such as positivism and realism, can result in IS researchers proposing incompatible models of given phenomenon at an applied level. The incompatibility of the models is further manifested when attempts are made to develop complex IS constructs such as the Internet which comprises of both the physical implementation and the contextual space it creates, from competing models instead of starting from an ontological examination. The paper utilizes the explanatory potential of Critical Realism as a philosophical foundation and Actor Network Theory (ANT) as a scaffold, by developing the Internet as a construct utilizing the three domains supported in Critical Realism being the real, actual and empirical, and illustrating how future work can build on such a construct by utilizing ANT.*

**Keywords:** Critical Realism, Cyberspace, Actor Network Theory, Ontology, Information System Constructs, Internet

## **1.0 INTRODUCTION**

The field of Information Systems is applied in a sphere of existence where technology and the human actor interact in increasingly complex sets of relationships. The Internet raises wide-ranging issues as a result of human involvement which emerge in the form of competing governance models, differing interpretation and implementation of ethics, and cause significant impact on the socio-economic condition of human actors. Despite the abundance of issues raised as a result of the Internet's existence and evolution that have been identified in the IS literature, the ontology of the Internet as a fundamental construct remains vague and ambiguous.

March & Smith (1995) regard the “construct” as the primary non-tangible initiator that shapes the subsequent tangible models, methods and instantiations of the original idea. They define the four steps from construct to instantiation as:

- 1) *“constructs which are “concepts with which to ... characterize phenomenon”*,
- 2) *models that “describe tasks, situations, or artifacts”*,
- 3) *methods as “ways of performing goal directed activities”*, and
- 4) *instantiations which are “physical implementations intended to perform certain tasks”*” (March & Smith, 1995)

IS literature contains many instances of research that investigate the modelling, methodical, methodological or instantiation issues on the Internet. By way of example, meta-models for governance on the Internet made explicit both e-governance and e-government and their impact are covered in the literature (Rossel & Finger, 2007, Clark, Wroclawski, Sollins, & Braden, 2005). Similarly, IS researchers have discussed methods for governing the root of the Internet (Mueller, 2004), and investigated issues with instantiations in form of the physical implementation of the Internet and associated standards. However, the debate on ontology of the Internet that accounts for Internet's physical implementation and the space of existence it creates being the Cyberspace, remains an unsettled debate (Baloch & Cusack, 2009).

The Cyberspace is a difficult construct to develop for IS research in that it cannot be easily analyzed using empirical research methodologies (Strate, 1999, p. 17). The ambiguity of the construct Cyberspace casts a similar bearing on the construct Internet, resulting in an epistemological understanding of the construct built using the knowledge of instantiation, methods and modeling patterns, instead of resulting after an ontological investigation.

In the debates surrounding the ontology of the Internet, academics utilize one of three philosophical perspective positions: explore the problem area utilizing the realist lens that allows for an independent existence of a space of abstraction, utilize a scientific positivistic lens that places emphasis on falsifiability and verificationism, or take the middle ground.

The paper is structured to first explore the noted philosophical frameworks and briefly examines the arguments for and against philosophy in the IS discipline. The next section selectively introduces Critical Realism and its potential for defining complex

IS constructs. The following section briefly examines Actor Network Theory and its implicit usage in ontology building. The paper concludes by mapping the construct Internet as per the guidelines given by Critical Realism and ANT and discusses the ramifications.

## **2.0 PHILOSOPHY IN INFORMATION SYSTEMS**

The role of philosophy in an applied field such as Information Systems has been a topic of debate in the IS literature. Against the academics who question the important of philosophy in an engineering discipline such as IS, Webster (2003) invokes John Locke's analogy of philosophy as the under-labourer whose assistance results in "clearing the ground a little...removing some of the rubbish that lies in the way of knowledge". Collier (1994) argues that that the alternative of "philosophy" is not "no philosophy", but instead "bad philosophy" and supports philosophical models to sustain applied IS methodologies and practices.

Dobson (2001) suggest that different methodological approaches towards resolving issues in the field of Information Systems have been inspired from differing philosophical understandings of reality. To this end, he suggests that since Information Systems is an applied field, the research carried out within the field is heavily oriented towards the application of IS to business. Dobson (2001) further contends that while the orientation towards the application has resulted in a great number of methodologies that have been used to address many of the issues that have been raised, a similar variety of literature does not exist which examines differing philosophical approaches that the methodologies fall under. Walsham (1995) supports the argument and suggests that coherent research must adopt different philosophical perspectives and the philosophical approach must be well understood and applied by the researcher.

As Information Systems research has derived research methodologies from philosophical foundations, it also inherits the philosophical debates surrounding the nature of reality. As such, the full spectrum of philosophical positions between liberalism and logical positivism are translated as tensions and divisions in IS research philosophies. Mingers (2004) provides a useful summary of the different philosophical perspective positions that utilize philosophical framework foundations that later enable philosophical debate such as nature of reality in the field of IS.

	Empiricism			Conventionalism	
	<i>Logical Empiricism</i>	<i>Hypothetico-Deductive</i>	<i>Pragmatism</i>	<i>Kuhnian Paradigms</i>	<i>Sociology of Science</i>
<i>Purpose</i>	Explaining events that can be empirically observed in terms of universal laws.	Explaining events that can be empirically observed in terms of universal laws.	A practical activity aimed at producing useful knowledge rather than truth.	Science aims at knowledge within a given framework of assumptions.	Science is essentially a social activity much like any other. It does not have a special hold on truth.
<i>Method</i>	Observations and measurements that can be represented mathematically.  The derivation of universal laws through induction.	Proposal of hypotheses or conjectures that can be verified or falsified but not proven.	Theories are judged in terms of their usefulness in solving a problem or their acceptability.	Science always works within a deeply held set of theories and assumptions (paradigm) that shapes the nature of scientific activity.	In practice, science works like any social activity in terms of power and influence rather than pure access to the truth.
<i>Assumptions</i>	Humean causality: only constant conjunctions of events;  Induction;  Objective observation and measurement;  Correspondence theory of truth.	Humean causality;  Direct observability of the criterion for existence;  Observations are theory and subject dependent;  Hypotheses in principle are unprovable; deduction rather than induction.	We cannot and should not aim for ultimate truth but rather usefulness; theories are instruments.  Consensus theory of truth.  The meaning of a concept comes from its use.	The prevailing theoretical paradigm determines scientific activity: measurements, theories, acceptability. Over time, paradigms replace one another but these may be incommensurable.  Truth is relative to the paradigm.	Knowledge is purely the outcome of power within social activity rather than a reflection of an external real world.

**Figure 1: Different philosophical approaches to research (Mingers, 2004)**

## 2.1 Realism and Positivism

One of the primary debates regarding the nature of reality in philosophy is that of realism versus positivism. Whereas, traditional continental philosophy allows for forms of realism, empiricist traditions lends support to verificationism and post-modernism regards reality as a social construct, there is significant variance in each position.

Fine (1986) in his argument against realism suggests that “*metatheoric arguments must satisfy more stringent requirements than those placed on the arguments used by the theory in question, for otherwise the significance of reasoning about the theory is simply moot*”. He is supported by Popper (1968) who suggests that positivist research utilizes “*falsifiability as a criterion of demarcation*” in the form of modus tollens to “*distinguish between the empirical sciences on the one hand, and mathematics and logic as well as ‘metaphysical’ systems on the other*” (Popper, 1968, p. 11).

There is a variety of different positions within the opposing philosophical perspectives on reality. For instance, Quine disagrees with the Kantian and logical positivists' claim for a firm distinction between analytic (those statements that are true by the virtue of definition and experience does not need to be invoked to establish the truth value) and synthetic statements (whose truth value must be obtained using experience) (Quine,

1951) and as such exhibits the great divisions on the nature of reality and human understanding of it within the empiricist philosophical school.

Similarly, the requirement of verificationism is difficult to establish in IS where controlled experiments cannot be carried out as a result of the nature of the investigated phenomenon. It is alluded to by Lee & Hubona (2009) where they concede that not all IS theories may be verifiable to the level that a logical positivist perspective may require.

Walsham (1993) suggests that subjective understanding of reality in IS research is an accepted factor that needs to be regarded in the research process.

*"Interpretive methods of research start from the position that our knowledge of reality, including the domain of human action, is a social construction by human actors and that this applies equally to researchers. Thus there is no objective reality which can be discovered by researchers and replicated by others, in contrast to the assumptions of positivist science" (Walsham, 1993).*

To this end, Orlikowski & Baroudi (1991) add:

*"The interpretive research approach towards the relationship between theory and practice is that the researcher can never assume a value-neutral stance, and is always implicated in the phenomena being studied" and "There is no direct access to reality unmediated by language and preconception" (Orlikowski & Baroudi, 1991)*

A consequence of social constructivism with a greater emphasis on the discourse and its ability to create reality is that the focus is taken away from the referent or object (Webster, 2003) and moved to the discourse. Dobson (2001) argues that the removal of the referent results in a research process in which the underlying reality, independent of the discourse or analysing perspective is ignored.

### **3.0 CRITICAL REALISM**

*We must avoid giving the elements and relations that form a structure an actuality which they do not have, and withdrawing from them a reality which they do have. (Deleuze, 1994).*

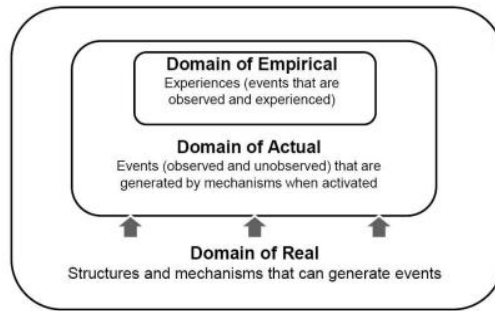
Critical Realism has gained considerable currency as a research philosophy amongst IS researchers that combines philosophy with IS research (Dobson, 2001; Webster &

Dobson, 2003; Mingers, 2004; Carlsson, 2006; Wynn & Williams, 2008; Radulescu & Vessey, 2009; Carlsson, 2005; Morton, 2006). Critical realism aims to strike a balance between the two conflicting academic research positions and view of reality, being positivism and philosophical realism. Being a meta theory, Carlsson (2006) argues that while Critical Realism is well developed as a philosophy of science, it is less developed on a methodological level.

Critical Realism argues for a relationship between methodology and philosophy (Dobson, 2001). Bhaskar (1978) who is the primary proponent of Critical Realism conceives of the relationship by arguing for the existence of a real, an actual, and the empirical. Bhaskar (1978) explains:

*“Real structures exist independently of and are often out of phase with the actual patterns of events. Indeed it is only because of the latter that we need to perform experiments and only because of the former that we can make sense of our performances of them. Similarly, it can be shown to be a condition of the intelligibility of perception that events occur independently of experiences. In addition, experiences are often (epistemically speaking) ‘out of phase’ with events—e.g., when they are misidentified. It is partly because of this possibility that the scientist needs a scientific education or training. Thus I will argue that what I will call the domains of the real, the actual and the empirical are distinct.”* (Bhaskar, 1978, p. 12)

Bhaskar (1991) explains that different domains, such as the real which is unobservable and the actual or empirical which can be observed and tested, require different epistemological approaches. He argues that a major fault of the post modernistic explanations of reality is an epistemic fallacy in which these domains are collapsed into each other. For example, Bhaskar (1991) suggests that it is a mistake to analyze statements about ontology (being) in light of statements about what is known about them through epistemology (Dobson, 2001).



**Figure 2: The Three domains in Critical Realism (Mingers, 2004)**

Mingers (2004) provides a useful illustration of the three domains that Bhaskar develops in figure 1, and table 1 below contrasts the three domains of Critical Realism against the epistemological attempts at knowing reality.

	Real	Actual	Empirical
Mechanisms	x		
Events	x	x	
Experiences	x	x	x

**Table 1. Different domains (Bhaskar, 1978)**

In contrasting positivistic methods like naturalism with post-modernistic explanations of social phenomena utilizing methods like hermeneutic circle, Miles & Huberman (1994) suggest that critical realism achieves a balance by accepting that facts are value laden and are imbued with subjective theory, while still allowing for 'lawful and reasonable stable relationships'. As per Bhaskar (1978), while Critical Realism allows for epistemic relativity in that it grants all beliefs are socially produced, it does not allow for judgmental relativity by equating the same status to them. Fleetwood (2005) adds:

*“Unlike various forms of naïve or empirical realism, critical realists accept that there is no (defensible) theory-neutral observation, description, interpretation, theorization, explanation or whatever. There is, in other words, no unmediated access to the world: access is always mediated.” (Fleetwood, 2005)*



Furthermore, de Vaujany (2008) suggests that the critical realism theory allows the researcher to escape the bounds of Actor Network Theory, which equates the personhood of a human to a non-human. Moreover, he suggests that critical realism provides more developed distinctions between actors such as persons, agents that can be utilized to bridge the 'biographical and social realms'. Bhaskar (1991, p. 76) regards society as "an ensemble of structures, practices and conventions that individuals reproduce or transform", and argues against the use of a flat ontology on the grounds that it can restrict explanatory power of theory.

The academic de Vaujany (2008) suggests that most of the critical realism academic research deals with theory instead of qualitative or quantitative research. A reason offered by Bhaskar (1979) suggests that the critical realist manner of exploring social phenomena lacks in the ability to predict due to the openness of the social systems, yet Bhaskar (1979) argues that Critical Realism can still be used for explanation of the phenomena.

Another proponent of Critical Realism (Archer, 1995) contrasts the pragmatic way of building theories using instrumentalism (with the focus on theories that can explain phenomena) with the critical realist manner of building theories that focus on explaining objective reality by suggesting that ontology and methodology are different issues. She suggests that the critical realism allows for a perspective, which can be utilized to focus both on the methodology of examining social phenomena, as well as allow for the explanation of the ontology. Archer (1995) further suggests that by binding together the ontology (the real), epistemology (the actual), and methodology (the empirical), the critical realist manner of exploring reality can provide consistent and rigorous research.

#### **4.0 ACTOR NETWORK THEORY**

Latour, Callon and Law developed the Actor Network Theory as a sociological theory that attempts to examine heterogeneous networks comprised of actors or actants, which could be either humans or technological agents (Latour, 1998). The theory attempts to create a method wherein relationships between the materials (things) can be examined with the semiotics (concepts). Latour (1998) suggests that the ANT attempts to bring together three different philosophical preoccupations: a semiotic definition on entity building, a framework of building a heterogeneous network, and an ontological basis for the actors.

Furthermore, (Latour, 1998) suggests that the network that the ANT introduces is different than a traditionally understood network. He contrasts the ANT network against an engineer's network, and contends that unlike the latter network which is a final, stabilized, intensely connected network, the ANT network can display no compulsory paths or strategic nodes. Latour (1998) contends that relationships between different actors in a network are constantly in a state of flux, and employ both formal and informal methods to maintain connectedness.

While an engineer's network comprises of engineering components that are easy to define and operate, the ANT network of an organization would also include the office desks, computers, managers, and even the doors as actors or actants within that network. As such, Latour (1998) contends that the ANT can be useful for creating ontologies as the theory can be utilized to create beyond the outer surfaces of a sociological order by dealing with the inner filaments that make up the network. Latour (1998) further suggests that the ANT reduces the importance of the co-relation between proximity and connectedness. Using the analogy of two pipes, one sewerage and the other a fibre, Latour (1998) suggests that the proximity in distance between the two pipes does not indicate a relationship between them. Heidegger also suggests the same when he argues that entities are connected on the basis of a shared purpose and positioning in time (Heidegger, 1962). Latour further contends that the notion of the network allows for the destruction of distance, a priori assumptions of the ordering of the entities in the network. The destruction allows for a network to be examined as a boundary without something outside or inside it and thus provisions the disregarding of the network's depth.

Furthermore, (Latour, 1991) introduces concepts of purity and translation in Actor Network Theory. He suggests the strength of the ANT network comes from the heterogeneity of the network (Latour, 1998), and the lack of purity or concentration of the entities as against a traditional network which works in inverse. Latour (1998) further suggests a linking between chaos theory and the ANT, in that both theories begin from "irreducible, incommensurable, unconnected localities, which then, at a great price, sometimes end into provisionally commensurable connections." (Latour, 1998, p. 2)

## 5.0 MAPPING CYBERSPACE THE CONSTRUCT

The illustration given by Mingers (2004) on the different domains of Critical Realism can be contrasted against the epistemological knowledge of the domains as given in table 1. Allowing for Archer's (1995) insight into different research facets in Critical Realism and March & Smith's (1995) division of research artifacts, the construct Internet's ontology can be defined as per table 2.

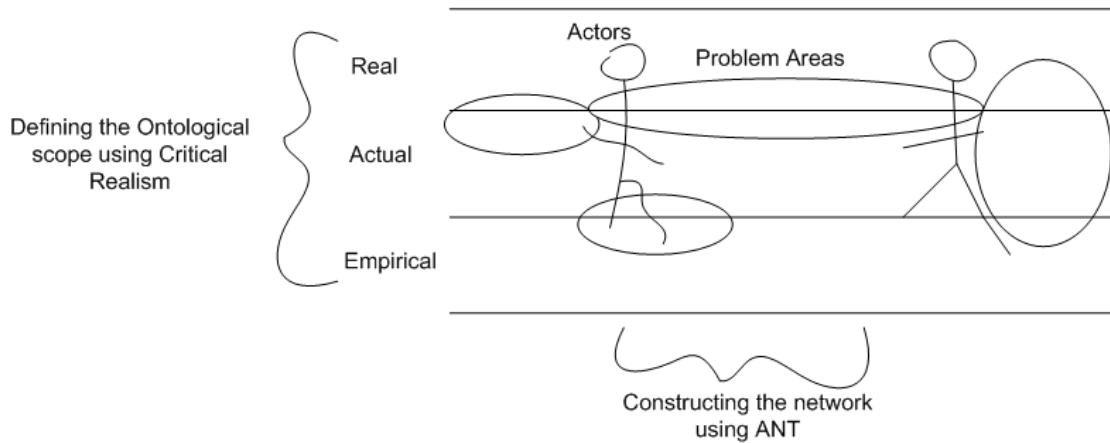
	Real <i>(Bhaskar, 1978)</i>	Actual	Empirical	
Methodology <i>(Archer, 1995)</i>			Physical Internet	Instantiation <i>(March &amp; Smith, 1995)</i>
Epistemology		Internet Architecture		Model
Ontology	Internet (including Cyberspace)			Construct

**Table 2. Mapping the construct Internet**

The IS artifact Internet, comprising of the physical Internet and the Cyberspace falls under the categories of ontology (as described by Archer, 1995), construct (as described by March & Smith, 1995), and domain of the real (as per Bhaskar, 1978).

The construct Internet comprising of the contextual space it creates being the Cyberspace is ontologically different from the physical architecture of the Internet or instantiations of the architecture. The Internet construct that has been mapped in table 2 exists in the domain of the real in that it enables mechanisms and a plurality of assemblages on a meta level that determines the architecture of the Internet in the domain of the actual, and becomes tangibly verifiable in the domain of the empirical.

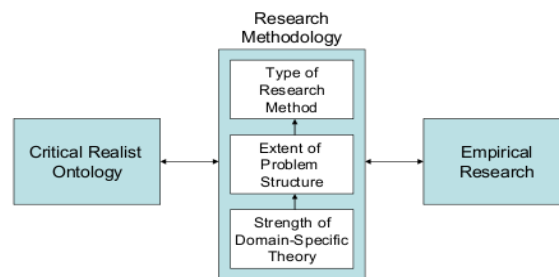
While Critical Realism can be used as a philosophical foundation for bracketing reality, Actor Network Theory can be utilized for exploring the different stakeholders, problems and the interplay of relationships. Utilizing Actor Network Theory in an ontologically defined space as determined by Critical Realism allows for a situated examination of problem areas on the Internet as per figure 3.



**Figure 3: Critical Realism and ANT to develop the construct Internet**

## 6.0 DISCUSSION

Raduescu & Vessey (2009) propose methodological guidelines in conducting Critical Realism research by introducing a mediator in form of domain-specific theory. They describe a strong domain-specific theory as being able to bridge the gap between the subjective biases of the researcher and the ontology of the system existent in the real domain.



**Figure 4: Domain-specific theory as a mediator (Raduescu & Vessey, 2009)**

In addition to the mediator, Raduescu & Vessey (2009) also classify the strength of the domain-specific theory as a useful signifier for a research method as per the figure below.

Type of Critical Realist Research	Type of Domain-Specific Theory	Type of Problem	Type of Research Method
Type I	Strong	Structured	Structured
Type II	Related	Structurable	Structurable
Type III	Weak	Unstructured	Unstructured

**Figure 5: Strength of Domain-specific theory in determining research methods**

The unexplored ontology of the construct Internet existing in the domain of the real allows for the non-understanding of non-linear (non-deterministic) causation that manifests in the domains of the actual and empirical. By remaining an ontology with weak domain-specific theory, the construct Internet does not allow for structured problems or research methods. Moreover, the continuing absence of the construct Internet enables debates on the domains of the actual and empirical without the essential framework to bound and guide the investigations.

By forcing actualization on the real ontology of the construct Internet as a condition for the development of the construct, the independence and autonomy of the ontology is denied. The denial, coupled with reified generality like the “Internet” instead of a well-established construct raises questions in the underlying domains of actual and empirical without a meta theory to help clear the problem area.

The bounding and definition of the ontology of the construct Internet achieved using Critical Realism allows for the usage of other theories, such as Actor Network Theory to investigate phenomena in a situated manner.

The application of an ANT network to depict problem areas that allows for their causes and effects to permeate various ontological realities as suggested by Critical Realism allows for the development of a rich context to examine phenomena. For instance, an examination of the issue of copyright infringement on the Internet can be modelled using traditionally developed ANT actors and depicting their relationships, while allowing for Real, Actual and Empirical realities. The division of the ANT network into three layers allows for the problem area to be examined from cultural, technical and historical perspectives.

## 7.0 CONCLUSION

The exploration of the ontology (in this case that of the Internet comprising of Cyberspace and physical Internet) has historically been a philosophical exercise. Other issues accompanying ontology such as governance, the role of ethics and morality in sustaining the governance framework, have also historically been philosophical pursuits. Therefore, it can be suggested that there is a requirement for a research philosophy that allows for a perspective positioning that can be utilized in gaining a higher meta level ontological understanding of the construct Internet and how it is understood across disciplines.

The paper has explored the potential of Critical Realism as a research philosophy that is capable of developing the construct while allowing competing models to remain present in the underlying layers. The allocation of epistemic equality to different theories, but disallowing judgmental relativity allows for research that can explore the ontology in detail.

The paper has also explored the usage of Actor Network Theory in a Critical-Realist ontology, where depth can be provided to an ANT network. Moreover, the paper has examined the feasibility of examining IS artifacts and problem areas by situating them on an ANT network and referencing against various ontological layers provided by Critical Realism.

It is expected that there will be future work that will develop the construct Internet further by utilizing the guiding philosophy of Critical Realism and modelling as per the guidelines of the Actor Network Theory.

## REFERENCES

- Archer, M. (1995). *Realist Social Theory: The Morphogenetic Approach*. Cambridge: Cambridge University Press.
- Baloch, F., & Cusack, B. (2009). Re-visualizing Cyberspace: Using Quasi Objects for Spatial Definitions. Proceedings of the ACIS Conference rahulr\_2006@yahoo.com2009, Melbourne, Australia.
- Bhaskar, R. (1978). *A Realist Theory of Science*. Sussex: Harvester Press.
- Bhaskar, R. (1991). *Philosophy and the Idea of Freedom*. Oxford: Blackwell.

- Carlsson, S. (2005). A Critical Realist Perspective on IS Evaluation Research. Presented at the ECIS 2005, Regensburg, Germany.
- Carlsson, S. (2006). Design Science Research in Information Systems: A Critical Realist Perspective. Presented at the ACIS 2006, Adelaide, Australia.
- Clark, D. D., Wroclawski, J., Sollins, K. R., & Braden, R. (2005). Tussle in cyberspace: defining tomorrow's internet. *IEEE/ACM Trans. Netw.*, 13(3), 462-475.
- Collier, A. (1994). *Critical realism: an introduction to the philosophy of Roy Bhaskar*. London: Verso.
- Deleuze, G., & Guattari, F. *What is Philosophy*. London: Verso.
- Dobson, P. (2001). The Philosophy of Critical Realism—An Opportunity for Information Systems Research. *Information Systems Frontiers*, 3(2), 199-210.
- Fleetwood, S. 2005. "Ontology in Organization and Management Studies: A Critical Realist Perspective," *Organization*, 12(2), pp. 197-222.
- Fine, A. (1986). The Natural Ontological Attitude. In *The Shaky Game*. Chicago: University of Chicago Press.
- Latour, B. (1991). *We have never been modern*. Cambridge, MA: Harvard University Press.
- Latour, B. (1998). On Actor Network Theory: A few clarifications. *Latour, Bruno: On Actor Network Theory: A few clarifications*. Retrieved Dec 30, 2010, from <http://www.nettime.org/Lists-Archives/nettime-1-9801/msg00019.html>
- March, S., & Smith, G. (1995). Design and natural science research on information technology. *DecisionSupport Systems*, 15(4), 251-266.
- Miles, M., & Huberman, M. (1994). *Qualitative Data Analysis*. Thousand Oaks, CA: Sage.
- Mingers, J. (2004). Real-izing information systems: critical realism as an underpinning philosophy for information systems. *Information and Organization*, 14(2), 87-103. doi:doi: DOI: 10.1016/j.infoandorg.2003.06.001

- Morton, P. (2006). Using Critical Realism to Explain Strategic Information Systems Planning. *Journal of Information Technology Theory and Application*, 8(1).
- Mueller, M. (2004). *Ruling the Root*. Cambridge, MA: MIT.
- Popper, K. (1968). *The Logic of Scientific Discovery*. New York: Harper Torchbooks.
- Quine, W. (1951). Main trends in recent philosophy: two dogmas of empiricism. *JSTOR*.
- Radulescu, C., & Vessey, I. (2009). Methodology in Critical Realist Research: The Mediating Role of Domain Specific Theory. Presented at the AMCIS 2009, San Francisco.
- Rossel, P., & Finger, M. (2007). Conceptualizing e-Governance. In *Proceedings of the 1st international conference on Theory and practice of electronic governance* (pp. 399-407). Macao, China: ACM.
- Strate, L. (1999). The varieties of cyberspace: Problems in definition and delimitation. *Western Journal of Communication*, 63(3), 382-413.
- de Vaujany, F. (2008). Capturing reflexivity modes in IS: A critical realist approach. *Information and Organization*, 18(1), 51-72. doi:doi: DOI: 10.1016/j.infoandorg.2007.11.001
- Walsham, G. (1995). Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems*, (4), 74-81.
- Webster, R., & Dobson, P. (2003). Philosophical Frameworks and Cognitive Profiles: Tools for the IS Student and Practitioner? Presented at the ACIS 2003, Perth, Australia.
- Wynn, D., & Williams, C. (2008). Critical Realm-Based Explanatory Case Study Research in Information Systems. In *ICIS*. Paris, France.