Philosophy and Information Systems: Where are We and Where Should We Go?

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Introduction

All research is philosophy in action. A lack of attention to and understanding of philosophy can render research and its outcomes misleading or vacuous. Understanding philosophical questions, on the other hand, can help information systems (IS) researchers ensure their work is rigorous and insightful. It can also improve the quality of the work itself (Lee, 2004). These are strong statements. In this editorial of the special issue on philosophy and the future of IS we develop arguments to support them, review the current state of philosophy in IS and put forward a research agenda. First, we need to justify this focus on philosophy that motivates the special issue.

In order to undertake any sort of research, the researcher needs to answer a number of philosophical questions that precede the research. These include questions such as: What am I researching? What does it mean to know? What is knowledge? How can I create knowledge? What is truth and is it important? What exists and can be described?

Are the consequences of my research acceptable? Is it right for me to ask the question? How can I communicate my insights? Who am I? Who is my audience and who are the people using IS? These questions may lead to other questions. What does "use" mean? And does "use" cover most of technology's effects? What about people who do not use those technologies but are impacted regardless.

Researchers in the field of IS, just like those in many other fields, tend to have implicit, taken-for-granted answers to these questions that are unacknowledged, and often broadly shared and agreed upon. It is important to acknowledge that such questions are typically open to many different types of answers and that successful research requires them to be addressed in a consistent manner. To do so, one needs to have an understanding of the field or discipline that deals with them, namely philosophy. This need for a philosophical grounding of research may explain why the highest degree that universities in many English-speaking countries confer is that of a Doctor of Philosophy (PhD). Researchers holding such a degree can therefore rightly be expected to display a significant awareness of philosophy. But what is it, this mysterious thing we call philosophy?

The literal meaning of philosophy is the "love of wisdom or knowledge" (Greek *philo-* "loving" + *sophia-* "wisdom"). In its current incarnation philosophy is typically seen as an academic discipline, part of the broader canon of the humanities. One can study philosophy at many universities. When doing so, the student of philosophy will typically be taught many of the sub-disciplines of philosophy including metaphysics, logic, ethics, aesthetics, epistemology, philosophy of language, political philosophy and many others. These different sub-disciplines ask particular questions and have more or less clearly defined subject areas that cover many of the questions listed earlier. A basic understanding of at least some of these fields is thus required for an IS researcher to be

able to justify their work and approach.

While this view of philosophy as an academic discipline is appropriate and represents the current state of affairs, we would like to point to a broader and older understanding of philosophy. When the term came up with the ancient Greeks, epitomized by great philosophers such as Socrates, Plato and Aristotle, the term covered the entire field of knowledge and was thus closer to what we now might call “science” or “research”. Most, if not all, academic disciplines as we know them today can be traced back to philosophy: physics, biology, chemistry and other sciences are all embodied in classics like Newton’s (1687) *Mathematical Principles of Natural Philosophy* and Lord Kelvin’s et al (1888) *Treatise of Natural Philosophy*. Going beyond such natural sciences, philosophy in a broader understanding did not only have the purpose of organizing knowledge in a particular domain, but also to inform individuals and societies about how to live their lives and achieve the “good life”. This was typically seen as a life spent perfecting oneself, including the development of knowledge, being part of a commonwealth, and having positive relationships with others in the pursuit of the optimum state of being that could be achieved, individually and collectively.

We do not want to overly romanticize the antique Greek way of life where slavery and the subjugation of women and foreigners were commonly accepted. It is furthermore clear that in modern pluralistic societies it will be more difficult, if not impossible, to find answers to such grand questions. This does not mean, however, that one cannot or should not ask these questions. Even a failure to find a shared answer can provide insights and shed light on the specific research one has undertaken and the results it has led to. Such insights help us individually and collectively to answer the question why we are doing research and how academic and other investigations position us in society.

We believe that a desire to gain this type of understanding is at the heart of the interest in philosophy. Not only can philosophy help us understand the basis of our research questions, methodologies and findings but, more importantly, it can help us locate ourselves and our research in a greater context. Research may remain anaemic and superficial if it does not consider the wider context and the question, "What role can IS play as a practice and as an academic discipline?" Achievements within the discipline are worthwhile, but how those achievements transcend across into the constellation of other disciplines answers those more intimate questions concerning which role I, as an individual researcher, can and should play. We therefore see this special issue and its focus on philosophy and IS as part of the discourse that tries to give an answer to Walsham's (2012) question, are we using IS to make the world a better place? While we may not reach a consensus in answering this question, we nevertheless believe that addressing this question serves as the aspiration of science and research. This aspiration, if taken seriously, requires a modicum of philosophical insights. In the end, if there is any doubt concerning the need for philosophy and its relevance for IS, let this editorial provide some answers.

Philosophical Interventions in the IS Discourse

"*The Weaponization of Information: The Need for Cognitive Security*", thus ran the title of a testimony to the Senate Armed Services Committee, Subcommittee on Cybersecurity, on April 27, 2017 by Rand Waltzman, representative of the Rand Corporation, a research organization that develops solutions to public policy challenges in the United States. For a field like IS that has the term "information" in its title and is concerned about the well-being and security of organizations, this would certainly fall within its purview. However, what is being discussed in this testimony falls outside the

IS field's traditional notions of what information is about: information for decision making, automation and effective control of organizations. Information, in this case, is being used to disrupt and break down decision making and create havoc within organizations rather than support them. In the wake of the disclosure that Steve Bannon was also the co-founder of the political analytics company, Cambridge Analytica, that was hired to help the Trump campaign (Frenkel, 2018), the dark underbelly of technology has never been so exposed, such that the US Senate are talking about the need to regulate information in the same way financial institutions and utilities are regulated (Stewart, 2018). The use of information as weapons is not new. During the Second World War, the "Ghost Army" (Garber, 2013) of the allies fooled the Nazis using inflatable tanks and airplanes, and sent to the front lines recordings of the sounds of moving armoured infantry units to scare them into retreat. After Caesar's assassination, Octavian, Caesar's adopted son, began a vicious program of disinformation and fake news against Mark Antony who claimed succession, which eventually helped Octavian defeat Mark Antony and transform him into Augustus, the first Emperor of Rome (Kaminska, 2018). Given today's reification of information through technology and even greater potential for negative consequences not only on organizations but also socio-political life, studies of such use of information should feature prominently in IS. Although in the past IS researchers have drawn from philosophy for their studies, the full repertoire of philosophical inventiveness is yet to be explicitly applied, especially for those intractable problems mentioned.

Following the general argument why IS scholars should take philosophy seriously, we also need to consider how philosophical work is represented and perceived in the IS discourse. This is an important question for researchers who have to make decisions about the use of their time and resources and need to ask how best to focus their

research. It is therefore important to understand whether a philosophical focus can be rewarded. When reflecting on this question, it is important to point out that even in established mainstream IS research there is strong evidence of the relevance of philosophy and of a broad recognition of this relevance. The IS tradition has produced a long list of highly-cited works, in its top journals indicating that philosophical work in IS has high visibility and can be considered highly successful (see Hevner et al. (2004), Benbasat et al. (1987), Klein and Myers (1999), Orlikowski and Baroudi (1991), Walsham (1995), Lee (1989) and Mingers (2001) in epistemology; Mason and Mitroff (1973), Orlikowski and Iacono (2001) and Gregor (2006) in metaphysics; Markus and Robey (1988) in rationality). This tradition is evidence that philosophical work is not only intrinsically important as we argued earlier, but it can also stand up in terms of some of the more established research metrics to other types of IS research. Having provided some evidence that philosophical work can find its way into highly regarded IS outlets, we can now look in more detail into different areas of philosophy and the way these are represented in IS and where future research might lead.

Philosophical questions in IS: history, current work and research agendas

In this section we want to move beyond the general overview offered earlier and develop a research agenda that highlights the importance of philosophical inquiry and demonstrates how such inquiry can promote the field of IS. The field of philosophy is broad and all research has philosophical roots and implications in many ways. We therefore do not aim for a comprehensive coverage of all aspects of philosophy but we focus on those areas that we believe to be most likely to be of theoretical or practical relevance. We use this section to give an overview of some of the key works in the

relevant sub-fields or disciplines of philosophy and to locate the contribution that the papers in this special issue make to those streams of discussion. From this position then we extrapolate next steps and further research. Overall, we hope that this approach contributes to a broader research agenda of philosophy in IS that can further promote the visibility and relevance of this type of research.

We focus on four well-established fields of philosophy (Teichman & Evans, 1995). However, we are aware that the division of philosophy into fields or sub-disciplines are somewhat arbitrary. In practice different philosophical questions are strongly interlinked and a commitment to one particular position in one field often implies corresponding commitment in other fields. The following sections highlight those aspects of philosophy in IS that in our opinion either have been covered significantly in the past or deserve more attention in the future. We use this discussion to locate the contributions in the special issue in the broader context of philosophy and IS.

Table 1: The Main Fields in Philosophy and Questions They Address

Main field	**Important questions relevant to IS**
Metaphysics	Ontology – what exists and what properties do they have? Causation – what is the nature of causality? The mind – what is the relation of the mind to the body? Sociomateriality – is the social world intrinsically different to the material world? Technology – what is the relation between the social and the technological? Information – does it exist and what is its nature?
Epistemology	What is the nature of knowledge? How do we gain knowledge? How does language (and its concepts and meanings) construct knowledge? What is truth? How do we ensure that knowledge is valid? Are there fundamentally different paradigms of research? What methodologies produce valid knowledge?
Rationality	What is it to be rational? Logic – how should we reason and make valid arguments? Theory – what is a good theory? Philosophy of science – how should science be conducted?

Axiology	Value – what is good and to be valued? Ethics/morality – how should we behave? Aesthetics – what is beauty, art, taste? Politics – how should we govern and regulate our communities?

Metaphysics: The First Philosophy

Aristotle (1998) began his treatise on metaphysics with the statement: "All men by nature desire to know" to describe the inherent force that urges, to varying degrees, all of us towards knowledge. With that phrase, Aristotle embarks on his strongest argument for wisdom (*sophia*), the love for it (Greek φιλοσοφία – *philosophia*) and for nurturing the capacity within us to learn and understand. He argues that if the knowledge pursued was for control or to be published, it would not be a desire for knowledge; it would be for the will to control or to be noted. Mathematics was founded in Egypt not for these reasons; it was founded by a priestly caste who pursued knowledge for its own sake (Lear, 1988). Aristotle's metaphysics sought to explain the nature of wisdom, philosophy and how to acquire it. In other words, according to metaphysics, our research should be inspired by wonder, awe, puzzlement and the honest pursuit for explanations for their own sake. Hence the description of metaphysics as "first philosophy," the beginning of all things, physical or otherwise, including knowledge itself. As first philosophy, metaphysics comes before science (episteme) and the study of it (epistemology).

What does all this mean to IS research? The history of metaphysics in key disciplines provides some answers. When the father of modern philosophy, Descartes (1644/1983; 1641/2014), wrote *Meditations on First Philosophy* and later *Principles of Philosophy*, he offered an alternative metaphysics to that of Aristotle while, at the same time, applied Aristotle's own methods. As Spinoza (1663/1961) explains, the Cartesian first principles of rejecting pre-conceived notions, searching for the bases of everything,

discovering the cause of error, understanding everything clearly and distinctly, would become the foundations of modern science for centuries after. Essentially Descartes led the way to natural philosophy and the sciences by asking the "What is …?" question. What is the nature of reality? What is the body? What is the mind? These are not questions that we can find in the sciences because unlike the science, they do not target qualities, features or characteristic of objects. They are questions that concern what Aristotle described as the substance or the essence of the object, which cannot be separated from it if it is to remain the same object. Descartes' (1630, p. 15) took the route that led him to have "discovered the foundations of physics" in essence as a mechanistic system, which Newton would later complete. Most of the sciences we know of began with similar metaphysical questions. Even as a naturalist himself, Darwin (1859) asked the question, "What is the Natural System?" His re-examination of the essence of his object of study would lead to one of the most influential and controversial theories in history. Schrödinger's (1945) *What is Life?* inspired Watson to discover the structure of DNA. The fecundity of the "What is …?" question is legend. Except for several notable exceptions (Mason & Mitroff, 1973; Schwartz, 2011; Mingers & Standing, 2017; Aakhus et al., 2014), such a path is not taken by mainstream IS research.

Most research in information system will either begin with qualities and characteristics of objects of study already laid out by other disciplines, with very little contemplation of the metaphysics of "information" or of "system." For example, the investigation of the success of an information system would take a different trajectory if it began with questioning the essence of "success" rather than enumerating and investigating its secondary characteristics. The inspiration behind the most prolific research theory in IS, the Technology Acceptance Model (TAM), was the good decade of effort by Fishbein

and Ajzen (Fishbein, 1961; Fishbein, 1963; Fishbein & Ajzen, 1972) to answer the question "What is attitude?" The attention given to this metaphysical question does not mean research cannot proceed at the same time, for example, on how attitude impacts overt behaviour (Fishbein & Ajzen, 1975). But the foundations of what constitutes attitude are not left in doubt. Research that adopted this theory in IS stripped it of its major elements (Davis, 1986), very little attention was afforded to what attitude entails within the context of the IS field. The foundations of the core concerns of the IS field, information, system and technology, remain in doubt (Lee, 2010) in part because metaphysical questions are not addressed.

Of course, just as Descartes transformed Aristotle's views, metaphysics itself will continue to evolve. In the 20th century, Heidegger, following his teacher Husserl, mounted the most vigorous critique of Cartesian metaphysics, questioning the separation between subject and object, body and mind. Heidegger's phenomenological view explains that for the most part we deal with the world in an absorbed, non-deliberative way, not as Cartesian dualism claims. Thus, Heidegger brings the question of metaphysics back to Aristotle's study of "being qua being," that is studying *being* not with a particular end or purpose in mind as it is done in the sciences, but studying being *as it is in itself,* placing how we encounter things in this world as *being-in-the-world*, not as separate, predefined entities. For IS research, these varied interpretations of metaphysics provide a rich foundation for developing the field's own metaphysics, as the field begins to re-examine the essence of its own core concerns, including information, systems and technology. What is information? What is technology? As a field, we are still working on the answers to these questions (Lee, 2010; McKinney & Yoos, 2010; Boell, 2017; Mingers, 1995; Mingers & Standing, 2017). Answers to these questions on the philosophy of information (Floridi, 2002; Floridi, 2011) and

technology (Feenberg, 1991; Feenberg, 2010b; Ihde, 1990; Ihde, 1993) are being provided by scholars outside of IS. The ongoing struggle to define the IT artefact (Orlikowski & Iacono, 2001; Akhlaghpour et al., 2013; Alter, 2015), is in fact, a struggle that metaphysics offers several opportunities, despite the dearth of such studies in IS.

One such opportunity that overlaps with metaphysics is the philosophy of technology which, despite being a late comer, has built a long tradition within critical studies in philosophy (Feenberg, 1991; Ihde, 1979; Ihde, 1990; Ihde, 1993; Hacking, 1983; Dusek, 2006; Mitcham, 1994). Contradicting the traditional view that technologies are neutral tools and merely the result of human decisions and agency, philosophers of technology such as Marcuse (1964), Ellul (1973) and Winner (1977; 1989) elaborate on the non-neutral and political essence of technology which, when escalated to certain levels of complexity and interrelatedness, creates indelible marks on society. Winner (1989) argues that technologies are not mere aids but are powerful forces acting to reshape human activity, create new cultures and new worlds, which no longer becoming causal in a linear way, resulting in unpredictable and even disruptive consequences. Borgmann (1984) goes further and distinguishes modern technologies from older technologies and discusses the "device paradigm" (p. 4) of new technologies which, instead of disburdening citizens threatens that which enriches life - what Borgmann calls "focal things and practices" (p. 4). We are realizing, albeit with some trepidation (McGranahan, 2017), what has already been noted by earlier philosophers of technology, that technologies appear to have moral significance (Verbeek, 2011). All of these multidimensional aspects of technology appear to be lost within IS circles, trapped within traditional notions of technology and its features and characteristics, as they attempt to describe the "IT artefact" using its secondary qualities and nomological

implications. The philosophy of science and philosophy of technology circles are only recently catching up and this gap in the progress of understanding technology, especially information technology, and this state of affairs offers the IS field an unprecedented opportunity to demonstrate its contribution to society, if only it can engage with metaphysics seriously (see article in this issue on the future of IS based on the philosophy of technology).

Epistemology: Why do we think we know and the problem of epistemology in IS

Epistemology is less of an issue in the natural sciences as it is in the social sciences. There was always a kind of an assumed boundary between these two scientific fields until the 1950s and 1960s (Kuhn, 1957; Kuhn, 1962; Merton, 1957) when several philosophers and sociologists began suggesting that they held some epistemological authority to the natural sciences, and hence was born terms such as the "sociology of science and knowledge" and "social construction of reality," which have to a large extent, become the received view of reality in IS (Hirschheim, 1985). Since science and knowledge are seen as social conventions, the how-to gain knowledge task of epistemology became more problematic and, not surprisingly, became somewhat of an obsession for IS researchers throughout its early history from the 1980s (Mumford et al., 1985; Hirschheim & Klein, 2012) through the turn of the century (see Mingers (2003)), especially in deciding, of the many 'reference disciplines' (Baskerville & Myers, 2002; Keen, 1980), which should best inform IS research. The realisation of the importance of epistemology for both research but also for practice sits behind the slogan of "epistemology matters" (Wastell & White, 2010) and the discussions about what constitute truth and knowledge. Is it the consensus of the community of competent speakers, as discourse theory would suggest (Habermas, 1981)? Is it the coherence of statements within a larger axiomatic framework, as we know it from mathematical

reasoning? Is it the successful practice that truth facilitates, as pragmatism would suggest (James, 1907)? As if these questions were not difficult enough, it is now well-established in IS and beyond that truth is not a value-neutral absolute term, but that it is political, contested and the basis of power, as Foucault (1980) has shown with his ideas of regimes of truth. This political component of truth and knowledge is highly relevant and questions the idea that information systems are containers of truths (James, 1907; Introna, 2003; Willcocks, 2004).

What has happened since these discussions have taken place is the establishment of so-called "paradigms" acting as proxy templates for IS research methods and the ensuing skirmishes between those who prefer one over the other (Mingers, 2004). Not only have these efforts and overemphasis on methods and methodologies misappropriated the Kuhnian concept of the "paradigm" and what it stands for in research (Hassan, 2014; Hassan & Mingers, in print), they have restricted epistemology to methods and deflected the attention of IS researchers away from their core concerns – the object of their study. The received view of paradigms in IS creates artificial epistemological boundaries between research groups as if these divisions exhaustively describe the nature of the research or the complexity of the real world. As a result of these artificial boundaries, it became necessary to justify the need for apparently incongruous terms such as "positivist case studies," (Dubé & Paré, 2003; Sarker & Lee, 2002) "interpretivist surveys" or "mixed-method research" (Venkatesh et al., 2013; Mingers, 2001; Mingers, 2003) or similar approaches that place the focus on the method rather than on the object of study. Novel approaches in IS such as critical realism and phronesis (explained in this issue) defy such restrictive epistemological categories.

If these restrictive categories become a disservice to researchers and yet, epistemology matters, where and how does it play a role in research? Its critical role is realized only when it is conceived to be closely related to all the other philosophical fields such as metaphysics, axiology and rationality. For how can one study something, when the essence or metaphysics of what to study is as yet underdetermined? How can one be sure of the knowledge surrounding IT strategy for example, if both "IT" and "strategy" can take different forms depending on who is researching, which articles are relied on, and how they are conceived? It is in these situations that philosophy offers solutions and alternatives.

The relationships between philosophy and methods are not as contrived or mechanical as is commonly viewed in IS. Doctoral students are often asked before embarking on their research, what methods they are choosing—positivist or interpretivist? What ontology – realist or idealist – is their research based on? As is found in research textbooks (e.g. Creswell (2003) and Crotty (1998)), epistemology implies theoretical perspectives (positivism or interpretivism) which in turn dictates a particular research method. The domain in which the research resides, whether it is quantitative or qualitative, is at best not a productive way to begin the research (Cook & Reichardt, 1979; Reichardt & Rallis, 1994). Notwithstanding the political and sociological demands that researchers face, starting with a focus on the metaphysics of the problem, coupled with clear research questions, and a judicious use of epistemological choices, will best serve the researcher.

Logic, Rationality and the Reasoning Process

Closely intertwined with knowledge and knowing, as defined by epistemology, are the logical processes we use to acquire knowledge. Logic, which in Greek literally means "the word," has come to represent the study of good reasoning by valid inference and

demonstration. Reasoning represents the thinking process and logic supplies the rules by which we know that our thinking process can be trusted. Reasoning processes that take the shape of claims become arguments, and logic supplies the rules and criteria for valid arguments. As Lee and Hubona (2009) emphasize, research, regardless whether they are quantitative or qualitative, are always founded on some form of argument. Therefore, the validity and quality of that research is predicated on the validity and quality of the logic and argument presented, and as they demonstrate, even articles in the top IS journal are not immune to logical inconsistencies. If every day societal debates and concerns are replete with logical inconsistencies and fallacies (Engel, 1999), which become the source of conflict and discord (e.g. the the oft-repeated slogan "guns don't kill people, people kill people" when examined is both *obscurum per obscurius* – failure to elucidate, and *ignoratio elenchi* – red herring), what of more complex arguments offered in research? Researchers and journal editors need to be more sensitive to how arguments are framed to avoid falling into those same traps and protect the integrity and validity of that research.

The bulk of the reasoning process applied in IS research is deductive reasoning, stemming from the prevalence of the practice of the hypothetico-deductive method (Chen & Hirschheim, 2004) within the field that seeks scientific certainty. Besides its susceptibility to fallacious arguments, one major weakness of deductive reasoning that relies solely on the premises is that it is non-ampliative (Gauch, 2003), or not inherently built with a generative or imaginative component. What this means is deductive logic cannot infer anything beyond the data provided by its premises. The conclusion of deductive logic is limited to its premises and coupled with the tendency of the IS field to excessively borrow from its reference disciplines (Hassan, 2011), the extensive use of

deductive logic is not likely to benefit from information beyond what already exists within the field or within its reference disciplines. This recipe for research puts severe limitations on creative theorizing. Other forms of reasoning such as inductive reasoning and abductive reasoning are inherently ampliative. Thus, in grounded theory, which is built on the inductive reasoning process, Glaser (1978) recommends reading outside the researcher's domain in order to creatively make analogous linkages that will help generate new ideas and concepts. Similarly, critical realism (see Williams and Wynn, this issue) encourages the use of reasoning processes such as retroduction, which is similar to Piercean abductive reasoning, to widen the diversity of possibilities for explaining the phenomena of interest. Indeed, specific areas in reasoning, such as causal reasoning, although introduce earlier on in IS history (Markus & Robey, 1988), are being re-examined in light of the conundrum surrounding the value of theoretical contribution in IS research (Markus & Rowe, forthcoming).

Such reasoning processes when linked to the context of the researcher, determines the rational bases for the researcher's reasoning. Because rationality is defined as the combination of reasoning in a way that is sanctioned by norms, and for achieving one's goals (Evans & Over, 1996), reasoning itself is not inherently tied to rationality. Thus, when a researcher decides to work on certain research topics that are more likely to get published regardless of the level of interest for that topic, Max Weber (1978) defines such a type as purposive or instrumental rationality. Because rationality is closely tied to the context of the person's goals, others may find their decisions irrational. Jurgen Habermas (1971) notes: "the choice of rationality over dogmatism must itself either be rationally justified, in which case rationality is committed, or be itself dogmatic" *Towards a Rational Society*, 1971. Karl Popper (1966) says: "There are

other tenable attitudes, notably that of critical rationalism, which recognises the fact that the fundamental rationalist attitude results from an act of faith – from faith in reason. … This is a moral decision" *The Open Society and its Enemies II,* 1966, p. 231. In other words, both argue that it is not possible to rationally justify rationality, it must ultimately be a decision based on personal faith or belief.

There are those, particularly from postmodernism or post-structuralism, who suggest that such is the case with how we instinctively rationalize. For example, Derrida (1978) claims that almost all our thinking, and hence our research, is riddled, if not vitiated by unjustified or unhelpful privileging of one thing over another. Derrida (1976) shows that historically, Western philosophy had essentially privileged speech, which is considered authentic communication, over writing, which is considered a transcript of that authentic speech, somewhat like a second-hand report of the original, lacking the interaction and authenticity that comes with conversation. Just like speech is privileged over writing, reason is privileged over intuition; men for long periods of history, over women; words over images; or sight over faith (as in, I'll believe it when I see it). In IS research, we do this when our top journals prefer the safety of positivistic research over other epistemological approaches (Chen & Hirschheim, 2004). Or when we adhere to proven research scripts (Grover & Lyytinen, 2015) or accepted research genres (Avital et al., 2017).

Derrida's point is that this privileging involves the failure to see the merits and value of the supposedly lesser side of the equation, and that the key counterparts of what we consider to be lesser is worthy of our attention and even support. To resolve this problem, Derrida (1978) proposes the notion of deconstruction, a way of thinking

which dismantles any loyalty we might have with any idea and seeking aspects of truth that may lie buried in its alleged opposite. The uniqueness and messiness of each situation has to be given its due consideration. And to deconstruct any idea is to admit that often it is confused and riddled with logical defects.

Relating this discussion back to IS research, as researchers, we need to admit that behind every problem, there is not necessarily a perfectly neat solution, and need to be cured from the love of crude simplicity, and the constant craving for them may lie the root of our problems. As researchers, we need to be comfortable with the permanently oscillating nature of wisdom. An admission to this situation of *aporia*, another term Derrida made famous that means impasse or puzzlement, is a state of mind that Derrida says we should be proud to visit often, because rather than admitting to being in a state of doubt or confusion, it is a state where we start asking questions, make inquiries and embark on a journey of understanding. Like the IS field, the management field too finds a paucity of discussions on these reasoning processes notwithstanding the massive volumes of research that have been devoted to rationality and the implications of cognitive limits (Mantere & Ketokivi, 2013). Despite the vast implications they hold for all aspects of research including research arguments, theories and theorizing, discussions on logic, rationality and the reasoning process have perhaps been taken for granted in the IS field. As Habermas (1996, p. 306) once said, we should be leveraging the "unforced force of the better argument," and philosophy provides the necessary resources for the better argument to prevail.

Axiology: What is good and to be valued, and what should we do and why should we do it?

Research, by many accounts, is not just about the nature of reality and how we can know anything about it, but also about how we evaluate it. We use the term 'axiology' here to denote the branch of philosophy that deals with values, including those of ethics, aesthetics, or religion (Rescher, 2005). The term is not widely used in the IS discourse, but the topics it covers are of crucial importance. If value is what makes something desirable, then an understanding of axiology is important for any type of IS research. Maximising profits, for example, if this is what an organisation does, expresses a specific set of values which need to be understood for the organisation's actions to be plausible. In the field of IS some aspects of axiology are well covered, notably ethics, whereas others are less prominent. There is relatively little discussion of aesthetic values in IS. Allen Lee (1991) in his discussion of architecture as a reference discipline highlighted the importance of aesthetic values. Maybe more importantly, aesthetic values influence the design of IS (Cyr et al., 2006) and are therefore of crucial importance for the field of IS, but remain under-researched (Tractinsky, 2004). There is more explicit discussion of aesthetic values in adjacent fields like human computer interaction, for example in terms of the relationship between aesthetics and usability (Tuch et al., 2012), but this debate is not reflected in mainstream IS.

While the discussion of aesthetical values in IS is not well developed, there is a much stronger engagement with ethical values in the IS literature. Ethics is the philosophical discipline interested in questions of right and wrong, good and bad, do's or don't. One key question of ethics is the basis upon which one can determine what is good, which is in many cases linked to a metaphysical position (Moore, 1993, p.110). Ethics has been a key concern in philosophy since Antiquity and in many philosophical systems it has

been the key question (Nussbaum, 2009). One way of classifying ethical theories is by looking at their relationship to some of the dominant traditions, notably virtue ethics, duty ethics (*deontology*) and consequentialism. Virtue ethics seeks to answer the question what is good by focusing on the character of the agent in question. Strongly associated with classical Greek philosophy and in particular Aristotle (Aristotle, 1934), virtue ethics locates the good in the reasoned character of the agent who knows to avoid the extremes to act virtuously. The deontological tradition, on the other hand, looks for the good in the motivation of the agent. The key proponent of this type of thinking is Immanuel Kant (1788; 1797) who believed that the agent's duty can be deduced from reason. The key formulation of this idea can be found in the Categorical Imperative that holds that one should "Act only on that maxim by which you can at the same time will that it should become a universal law" (translation according to (Bowie, 1999, p. 14)). The third frequently cited stream of ethical theories builds on the insight that determining good and bad needs to take into considerations the consequences of acts. This type of reasoning, often called consequentialist is strongly linked with the utilitarian tradition and individuals like Mill (1861) and Bentham (1780/2007).

This set of three ethical theories or family of theories does not cover all possible theories, but it has been very influential in informing the debate about the ethics of computing. Considerations of ethics of computing can be traced back to the early days of digital computing (Wiener, 1954). This has led to the development an ongoing discourse around computer ethics (Bynum, 2015; Bynum & Rogerson, 2003) and information ethics (Capurro, 2006; Floridi, 1999). The discussion of ethical questions in IS has been informed to some degree by computer and information ethics but it has also developed its own flavour of the debate. The probably most prominent contribution to ethics in IS by Mason (1986) who defined the topics of the debate using the acronym

PAPA (privacy, accuracy, property, accessibility) for years to come and it remains highly influential. There is a rich history of dealing with ethics in IS (Stahl, 2012a) which tends to focus on particular issues such as data protection (Culnan & Williams, 2009; Dulipovici & Baskerville, 2007) or professional behaviour (Stoodley et al., 2010) (Towell et al., 2004). There is also some debate about ethical theories and their relevance to IS (Bull, 2009; Mingers & Walsham, 2010; Walsham, 1996).

What all of these ethical discussions in IS have in common and share with most of the traditional philosophical ethical discourse is an assumption of a relatively low epistemic and normative uncertainty. This means that the consequences of actions are predictable and that there is a relatively high level of agreement on the principles of what counts as good or bad. Both of these assumptions are increasingly open to doubt. The rapid spread of current and emerging ICTs through society and the increasing capabilities of these new technologies render it difficult to ascertain facts and their moral evaluation. A good example of that is the current discussion around artificial intelligence. It is not always easy to distinguish hype and fiction from factual descriptions and there is often little agreement on whether novel technologies, such as autonomous cars, are acceptable or under which conditions they would be.

Another recent phenomenon that puts the assumption that ethical discourse is of a low epistemic and normative significance is the high rate of consumption of fake news and its debilitating effects (Allcott & Gentzkow, 2017). This phenomenon not only refers to epistemological questions but had a direct impact on what should count as a right and appropriate course of action. Fake news is closely related to questions of political action, given the highly visible use of US president Trump's use of the term (Lanktree, 2018). It also spills over into questions of manipulation of the electorate which several

organisations are accused of, notably the UK company Cambridge Analytica and their unauthorised use of psychographics on more than 87 million Facebook users (Cadwalladr & Graham-Harrison, 2018). The psychologist and neuroscientist who supplied Cambridge Analytica with his research went through a review board and followed the necessary ethical rules, but nevertheless was not aware that the research was used for illegal and unethical use. As a result of these events, ethical rules as they apply to academicians are being reexamined (Editorials Nature, 2018). Despite over a decade of research in privacy and security of information in IS (Acquisti & Gross, 2006; Lowry et al., 2017; Posey et al., 2017), we cannot assume that the problem is solved. A new approach to privacy and security may be necessary to overcome these challenges.

This "weaponization of information" (Waltzman, 2017), the ability for mass manipulation by rogue elements to gain an advantage over others, shows the direct link between the axiological issues of ethics, good and right and politics. This link was well accepted in classical philosophy and this traditional link seems to be revived in 21st century socio-technical reality. However, the field of IS does not seem well equipped to deal with these challenges. Where in the past the focus of the field may have been predominantly on organisational use of ICT, the dividing line between organisational, personal and societal use is now much more difficult to draw. Similarly, it has become more difficult to determine what counts as an information system. Uncertainty and risk have long been a compounding factor of ethical debates, but they are now turning into a constitutive part of ethics.

This means that ethical questions now require a more explicit metaphysical and epistemological discussion. In order to determine what is good, we need to know what is. And, to make matters worse, these discussions often have to be undertaken before

there can be certainty concerning the capabilities of new technologies. Current debates of the role that IT play in society would benefit greatly from the expertise that the IS community has built up over a long period. But this implies that IS scholars explicitly engage with these questions. A better understanding of axiological questions can help IS scholars to identify relevant positions and contribute to the debate. Even more importantly, this axiological understanding needs to be embedded in consistent metaphysical and epistemological positions. This can then inform practical interventions where axiological insights can be used to inform practical debates that aim to shape policy, political practice and public discourses.

Moving Forward

It is reasonable to assume that people are rightly confused about the merits of capitalism and socialism or in the case of IS research, between positivism and non-positivists, between diversity or unity, between rigor and relevance, between theory-heavy and theory-light research or whatever central issue that's captured the minds of IS researchers; so we should not rush to any conclusions on these topics before examining what useful things can be said about both sides of the alleged divide. To conclude that one or the other is good or bad, or that one has no relationship to the other is to be dismissive of the complex and kaleidoscopic nature of life and reality.

This is what writing philosophy is all about. Granted, many important principles depend on logic, and rational thinking, and rely on language as a means of communication, but an overreliance on logic, i.e., being overly logocentric, prevents us from understanding other important principles and values that cannot be simply communicated with logic or words, but require a treasure of background knowledge and

the ability to go beyond the logic and embrace equally if not more important aspects of life and living. Someone who is capable of solving a mathematical equation tells us very little about that person's ability to make a success out of a marriage, business or academic relationships. Not overly relying on logic doesn't imply relativism or incoherence. Coherency is the hallmark of scholarship. What's required to open one's mind to the possibility of a different but nevertheless coherent thought.

The first step in opening up our minds to alternative thinking is to identify what Derrida calls the *centre* which everything that is significant refers to. In the case of IS, the philosophical centre that has guided IS research for many years was and is positivism. Although other centres have attempted to decentre it, they have made only modest progress; thus, other research approaches such as interpretivism or critical theory can only command a limited amount of influence in structuring how IS research proceeds. As Derrida says, with that centre, there is a lack of play possible within the field since everything needs to refer back to that original centre that guarantees all the signifiers' ontological fixity and stability. This traditional understanding goes all the way back to Descarte's notion of the cogito that fixes the absolute space for everything else. It is convenient for researchers because it projects a ready-made template that can be easily imitated and recognized as being the standard method. This tendency towards a standard method in the form of epistemology is a natural development of any field on the road towards maturity; however, as a result, the meaning of IS research is therefore fixed to specific research archetypes, bounded and traditional to that eidos (intellectual character) of the field. Notwithstanding this preferred orthodoxy, there is a greater issue at stake, that is less a matter of choosing between positivism or other approaches and more of an attitude towards research that favours the "safe" mechanical research

approach that seemingly guarantees results. Such tendencies exists even in non-positivist research, for as Myers and Klein (2011, p. 18) note, “We also caution against our principles being used in a mechanistic manner … scholars need to exercise their judgement and discretion in deciding whether, how, and which of the principles should be applied in any given research project.” Such a state of affairs engenders an inability for the IS field to be “box breaking,” impactful or innovative in its studies. There will always be a need to introduce or improve on methods but, at the same time, if those methods are not applied or applied in a sterile, mechanical manner, progress will be disproportionally less than the effort expended. As Roszak (1972, p. 202) succinctly describes this over-emphasis on method:

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

Writing philosophy is the exact opposite of such a strategy in research, for there can never be a cookie-cutter way to philosophize. An image of what philosophy in IS entails is needed to discourage the kind of mimicry that Roszak talks about. Alternative reasoning processes are slowly gaining ground in IS research.. Many of these alternative reasoning, argumentation and rhetorical styles are being welcomed into the IS field. A special issue in the *European Journal of Information Systems* (Avital et al., 2017) on “Alternative Genres in Information Systems Research” introduces to the IS community various literary and narrative rhetorical styles that are suited for philosophical argumentation. These literary and narrative-type argumentation styles, which are briefly discussed in this section, are less popular among IS authors, despite their suitability for the subject-matter of IS-the human and social side of the IS phenomena.

Synopsis of Articles

Our call for papers for this Special Issue generated considerable interest, with over 40 submissions, in many varying philosophical topics ranging from metaphysical topics discussing the nature of IT and IS, theories and theorizing, and proposing various epistemological approaches. The quality of the discourse of the submissions was impressive and given the limited space allowed for the Special Issue, it was a challenge to choose just six articles. The authors of these six articles represented both senior scholars in IS as well as younger authors, a result that is very gratifying to witness, given the goals of Special Issue to encourage younger authors and novel thinking in IS philosophy. The editors also took pains to ensure that the language of the articles in the Special Issue is accessible to all IS researchers regardless of their background in philosophy.

Table 2: Summary of Articles

Title	**Authors**	**Focus**	**Contribution**
The IT Artefact and its Spirit: A Nexus of Human Values, Affordances, Symbolic Expressions, and IT Features	Mustapha Cheikh-Ammar	Metaphysics and axiology of IT	Offers a solution to the problems surrounding the conceptualization of the IT artefact by integrating features, symbolic expressions and affordances into values within a specified context that together emerge as the essence of IT in terms of its "spirit."
What's in a Face? Making Sense of Tangible Information Systems in terms of Peircean Semiotics	Paul Beynon-Davies	Metaphysics and Epistemology of IS	Introduces a cross-disciplinary Peircean alternative that views the IT artefact as an emergent and dynamic IS artefact instead of configurable stable bundles of hardware and software
Critical Realist Scripts for Creative Theorizing in	Clay Williams & Donald Wynn,	Metaphysics, Epistemology and	Argues for how critical realism addresses the dominant theorizing

Information Systems	Jr.	Rationality	approaches within IS that lack diversity and practical relevance, excessively borrow, and inadequately internalize IT
From Sovereign IT Governance to Liberal IT Governmentality? A Foucauldian Analogy	Aurélie Leclercq-Vandelannoitte and Emmanuel Bertin	Axiology and Rationality	Applies an explicit analogical reasoning to build a foundation based on Michel Foucault's liberal model for research in IT governance
Phronesis, Argumentation and Puzzle Solving in IS Research: Illustrating an Approach to Phronetic IS Research Practice	Ojelanki Ngwenyama and Stefan Klein	Axiology, Rationality and Epistemology	Discusses how a third type of knowledge, Aristotle's phronesis, informs the ethical application of episteme (sciences) and techne (technology) and addresses the increasingly problematic value conflicts arising from the embeddedness of IS in everyday life.
Philosophical Foundations for Informing the Future(s) through IS Research	Elizabeth Davidson, Mike Chiasson, and Jenifer Winter	Philosophy of technology and Axiology	Draws on critical theory of technology, in particular Feenberg's work, to demonstrate how IS research can and should take into consideration future, using the example of big data analysis.

The IT Artefact and its Spirit: A Nexus of Human Values, Affordances, Symbolic Expressions, and IT Features

The synopsis begins with the article that discusses the "first philosophy" – metaphysics. This article is timely not only because its philosophical subject matter is rarely covered in IS research, but also because it applies metaphysics to inform the debate on the IT artefact, a core concern that is naturally addressed by metaphysics. This approach to understanding technology differs from how the field traditionally understands technology – as a bundle of features and secondary qualities—which limits the way of thinking of technology to only what is superficially perceptible. As Heidegger (1977)

puts it, when we think about a "tree," we don't just think about how tall it is, or the about the colour of its bark, the essence of the tree goes beyond those features and secondary qualities. The ongoing battle between those who reap financial benefits from deforestation, and those who oppose it, understand the relationship between trees and climate change and find solace and inspiration in trees, illustrates the difference in thinking about trees. Similarly, when we think about technology, Heidegger says, it is "by no means anything technological" (p. 4). What Heidegger means by this is that we miss the point when we merely think of technology as just a means to an end. Our connection to and dependence on technology is much more primal, and consequently, needs to feature prominently in our research. Technology, as alluded earlier, is not just technological, it is social, ethical and imbued with spirit, which is the discussion this article explores by linking the technologies secondary qualities and affordances with values and spirit.

What's in a face? Making sense of tangible information systems in terms of Peircean semiotics

Beynon Davies' article reflects the kind of philosophy that the Special Issue is looking for, that is the kind that links metaphysics, epistemology, axiology and rationality into a theory that carries implications for many fields. Peirce's metaphysics rests on his logic or rationality, whereas his epistemology, most famously, his version of pragmatism was inspired by Kantian epistemology and ethics. In all of his well-known contributions, be it semiotics, or logic and abductive reasoning, we see the cross-over from one philosophical field to another. Beynon Davies' article folds all of these philosophical inspirations, and specifically semiotics, into design science and demonstrates how Peirce's conceptualization of the sign brings together inquiry, meaning and truth. For information systems, this pragmatic approach to philosophy is especially pertinent since

Peirce is well trained in the sciences, especially physics, and he constantly applies his philosophy to benefit the sciences. Beynon Davies' article shows how such an approach benefits design science and informs our understanding of sociomateriality in the case of visual devices. Viewed from the perspective that signs are processes instead of static hardware-software artefacts, the IS artefact can be research as an emergent phenomenon.

Critical Realist Scripts for Creative Theorizing in Information Systems

Addressing the perennial issues facing the IS field that demonstrate a lack of diversity in theories and theorizing, struggle in balancing reference theories with empirics as well as bridging with practitioners, and inadequately internalize the information technology (IT) artefact into its research, Williams and Wynn propose critical realism as a potential solution. Responding to what Grover and Lyytinen call the "dominant epistemic script" in IS research that tows the line of the status quo, the authors describe the alternative ontological and epistemological foundations that are built into critical realism, which links what is observed with causal mechanisms within the observed phenomena through a logical process of abduction and retroduction (pulling once again on the philosophy of Peirce). As they present their case, the problem of diversity and the balance between borrowing theories and empirics is addressed via critical realism's retroductive process of theorizing that forces researchers to find a balance between data-driven theorizing and existing theories. The study of the network of causal mechanisms, which include the properties and forces embedded in the digital artefacts themselves, enables a focus on the technology's affordances (which links to what the first article discussed) and its ongoing interactions with human and social entities, thereby helping to bridge the research to practitioner concerns.

From sovereign IT governance to liberal IT governmentality? A Foucauldian analogy

Inspired by Michel Foucault's concept of governmentality—the rationality of governing—Leclercq-Vandelannoitte and Bertin apply an explicit analogical reasoning approach to IT governance to build a solid foundation upon which future research could grow. In light of recent events such as the email scandals that derailed the Clinton presidential campaign in 2016, the increasing frequency of leaks and data breaches, and President Trump's overindulgence of his Twitter account, the issue of IT governance has become increasingly central to the socio-political domain. Yet, IS research has made only modest progress on what is arguably the weakest link in the overall internal corporate governance structure (Brown & Grant, 2005). The authors propose and argue for a liberal model for IT governance based on the Foucauldian concept of power-knowledge relations that finds a balance between encouraging free, innovative and effective use of IT within corporate environments and maintaining regulatory control and enhancing accountability. This article also demonstrates an innovative theorizing process in the form of explicit analogical reasoning that does not rely on oft-used box-arrow modelling and diagrams and offers an alternative to developing similarity and causal relations between core concepts in a theoretical framework. As a result, core IS concepts such as usage are redefined and enhanced.

Phronesis, Argumentation and Puzzle Solving in IS Research: Illustrating an Approach to Phronetic IS Research Practice

Following from the disruptive and even chaotic consequences of technology on society, researchers are finding it difficult to reconcile improvements in productivity and efficiency with increasing value conflicts. Knowledge associated with the sciences (episteme) and technology (techne) ignores the intricate relationships between

consequences of technology and their implications on the value systems and beliefs of society. Enter phronesis (practical wisdom), the Aristotelian category of knowledge that informs the ethical applications of both science and technology, bringing into the discussion what it means to, in a practical sense, act virtuously. The concept of phronesis is yet another philosophical concept that cuts across long-held divisions and categories in IS research and seeks both individual and social well-being. Phronetic research cuts across positivist, interpretivist or critical research divisions, and automatically bridges with issues of praxis, for it brings all of their salient points into view. It is dialogical, non-dualistic, reflective, hermeneutic and value-laden; yet at the same time incorporates the principles of empirical analysis that is the bedrock of positivist science. Its concern with details and particulars makes it amenable to substantive theory development. Following the manner in which Stephen Toulmin and Bent Flyvbjerg, and to a lesser extent Hans-Georg Gadamer, develop Aristotle's concept of phronesis, the authors study the case of the failure of a German digitized drug-dispensing infrastructure designed to reduce non-compliance amongst patients using individualized medication blisters. The phronetic analysis of the national initiative demonstrates how, despite evidence of enhanced effectiveness of the proposed project, opponents of the project were able to develop a narrative, with its own demonstrable evidence, to undermine and delegitimize the proposed project, despite clear economic efficiencies, improved visibility, and prevention of adverse drug interactions built into the digital infrastructure.

Philosophical foundations for informing the future(s) through IS research

One of the glaring ironies of the study of technology in the IS field is the dearth of any philosophy of technology. Not surprisingly, IS scholars continue to lament the minimal attention that the field has paid to technology itself (Orlikowski & Iacono, 2001;

Akhlaghpour et al., 2013). The article by Davidson, Chiasson & Winter directly addresses this gap. They frame their paper in terms of the responsibilities of IS researchers with regards to the outcomes of their work on sociotechnical practices, and apply Feenberg's (2010a; 2010b) critical philosophy of technology that distinguishes between technologies that embed technical rationality from technologies that embed underlying societal values, interests, and priorities. They achieve this by drawing on existing future and foresight studies and integrating those with ideas about the potentiality and actuality of technology as developed by Feenberg. These ideas which were introduced under the concept of responsible research and innovation in IS (Stahl, 2012b; Stahl et al., 2014) are then illustrated using examples from big data research.

We hope that the set of papers brought together in this special issue demonstrate the significance and importance of philosophical work in IS. They draw from different philosophical fields and provide important bases for existing and future research. We hope this brief introduction to the potential of philosophy in IS will inspire a stream of research that will locate IS research as a major reference discipline for studies in novel and emerging technologies.

References

AAKHUS M, ÅGERFALK PJ, LYYTINEN K AND TE'ENI D (2014) Symbolic action research in information systems: Introduction to the special issue. *MIS Quarterly* 38(4), 1187-1200.

ACQUISTI A AND GROSS R (2006) Imagined communities: awareness, information sharing, and privacy on the Facebook. In *Privacy Enhancing Technologies: 6th international workshop, PET 2006*, pp. 36–58, Springer, Cambridge.

AKHLAGHPOUR S, WU J, LAPOINTE L AND PINSONNEAULT A (2013) The ongoing quest for the IT artifact: Looking back, moving forward. *Journal of Information Technology* 28(2), 150–166.

ALLCOTT H AND GENTZKOW M (2017) Social media and fake news in the 2016 election. *Journal of Economic Perspectives* 31(2), 211–236.

ALTER S (2015) The concept of 'IT artifact' has outlived its usefulness and should be retired now. *Information Systems Journal* 15(1), 47–60.

ARISTOTLE (1934) *Nicomachean Ethics.* Translated by RACKHAM H. William Heinemann Ltd, London.
ARISTOTLE (1998) *Metaphysics.* Translated by LAWSON-TANCRED H. Penguin Group, New York.
AVITAL M, MATHIASSEN L AND SCHULTZE U (2017) Alternative genres in information systems research. *European Journal of Information Systems* 26(3), 240–247.
BASKERVILLE RL AND MYERS MD (2002) Information systems as a reference discipline. *MIS Quarterly* 26(1), 1-14.
BENBASAT I, GOLDSTEIN DK AND MEAD M (1987) The Case Research Strategy in Studies of Information Systems. *MIS Quarterly* 11(3), 369-386.
BENTHAM J (1780/2007) *An Introduction to the Principles of Morals and Legislation.* Dover Publications, Inc., Mineola, NY.
BOELL SK (2017) Information: Fundamental positions and their implications for information systems research, education and practice. *Information and Organization* 27(1), 1-17.
BORGMANN A (1984) *Technology and the Character of Contemporary Life: A Philosophical Inquiry*. University of Chicago Press Chicago.
BOWIE NE (1999) *Business Ethics: A Kantian Perspective*. Wiley-Blackwell, New York.
BROWN AE AND GRANT GG (2005) Framing the frameworks: A review of IT governance research. *Communications of the Association for Information Systems* 15(1 Art 38), 696-712.
BULL C (2009) A review of ethical theory in the "upper echelons" of information systems research. In *Proceedings of the 17th European Conference on Information Systems (ECIS 2009)*, Verona, Italy. http://aisel.aisnet.org/ecis2009/9
BYNUM T (2015) Computer and Information Ethics, *Stanford Encyclopedia of Philosophy*, Metaphysics Research Lab, Stanford University, Stanford, CA, https://plato.stanford.edu/archives/win2016/entries/ethics-computer/.
BYNUM TW AND ROGERSON S (Eds.) (2003) *Computer Ethics and Professional Responsibility.* Wiley-Blackwell, New York.
CADWALLADR C AND GRAHAM-HARRISON E (2018) Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach, *The Guardian*, Sat 17, March 2018, London, UK, https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election.
CAPURRO R (2006) Towards an ontological foundation of information ethics. *Ethics and Information Technology* 8(4), 175–186.
CHEN W AND HIRSCHHEIM R (2004) A Paradigmatic and Methodological Examination of Information Systems Research from 1991 to 2001. *Information Systems Journal* 14(3), 197-235.
COOK TD AND REICHARDT CS (Eds.) (1979) *Qualitative and Quantitative Methods in Evaluation Research.* Sage, Beverly Hills.
CRESWELL JW (2003) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. SAGE Publications, Thousand Oaks, CA.
CROTTY M (1998) *The Foundations of Social Research*. Sage, Thousand Oaks.
CULNAN MJ AND WILLIAMS CC (2009) How ethics can enhance organizational privacy: Lessons from the ChoicePoint and TJX data breaches. *MIS Quarterly* 33(4), 673-687.

CYR D, HEAD M AND IVANOV A (2006) Design aesthetics leading to m-loyalty in mobile commerce. *Information & Management* 43(8), 950–963.
DARWIN C (1859) *On the Origin of Species*. John Murray, London.
DAVIS FD, JR. (1986) A technology acceptance model for empirically testing new end-user information systems : theory and results, *Sloan School of Management*, Massachusetts Institute of Technology, Cambridge, MA.
DERRIDA J (1976) *Of Grammatology*. Johns Hopkins University Press, Baltimore, MD.
DERRIDA J (1978) *Writing and difference*. University of Chicago Press, Chicago, IL.
DESCARTES R (1630) Letter to Mersenne, April 15, 1630, Jonathan Bennett, http://www.earlymoderntexts.com/assets/pdfs/descartes1619_1.pdf.
DESCARTES R (1641/2014) *René Descartes: Meditations on First Philosophy: With Selections from the Objections and Replies*. Translated by COTTINGHAM J. Cambridge University Press, Cambridge, UK.
DESCARTES R (1644/1983) *Principles of Philosophy*. Reidel Dordrecht, Holland.
DUBÉ L AND PARÉ G (2003) Rigor in Information Systems Positivist Case Research: Current Practices, Trends, and Recommendations. *MIS Quarterly* 27(4), 597-635.
DULIPOVICI A AND BASKERVILLE R (2007) Conflicts between privacy and property: The discourse in personal and organizational knowledge. *Journal of Strategic Information Systems* 16(2), 187-213.
DUSEK V (2006) *The Philosophy of Technology*. Blackwell Publishing, Malden, MA.
EDITORIALS NATURE (2018) Digital trust. *Nature* 555, 560.
ELLUL J (1973) *The Technological Society*. Alfred A. Knopf, New York.
ENGEL SM (1999) *With Good Reason: An Introduction to Informal Fallacies*. St. Martin's Press, New York.
EVANS JSBT AND OVER DE (1996) *Rationality and Reasoning*. Psychology Press, Hove, UK.
FEENBERG A (1991) *The Critical Theory of Technology*. Oxford University Press, New York.
FEENBERG A (2010a) *Between Reason and Experience: Essays in Technology and Modernity*. MIT Press, Cambridge, MA.
FEENBERG A (2010b) Ten paradoxes of technology. *Techné* 14(1), 3-13.
FISHBEIN M (1961) An investigation of the relationship between beliefs about an object and the attitude toward that object, University of California, Los Angeles.
FISHBEIN M (1963) An investigation of the relationship between beliefs about an object and the attitude toward that object. *Human Relations* 16(3), 233-240.
FISHBEIN M AND AJZEN I (1972) Attitudes and opinions. *Annual Review of Psychology* 23(1), 487-544.
FISHBEIN M AND AJZEN I (1975) *Belief, Attitude, Intention and Behavior*. Addison-Wesley, Reading, MA.
FLORIDI L (1999) Information ethics: On the philosophical foundation of computer ethics. *Ethics and Information Technology* 1(1), 37–56.
FLORIDI L (2002) What is the philosophy of information? *Metaphilosophy* 33(1/2), 123-145.
FLORIDI L (2011) *The Philosophy of Information*. Oxford University Press, New York, NY.
FOUCAULT M (1980) *Power/Knowledge : Selected Interviews and Other Writings, 1972-1977*. Pantheon Books, New York.
FRENKEL CKAS (2018) Facebook says Cambridge Analytica harvested data of up to 87 million users, *New York Times*, April 4,

https://www.nytimes.com/2018/04/04/technology/mark-zuckerberg-testify-congress.html.
GARBER M (2013) Ghost army: The inflatable tanks that fooled Hitler, *The Atlantic*, April 10, 2018, https://www.theatlantic.com/technology/archive/2013/05/ghost-army-the-inflatable-tanks-that-fooled-hitler/276137/.
GAUCH HG (2003) *Scientific Method in Practice*. Cambridge University Press, Cambridge, UK.
GLASER BG (1978) *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory*. The Sociology Press, Mill Valley, CA.
GREGOR S (2006) The nature of theory in information systems. *MIS Quarterly* 30(3), 611-642.
GROVER V AND LYYTINEN K (2015) New State of Play in Information Systems Research: The Push to the Edges. *MIS Quarterly* 39(2), 271-296.
HABERMAS J (1971) *Toward a Rational Society: Student Protest, Science and Politics*. Beacon Press, Boston.
HABERMAS J (1981) *Theorie des Kommunikativen*. Handelns, Suhrkamp.
HABERMAS J (1996) *Between Facts and Norms: Contributions to a Discourse Theory of Law and Democracy*. MIT Press, Cambridge, MA.
HACKING I (1983) *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. Cambridge University Press, Cambridge.
HASSAN NR (2011) Is information systems a discipline? Foucauldian and Toulminian insights. *European Journal of Information Systems* 20(4), 456-476.
HASSAN NR (2014) Paradigm lost … paradigm gained: a hermeneutical rejoinder to Banville and Landry's 'Can the Field of MIS be Disciplined?'. *European Journal of Information Systems* 23(6), 600-615.
HASSAN NR AND MINGERS JC (in print) Reinterpreting the Kuhnian paradigm in information systems. *Journal of the Association for Information Systems*,
HEIDEGGER M (1977) *The Question Concerning Technology, and Other Essays*. Harper & Row, New York.
HEVNER AR, MARCH ST, PARK J AND RAM S (2004) Design Science in Information Systems Research. *MIS Quarterly* 28(1), 75-105.
HIRSCHHEIM R AND KLEIN HK (2012) A glorious and not-so-short history of the information systems field. *Journal of the Association for Information Systems* 13(4), 188-235.
HIRSCHHEIM RA (1985) Information systems epistemology: an historical perspective. In *Research Methods in Information Systems*, pp. 13-36, Elsevier Science Publishers B.V.
IHDE D (1979) *Technics and Praxis*. D. Reidel Publishing Company, Boston.
IHDE D (1990) *Technology and the Lifeworld*. Indiana University Press, Bloomington, IN.
IHDE D (1993) *Philosophy of Technology: An Introduction*. Paragon House, New York.
INTRONA LD (2003) Disciplining information systems: Truth and its regimes. *European Journal of Information Systems* 12(3), 235-240.
JAMES W (1907) *Pragmatism*. Project Gutenberg.
KAMINSKA I (2018) A lesson in fake news from the info-wars of ancient Rome, *Financial Times*, January 17, Accessed April 10, 2018, available from https://www.ft.com/content/aaf2bb08-dca2-11e6-86ac-f253db7791c6.
KANT I (1788) *Kritik der praktischen Vernunft*. Reclam, Ditzingen.
KANT I (1797) *Grundlegung zur Metaphysik der Sitten*. Reclam, Ditzingen.

KEEN PGW (1980) MIS research: reference disciplines and a cumulative tradition. In *International Conference on Information Systems (ICIS)* (MCLEAN E, Ed), pp. 9-18, ACM Press, Philadelphia, PA

KELVIN WT, TAIT PG AND DARWIN GH (1888) *Treatise on Natural Philosophy*. Cambridge University Press, Cambridge, UK.

KLEIN HK AND MYERS MD (1999) A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly* 23(1), 67-94.

KUHN T (1962) *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago.

KUHN TS (1957) *The Copernican Revolution: Planetary Astronomy in the Development of Western Thought*. Harvard University Press, Cambridge.

LANKTREE G (2018) Nobel prize-winning economist calls Trump '2,000-lie man' after getting 'fake news' award, *Newsweek*, March 25, 2018, http://www.newsweek.com/nobel-prize-winning-economist-calls-trump-2000-lie-man-after-getting-fake-news-784497.

LEAR J (1988) *Aristotle: The Desire to Understand*. Cambridge University Press, New York.

LEE AS (1989) A Scientific Methodology for MIS Case Studies. *MIS Quarterly* 13(1), 33-52.

LEE AS (1991) Architecture as a Reference Discipline for MIS. In *Information Systems Research: Contemporary Approaches and Emergent Traditions* (NISSEN H-E, KLEIN HK AND HIRSCHHEIM R, Eds), pp. 573-592, Elsevier North-Holland, Amsterdam.

LEE AS (2010) Retrospect and prospect: information systems research in the last and next 25 years. *Journal of Information Technology* 25(4), 336-348.

LEE AS AND HUBONA GS (2009) A scientific basis for rigor in information systems research. *MIS Quarterly* 33(2), 237-262.

LOWRY PB, DINEV T AND WILLISON R (2017) Why security and privacy research lies at the centre of the information systems (IS) artefact: proposing a bold research agenda. *European Journal of Information Systems* 26(6), 546-563.

MANTERE S AND KETOKIVI M (2013) Reasoning in organization science. *Academy of Management Review* 38(1), 70-89.

MARCUSE H (1964) *One Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Beacon Press, Boston.

MARKUS ML AND ROBEY D (1988) Information technology and organizational change: Causal structure in theory and research. *Management Science* 34(5), 583-598.

MARKUS ML AND ROWE F (forthcoming) Is IT changing the world? Conceptions of causality for information systems theorizing. *MIS Quarterly*,

MASON RO (1986) Four ethical issues of the information age. *MIS Quarterly* (March), 12-May.

MASON RO AND MITROFF II (1973) A Program for Research on Management Information Systems. *Management Science* 19(5), 475-487.

MCGRANAHAN C (2017) An anthropology of lying: Trump and the political sociality of moral outrage. *American Ethnologist* 44(2), 243–248.

MCKINNEY EH, JR. AND YOOS CJ (2010) Information about information: A taxonomy of views. *MIS Quarterly* 34(2), 329-344.

MERTON RK (1957) Priorities in scientific discovery. *American Sociological Review* 22(6), 635-659.

MILL JS (1861) *Utilitarianism*. Hackett Publishing Company, Inc., Indianapolis, IN.

MINGERS J (2001) Combining IS Research Methods: Towards a Pluralist Methodology. *Information Systems Research* 12(3), 240-259.
MINGERS J (2003) The paucity of multimethod research: a review of the information systems literature. *Information Systems Journal* 13(3), 233-249.
MINGERS J (2004) Paradigm Wars: Ceasefire Announced Who Will Set Up the New Administration. *Journal of Information Technology* 19(3), 165-171.
MINGERS J AND STANDING C (2017) What is information? Toward a theory of information as objective and veridical. *Journal of Information Technology* https://doi.org/10.1057/s41265-017-0038-6,
MINGERS J AND WALSHAM G (2010) Toward ethical information systems: The contribution of discourse ethics. *MIS Quarterly* 34(4), 833-854.
MINGERS JC (1995) Information and meaning--foundations for an intersubjective account. *Information Systems Journal* 5(4), 285-306.
MITCHAM C (1994) *Thinking through Technology: The Path between Engineering and Philosophy*. The University of Chicago Press, Chicago.
MOORE GE (1993) *Principia Ethica: With the Preface to the Second Edition and Other Papers*. Cambridge University Press, Cambridge, UK.
MUMFORD E, HIRSCHHEIM RA, FITZGERALD G AND WOOD-HARPER AT (Eds.) (1985) *Research Methods in Information Systems, Proceedings: IFIP WG 8.2 Colloquium, Manchester, 1-3 September, 1984.* Elsevier Science Publishers B. V., North Holland.
MYERS MD AND KLEIN HK (2011) A set of principles for conducting critical research in information systems. *MIS Quarterly* 35(1), 17-36.
NEWTON I (1687) *Philosophiæ Naturalis Principia Mathematica (The Mathematical Principles of Natural Philosophy)*. Joseph Streater for the Royal Society, London.
NUSSBAUM MC (2009) *The Therapy of Desire Theory and Practice in Hellenistic Ethics* Princeton University Press, Princeton, NJ.
ORLIKOWSKI WJ AND BAROUDI JJ (1991) Studying information technology in organizations: research approaches and assumptions. *Information Systems Research* 2(1), 1-28.
ORLIKOWSKI WJ AND IACONO CS (2001) Research commentary: desperately seeking the 'IT' in IT research--a call to theorizing the IT artifact. *Information Systems Research* 12(2), 121-134.
POPPER KR (1966) *The Open Society and Its Enemies, Vol. 2: Hegel, Marx, and the Aftermath*. Princeton University Press, Princeton, CA.
POSEY C, RAJA U, CROSSLER RE AND BURNS AJ (2017) Taking stock of organisations' protection of privacy: categorising and assessing threats to personally identifiable information in the USA. *European Journal of Information Systems* 26(6), 585-604.
REICHARDT CS AND RALLIS SF (1994) *The Qualitative-Quantitative Debate: New Perspectives*. Jossey-Bass Publishers, San Francisco, CA.
RESCHER N (2005) *Value Matters: Studies in Axiology*. Ontos-Verlag, Frankfurt.
ROSZAK T (1972) *Where the Wasteland Ends; Politics and Transcendence in Postindustrial Society*. Doubleday, Garden City, N.Y.
SARKER S AND LEE AS (2002) Using a Positivist Case Research Methodology to Test Three Competing Theories-in-Use of Business Process Redesign. *Journal of the AIS* 2(7),
SCHRÖDINGER E (1945) *What is Life?: The Physical Aspect of the Living Cell*. Cambridge University press, Cambridge, UK.

SCHWARTZ DG (2011) An Aristotelian view of knowledge for knowledge management. In *Encyclopedia of Knowledge Management* (SCHWARTZ DG AND TE'ENI D, Eds), pp. 39-48, IGI Global, Hershey, PA.
SPINOZA BD (1663/1961) *The Principles of Descartes' Philosophy*. The Open Court Publishing Company, La Salle, IL.
STAHL BC (2012a) Morality, Ethics, and Reflection: A Categorization of Normative IS Research. *Journal of the Association for Information Systems* 13(8), 636-656.
STAHL BC (2012b) Responsible research and innovation in information systems. *European Journal of Information Systems* 21(3), 207–211.
STAHL BC, EDEN G, JIROTKA M AND COECKELBERGH M (2014) From computer ethics to responsible research and innovation in ICT: The transition of reference discourses informing ethics-related research in information systems. *Information & Management* 51(6), 810-818.
STEWART E (2018) What the government could actually do about Facebook, *Vox*, April 10, Vox Media, Inc., Accessed April 11, 2018, available from https://www.vox.com/policy-and-politics/2018/4/10/17208322/facebook-mark-zuckerberg-congress-testimony-regulation.
STOODLEY I, BRUCE C AND EDWARDS S (2010) Expanding ethical vistas of IT professionals. *Information Systems Frontiers* 12(4), 379-387.
TEICHMAN J AND EVANS KC (1995) *Philosophy: A Beginner's Guide*. Wiley-Blackwell New York.
TOWELL E, THOMPSON JB AND MCFADDEN KL (2004) Introducing and developing professional standards in the information systems curriculum. *Ethics and Information Technology* 6(4), 291–299.
TRACTINSKY N (2004) Toward the Study of Aesthetics in Information Technology. In *International Conference on Information Systems (ICIS 2004), Dec 12-15*, pp. 771-780, Washington DC
TUCH AN, ROTH SP, HORNBÆK K, OPWIS K AND BARGAS-AVILA JA (2012) Is beautiful really usable? Toward understanding the relation between usability, aesthetics, and affect in HCI. *Computers in Human Behavior* 28(5), 1596–1607.
VENKATESH V, BROWN S AND BALA H (2013) Bridging the Qualitative–Quantitative Divide: Guidelines for Conducting Mixed Methods Research in Information Systems. *MIS Quarterly* 37(1), 21-54.
VERBEEK P-P (2011) *Moralizing Technology: Understanding and Designing the Morality of Things*. University of Chicago Press, Chicago.
WALSHAM G (1995) Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems* 4(2), 74-81.
WALSHAM G (1996) Ethical theory, codes of ethics and IS practice. *Information Systems Journal* 6(1), 69-81.
WALTZMAN R (2017) The weaponization of information: The need for cognitive security, The RAND Corporation, Santa Monica, CA, https://www.rand.org/pubs/testimonies/CT473.html.
WASTELL D AND WHITE S (2010) Facts, myths and thought-styles… and a rallying cry for civic engagement. *Journal of Strategic Information Systems* 19(4), 307-318.
WEBER M (1978) *Economy and Society: An Outline of Interpretive Sociology*. University of California Press, Berkeley, CA.
WIENER N (1954) *The Human Use of Human Beings*. Houghton Mifflin Co., Boston.
WILLCOCKS L (2004) Foucault, power/knowledge and information systems: reconstructing the present. In *Social Theory and Philosophy for Information*

Systems (MINGERS J AND WILLCOCKS L, Eds), pp. 238-296, Wiley, Chichester, West Sussex, England.

WINNER L (1977) *Autonomous technology : Technics-Out-of-Control as a Theme in Political Thought*. MIT Press, Cambridge, MA.

WINNER L (1989) *The Whale and the Reactor : A Search for Limits in an Age of High Technology*. University of Chicago Press, Chicago.