Communications of the Association for Information Systems

Volume 43 Article 9

8-2018

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Essay DOI: 10.17705/1CAIS.04309 ISSN: 1529-3181

Is Information Systems a Science?

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Abstract:

Some researchers have compared the information systems discipline with the physical and biological sciences, which suggests that information systems sits in the same academic space as the physical and natural sciences. Indeed, the language and perceptions expressed in journals such as the *Transactions for Replication Research*, which refer to "scientific consensus" and the involvement of information systems researchers in "the quest for scientific advancement", supports this suggestion. In this paper, I argue that the view that information systems is a science in which general laws can be developed by applying statistical surveys and running laboratory experiments has negatively affected the development of the discipline. I argue that the discipline's nature is such that one cannot pitch it as a science. After briefly discussing the motivation and philosophy that might underlie the perception of information systems as a science, I offer an alternative view of information systems as a deep, complex, and multi-layered discipline in the humanities. I propose dance studies as an appropriate discipline to twin with information systems.

Keywords: Information Systems Discipline, Science and Humanities, Dance Studies.

This manuscript was solicited by the Department Editor for Debates, Karlheinz Kautz.

1 Introduction

Large statistical studies, extensive tables of numbers presented to three decimal places, accretions of influence diagrams built to ever-increasing levels of complexity, hypotheses supported or refuted by number-crunching, and quests for independent variables: such are the characteristics of much published information systems research. Several recent studies confirm that the information systems (IS) discipline has converged on a limited range of topics and methodologies. Does such convergence represent a discipline's maturation or stagnation? Palvia, Daneshvar, Ghoshal, Uppala, and Wang (2015) suggest that, "while many things have changed, much has remained the same in conducting IS research. Perhaps the IS researcher is slow to change and an introspection is clearly in order.". I would suggest that it is time to reignite the debate on the nature of information systems research and the underlying philosophy that drives information systems researchers. While environmental influences such as the demands of PhD students and the rigors of tenure may influence the evolution of information system research (see McBride, 2017), I would suggest that the malaise in information systems derives from much deeper philosophical concern about the nature of humanity and society that underlies the view that one can treat information systems as a science.

Stein, Galliers, and Whitley's (2016) recent study of information system trends as represented in ECIS over the last ten years suggests that information system academia has drifted into a cul-de-sac. Far from bringing cutting-edge ideas, insights, and wisdom to academics and practitioners across management and technology disciplines, information systems has become a side subject that concerns technology adoption. Stein et al. (2016) illustrate the predominance of positivist frameworks such as TAM and IS researchers' reluctance to pursue new avenues and take a systemic view of information systems as enshrined in the discipline's title.

It looks as if the discipline has retreated to the apparent safety of pure positivist statistical techniques. Case studies, reflection, creative qualitative research has been sidelined. In pursuing this certainty and safety, we observe a predominance of statistical studies. PhDs are considered valid if they identify hypotheses, run surveys, and process data *through* a statistical system such as AMOS. A concern with techniques such as structural equation modeling results in discussions about conclusions based on levels of statistical significance that professional statisticians would probably question. Frequently, the IS discipline accepts qualitative research only if authors have appropriately processed it through software to give it a positivist veneer and support the expression of numerical data derived from field work.

Has the information system community abandoned its responsibility to be thought leaders, to question and reflect on information systems practice, to draw on concepts from a range of disciplines, to establish new understanding and new methodological directions? Has it abandoned engagement and dialogue with practice and with other disciplines to pursue a scientific purism that is neither useful to practitioners nor philosophically justifiable?

In their study, Lui, Goncalves, Kostakos, and Xiao (2016) examine information systems themes that the major information systems journals have covered over 20 years. They found that the discipline has converged on technology adoption and acceptance. Furthermore, they show that adoption/acceptance, usage, and TAM form the motor theme of information systems research across 20 years of information systems research. Lui et al. point to the domination of TAM-related research in information systems. TAM has invaded 16 new application areas in the last decade. Lui et al. identify that much research now revolves around technology adoption. This evolution is not healthy; rather, it represents a slide into the safety of side waters to avoid negotiating the rapids of technological and social change. Our discipline seems trapped by a thematic myopia and a methodological conservatism.

Indeed, from analyzing 2,487 papers from 2004 to 2013, Palvia et al. (2015) found that IS research has displayed a methodological dependence on surveys and laboratory "experiments" (together, they accounted for 36.4 percent of the papers). They also show that mathematical modeling accounted for 7.5 percent of all papers. Multi-tier influence models, of which TAM exemplifies, dominate, and positivist approaches accounted for 72.3 percent of papers. TAM studies pander to the illusion of scientific accuracy and fail to address the complex social, political, and economic forces that encompasses technology acceptance in the real world. Any value in TAM studies lies not in the statistical accuracy but in the interpretations that produce valuable insights (see, e.g., Elbeltagi, McBride, & Hardaker, 2005).

In their study, Lui et al. (2016) present information systems as a discipline that has contracted rather than expanded to match the diversification associated with information systems in the real world. Significantly,

when it comes to comparing the progression of information systems with that of other disciplines, Lui at el. choose example disciplines, which one might define as hard science, including stem cell research and psychophysiology. In comparing information systems to "well-established scientific disciplines such as psychology" (Lui et al., 2016, p. 21), one assumes that information systems is a science—a study of deterministic, natural phenomena that can be measured and theorized in the same way as environmental ecology or quantum physics.

Dennis and Valacich (2014) take this assumption much further. In introducing the journal *Transactions of Replication Research*, they explicitly equate information systems as a discipline with the physical sciences. One might expect researchers to replicate experiments when dealing with physical sciences, but are we so deluded as to expect such replication in the IS discipline where "the object of study, humans, have free will and a diversity of automatic subconscious responses" (Dennis & Valacich, 2014)? Dennis and Valacich admit that social science differs from the natural science where one can precisely reproduce chemical reactions under the same laboratory conditions, and yet they express an expectation that one can replicate information systems research as well and, thus, provide scientific validation. Does the presence of automatic subconscious responses suggest that free will is not really operating? Depending on their philosophy of free will, do they mean to suggest that social phenomena are deterministic and reproducible in a manner that is open to the scientific method? Dennis and Valacich (2014) clearly expound an underlying viewpoint that information systems is a science: replication "enables scientific consensus", "validation is crucial to the advancement of science" , "Either outcome will advance science", and "we call on our colleagues to join us in this quest for scientific advancement".

In this paper, I argue that the positioning of the IS discipline as a science has damaged it both academically and practically and that the view that information systems is a science is unsustainable. I also briefly consider the debate in the past about the nature of information system as a discipline and offer a new disciplinary model of information systems. If the IS discipline is to survive, we need to reposition it both academically and practically.

2 Consequences of Treating Information Systems as a Science

The presence of an underlying deterministic philosophy of information systems results in a type of research that favors numbers over words and concepts, which reifies the scientific hypothesis and expects reproducible cause and effect. It may equate the presence of statistical results and mathematical expressions with truth, robustness, and reliability. It sets the expectation that a conclusion is correct because it is based on numerical analysis. It excludes interpretation and judgment as an element of research and takes a theory, concepts, or cause and effect linkage as something "out there", objective, fixed, and waiting to be discovered by an objective and detached researcher.

Many information systems studies are heavy on data analysis but light on theoretical depth. Recently, in applying privacy calculus, Kehr, Kowatsch, Wentzel, and Fleisch (2015), in a study that a Swiss insurance company partially supported, selected sets of participants from the United States and Germany. The participants completed an initial questionnaire and were introduced to variants of a mobile application that would monitor driver behavior using either lowly or highly sensitive personal data. They then completed a questionnaire driven by the researchers' quantitative model. The authors' fairly obvious conclusions were that how people feel affects how they rationally evaluate a situation and that people make decisions based on the specific situation rather than based on generally held attitudes. The authors view these conclusions as having practical significance with the ethically naïve statement that "simple manipulation of affective content may be sufficient to override [privacy] concerns" (Kehr et al., 2015, p. 627).

In another recent study, Scott, DeLone, and Golden (2016) drew on DeLone and McLean's (1992) IS success model, another framework that has dominated information systems research. Despite the orthodoxy of the framework, Scott et al. immediately open with admissions that there is little consensus on the appropriate measures for IS success, there is a lack of progress in measuring specific dimensions of IS success, and there is a tendency to use user satisfaction as a surrogate for IS success. The authors present eleven constructs, thirty items, and a homogenous population of university staff and students as the basis for analyzing e-government success. They drop a key construct that concerns control and that might have exposed, at least in part, the complex control and power relationships between citizen and state. They reduce IS success to a kind of limited user satisfaction. The simplification is so severe that the results say little about the complex interactions that render an information system successful. The authors do not reference task and purpose. I do not use the U.K. Driver and Vehicle Licensing Agency (DVLA)

website to license my car because I value information retrieval but because I must use it to avoid fines. The success of that website lies in the quality of design of the business process and the clarity by which it guides me through the business process. The focus on user satisfaction ignores the much more extensive, systemic nature of IS success. Power, politics, regulation, culture, media presentation, technology, government relationship to industry, the development of industry standards, and many more factors play a much larger role in information system success than the view of university students about whether they can use an e-government website around the clock. As a result, such a study masks the complexity of the information systems discipline and limits the practical use of such research.

Sollner, Hoffman, and Leimeister's (2016) study further illustrates the consequences of treating IS as a science. First, they make obvious conclusions. In applying the trust-TAM model to investigate users' trust in four parties (information systems, provider, Internet, community of Internet users) while on a simulated meeting-arranging system, the authors conclude that trust in the IS provider influences intention to use. They also conclude that trust in the IS is a major driver of IS use and that trust in the provider is more important than trust in the IS. One does not need to perform a complex structural equation modeling study to come to these conclusions. In the paper, the authors make no attempt to understand the different characteristics of the artefacts (information systems and Internet) and the social actors (providers and communities). As a result, the paper airbrushes out the difference between things and people and ignores the possibility that trust is a property of a relationship between two social entities and that the information system functions as a mediator between the two entities as a basis for negotiating and expressing trust. Second, they provide superficial advice to practitioners that relates little to the study. It may be the case that it may be difficult to transition many studies from the academic to the practical. Indeed, Sollner et al. admit that advice to take measures to demonstrate ability, benevolence, and integrity offer little practically. Third, the veneer of objectivity that positivist studies so often presume peels off all too easily. The participants were students, the researchers were academics at the same institution, and the IS provider was the academics. Further, the observer was the provider and a partner in the trust relationship. In other words, the authors had already established a strong trust relationship before they conducted any experiment—it is no wonder that the significance of the study's provider trust constructs was as high as sixty times greater than any other.

But one can find such a paucity of theory and insight in more than just positivist studies: it has also spread to qualitative studies. Consider Cunha, Carugati, and Leclercq-Vandelannoitte's (2015) study on the deployment of a customer relationship management system in a communication company. The authors conducted a rich longitudinal case study that involved 307 days of observation in the field, attendance and transcription of 51 team meetings, and the gathering of 3,000 pages of documentation. It is clear from the published work that the study offers extraordinary opportunities for interpretation, for the development of narratives, and for the identification of creative insights. And yet a conformance to a scientific or pseudo-scientific paradigm demands an attempt to appear scientific through data reduction, open coding, and categorization. In pursuing the veneer of objectivity that a grounded theory-like approach offers, the authors drain huge reservoirs of interpretive insights in favor of a weak conclusion that concerns the loose-coupling of work with its representation. The authors' conclusion for practitioners that "managers…need to anchor the design and implementation of information systems on the work practices that employees actually use in their everyday work" (Cunha et al., 2015, p. 343) not only offers them little value but fails to understand the complex role of information systems in organizations.

Laboratory experiments may give the impression that a complex social phenomenon is being isolated as in the same way a physical variable might be in, say, experiments with light. For example, Brown, Fuller, and Thatcher's (2016) study on email style and impression formation not only reifies complex literary styles in emails as the independent variable of email style and dependent variables of social and task competence but also furthers the illusion of a science by attempting to isolate the social phenomena via laboratory experiments. The variables are interpretive variables cast as objective variables. Can one really measure and define email style in the same as a sugar concentration in cells or variation in an mRNA population? Using a laboratory situation gives a false sense of comfort that one has isolated something social and can examine it under controlled conditions. Additionally, one needs to recognize that laboratories are social environment, which adds further layers of social complexity.

But creating laboratory experiments is only one way in which information systems build an illusion of scientific activity and accuracy in what are really immeasurable, social, and interpreted phenomena. Another approach to creating a veneer of scientific accuracy is in the use of mathematical models to represent what is a highly subjective phenomena as mathematical rules and structures implicitly parallel to

the equations that might drive quantum physics. Such research renders the social phenomenon as equivalent to a physical phenomenon in what is clearly a category error.

Machado, Taghu, Sainam, and Sinha's (2017) mathematical modeling clearly exemplifies attempts to render a social phenomenon as science. The authors self-referentially validate their theoretical models through simulations with no attempt to relate them to reality. Mathematical models and simulations of social and economic phenomena are notoriously unreliable. Even engineering simulations of, for example, robot structures and swarm robots fail when one attempts to translate them into real-world engineering products. Pursuing mathematical models in information systems is only another attempt to pretend that information systems does not differ from rigorous physical sciences and the study of physical phenomena such as light, sound, and electricity. Nelson (2016) comments that one should regard even mathematical models should as allegories that help thinking. However, as Machado et al.'s (2017) work illustrates, many IS researchers treat these models of complex social phenomenon as if they identify stable laws that can lead to "scientifically" based strategy. Nothing could be further from the truth.

3 Why Information Systems is Not a Science

The rhetoric of information systems as a science that produces scientific paper points to the illusion that the behavioral and social sciences can be treated with the same instruments and viewed as phenomenologically the same as the physical sciences, which have straightforward quantitative specification, mathematical sharpness, and precision of causal explanation (Nelson, 2016). They cannot. The nature of reductionist science requires constraints, simplification, and the managing of the environment in which one studies a phenomenon.

For instance, I can take a single species of green algae and split a culture into two separate ones that I can then grow in the same light conditions with the same media. I can then cover one culture with cooking foil. The culture in the dark switches a majority of its protein synthesis to the production of one enzyme, isocitrate lyase (McBride & Thurston, 1983), which I can measure and describe both in terms of protein and messenger ribonucleic acid (mRNA) populations. One cannot compare this science to a study of 487 students' guilt reactions to thinking about discontinuing the use of a social networking site (Turel, 2016). To equate such a study with sciences as if its methods and outcomes align with those of the physical science is clearly a category error. One cannot measure fear, shame, and guilt in the same way as shifts in RNA populations. What do people mean by good or bad? What is the difference between very slight guilt and extreme guilt?

In examining the distinctiveness of information systems, Lui et al. (2016, p. 14) compare IS research with other scientific disciplines. They compare information systems with psychology, behavioral research, the study of environmental acidification, software engineering, and (even more inappropriately) stem cell research.

As the National Institutes of Health (2016) states, stem cells are unspecialized cells that can multiply and flourish as a population for a significant time. They are cell lines that can be maintained in the laboratory. They can be well characterized, confined, and isolated. A well-understood boundary of study can be erected around them. Their function can be understood in physiological and biochemical terms. Metabolic pathways can be traced. Biochemical phenomena can be isolated and controlled in such a way that one step can be studied through manipulating one element of a biochemical pathway. Stems cells can be uniquely induced to differentiate by altering a limited number of parameters and maintaining complete control of the chemical environment they exist in. Such are the constraints we can apply to stem cells that we can eliminate any extraneous effects on the manipulation of the biology of stem cells. Stem cells are homogenous: every cell has the same characteristics. Their interactions are predictable. They do not vary in complex ways. The do not have free will. They do not counter or resist scientific manipulation. They do not have language, they do not take multiple different interpretations of their environment, they do not argue, they do not walk out of their petri dishes, and they do not form unpredictable political alliances. Thus, comparing the science of stem cells with the "science" of information systems makes no sense.

Conducting science requires quantification (although, in fact, researchers present much of the output of science as narratives and stories that they have developed from interpreting the numbers). We must identify or create measurables, measure and identify trends, and measure changes. The parameter selected must be appropriate and represent the phenomenon in a reliable way that scientific consensus accepts. The indicators one selects and the quantity one measures clearly results from one's interpretation. The measurable is, as far as we can tell, a real physical effect. We can measure the

amount of isocitrate lyase, the density of DNA bands on a gel, electrical potential, and so on. There is no or at least a minimal gap between the natural phenomena and the change being measured. Our laboratory work may simplify the complex systems. But we simplify things in order to make the system measurable. In the case of Chlorella, the complexity of algal respiration is reduced by, in essence, placing a mask over the algae so that the only change is whether the plant is in the light or the dark and the only measurable is the amount of isocitrate lyase. This simplification creates manageable quantification and a focus on one aspect of the system.

In contrast, a social system features orders of magnitude more complexity and a greatly reduced extent of controllability. Not only does it become essentially impossible to limit the variable changes, but also the distance between the actual change and what we "measure" becomes unsustainably immense.

In such "social science experiments", we must question whether the selected measurable actually represents anything of value in the real social situations. We separate proxy variables that we take to indicate some significant phenomenon from the phenomenon by some unknown distance and unknown intermediary influences. There are no direct measures. We invent the proxies, which may have little connection with the real world. Indeed, Nelson (2016) suggests that "there are strong reasons to be cautious about the extent to which these proxies or indicators really provide illuminating counts or measures of the variables they purport to quantify".

Many concepts pursued in information systems such as trust, guilt, anxiety are vague, subjective, and variable. Meanings will vary according to subject, context, and a host of other interacting influences. Even perceived ease of use and perceived usefulness will be highly contextual and individual and affected by individuals' prejudices, feelings, and health. Yet, the discipline sees defining a three-letter acronym, allocating a set of numbers, and providing a Cronbach's alpha as a justification for labeling the research as "science".

Further, IS researchers ignore complexity and heterogeneity. Like studying an elephant in the room, we obsess about the toenail and ignore the head, brain, and threatening tusks. We cling to an illusion of objectivity in our statistical and laboratory studies. Even the most rigorous scientific experiment contains a certain subjectivity in the variables one selects and the conclusions one draws. In the social situation, all is subjective. The researcher is a social being who acts in the situation. In the laboratory situation, the researcher has immense influence—particularly when the research subject's professor.

Furthermore, what one does not select as a variable—what one excludes—is just as important, just as much an interpretation, and just as likely to be a result of prejudices and personal opinion as what one selects. We see what we want to see. Our questions may be the wrong questions because of our social expectations. We may ignore or side-step complex factors. Really exploring the complex networks of interactions that drive the relationship between organizations and information systems is inconveniently messy. Culture, for example, with its layering of interactions (the political, the social, the religious, the historical) is much easier purified to Hofstede's six dimensions of national culture that offer the safety of easy measurement. In any quantitative study, the exclusions must raise questions about the validity of the limited set of variables selected.

4 The Quantitative Motivation for Information Systems Research

I would suggest that much of information systems research lacks both descriptive and predictive power. Social sciences are predictively weak and do not turn out law-like generalizations. Indeed, quantitative concentration on formal hypothesis, so-called testable, strip out rich insights and render colorful phenomena in black and white.

MacIntyre (1981, p. 94) notes that, for much social science, counter examples can coexist without any refutation, a situation that would be unacceptable in the physical sciences that disciplines such as information systems seek to emulate. Furthermore, replication is an impossibility in most social and behavior science. Even in the so-called "laboratory conditions", one cannot demonstrate that IS hypotheses would hold in all circumstances. There are no universal quantifiers. There are no clearly defined scope and boundaries. A lot of information systems phenomena are infinitely variable—a result of complex, systemic interactions that create unique conditions in every organization, unique individual behaviors, and an infinite range of relationships.

If there is a science of human behavior, which is what some information systems researchers seem to be pursuing, it would need to omit all reference to intention, purpose, and reason (MacIntyre, 1981, p. 83)

because such quantitative research would be examining deterministic cause-and-effect phenomena—natural interactions devoid of human free will and without purpose. Scientific fact must be value free, but in information systems it is not. As such, information systems researchers try to create an edifice of intention and purpose that is unsustainable and will inevitably crash to the ground.

What underpins the ideology of information systems as science is a materialism that views quarks, genes, organizations, and social systems as one and the same thing: one view, one lens, one method of explanation; a world underpinned by a physical theory of everything that explains all phenomena from Valentine's Day to vacuums. If mathematics can describe Higg's boson, why can mathematics not describe IBM's IT outsourcing? Is there any difference between a population of gas molecules colliding in a jar and a population of warehouse men navigating round a warehouse and undermining carefully constructed information systems?

Some information systems research seems to be driven by a kind of social atomism in which organizational interactions can be reduced to the determined behavior of individuals who can be subjected to questionnaires and laboratory experiments to derive an underlying scientific law that applies to doctors in Ukraine and surfers in Sydney. The IS discipline aspires to be like the physical sciences such that the highest and most pure information systems model will be expressed in mathematical formulae. Abstraction is the prime aim (Midgley, 2002, p. 194). However, that aim dissolves the human, the organizational, and the social and leaves one with a bleached skeleton that is a far cry from the living breathing being and has lost more in description than would ever be gained through "science".

As Midgley (2002, p. 195) suggests, there are many maps, many ways of describing a social phenomenon. There are multiple levels of divergent explanation, multiple purposes, multiple angles of observation, multiple tools for observation. But a belief in scientism will drive the IS discipline to express everything in numbers and to the conclusion that complex organizational systems are as measurable and reproducible as the speed of light.

Such a scientific positioning in information systems is unrealistic. It is safe and comforting to float in a (dead) sea of numbers and equations. We are simply drawing a physical conclusion—developing a law-like generalization that is out there waiting to be discovered. The numbers say so, so there is no argument, no debate, no dangerous involvement of subjective and flawed humanity.

5 Remobilizing Information Systems Research

If information systems research is not the same as behavioral science research, if quantum physics and information systems are not sister disciplines, and if the social and political complexities involved in deploying information systems in organizations and even how individuals use them defy quantification, where can we locate information systems, and how can such a relocation reinvigorate information systems research both in diversity and relevance?

Information systems involve movement and change. They support the development of organizational and individual behavior; they change activities and behavior. Information systems both impose meaning on human activity and reflect existing meaning. They are the vehicles for determining meaning, for collaborating in the complexities of society and organization.

I would suggest that information systems research would benefit from a return to the primacy of narrative. Even in the most concentrated quantitative studies, the value emerges in the narrative, in the resulting story. MacIntyre (1981) suggests that it is impossible to give an intelligible account of human actions outside the narrative mode. One needs to explain the role and influence of information systems as stories. We should start with description, with movement and the progression of actions. We may better express information systems phenomena by developing thick descriptions (Denzin, 2001) or by pursuing literary genres. For instance, Avison, Malaurent, and Enyaud (2016) draw on the French *nouveau roman* ("new novel") to serve as their study's structure, which exemplifies how one can create a challenging approach to storytelling in information systems research. Other examples include the use of poetry (McBride, 2008) and radio plays (Stahl, McBride, Wakunuma, & Flick, 2014).

Narrative should form the heart of efforts to not only present information systems phenomena but also develop understanding and explore context. Information systems research needs to return to developing theoretical narratives and to exploring a wide range of theoretical artefacts (Alter, 2017) as a product of our research. Information systems researchers should pursue a wide range of approaches. Theories may provide frameworks or scaffolding for researchers to explore patterns, develop distilled concepts, and

create insights and understand that others can reflect on and that can fundamentally influence practice. We should bring to bear theories, ideas, and conceptual frameworks not as material laws but as metaphors, support for learning, tools for reflection, and organizers of narrative structure. Information systems has been known for drawing on a wide range of disciplines both in the social sciences and beyond. The physics of quantum theory (McBride, 2006), chaos theory (McBride, 2005), and hierarchy theory (McBride, 2015) provide ways of creating coherent stories, providing insights, and driving thinking.

Narratives offer an immersion, involvement, and engagement with the world. They constitute a fundamental way of learning. They provide a platform for discovering and documenting wisdom. Storytelling transmits guidance, shapes the cumulative wisdom, and enables one to discover and document mature thinking and wise social involvement. Such narratives can be distilled into proverbs, guidelines, and commentaries that encourage and enable wise behavior in difficult organizational situations.

However, IS research needs to free up not only the methodologies it uses and accepts but also the variety of other disciplines it draws on. Remobilizing information systems will, for example, require engaging with the past. Researchers should recognize the importance of history and seek to understand how past practice influences current information systems implementation. Design approaches should be traced. Pursuing narrative requires that we engage with the past, the life of organizations, the learning and prejudices of users. Rituals, traditions and historical context all play a role in the development of information systems. Quantitative surveys and laboratory experiments cannot provide such engagement. They deny the past and create a permanent now.

IS researchers should engage with philosophy and the purpose of information systems that Beynon-Davis (2007) explains so well. Additionally, IS researchers need to treat information systems as a political discipline and explore both the macro and micro political environments and contexts that drive information systems. Up until now, IS researchers have otherwise skirted such an exploration in a wide range of both organization and national contexts.

A reference or sister discipline for information systems cannot come from the physical sciences or even the biological sciences however comforting that might be. It has to be more dangerous, complex, and difficult to pin down. I would suggest that dance studies is the IS discipline's sister discipline. Like information systems, dance studies is still relatively new. It has struggled to find its feet. It has been unmoored, homeless, and alienated (Gierstof & Wong, 2016). Like information systems, it is a complex accretion of disciplinary activities and practices.

Biological and physical facts about the human body its anatomy, mechanics, and physiology constitute dance studies' core. Patterns of dance and dance structure can be researched, analyzed and characterized. Dance can be considered in the context of its embedding in tradition and history. The study of dance must address the importance of culture, human interaction, human relationships, and the social cohesion of society. It concerns a political involvement through the expression of new dance art forms and through commentary on politics, power, and society (Mullis, 2015). It recognizes the creative force exerted through design, choreography, expression, and creativity. One can surmise that it will involve investigations into economic and business structure through government sponsorship, grants, commercial connections, television, film, and other media. Further, researchers must develop business practices and methodologies about running dance companies and associated commercial structures. Dance studies will have a strong educational practice element conducted through dance schools and ballet schools.

Courses in dance studies cover history, philosophy, anthropology, choreography, and the ways in which dance shapes or is shaped by society. Taught dance techniques include both contemporary and novel styles and traditional ballet. Dance courses also delve into the cultural tradition of dance in society. Dance studies also concern the practicalities of theatre lighting, stage design and management, screen dance, choreography, and production and project management. Dance involves learning languages and developing meaning and communication through movement (Bannermann, 2014). It is inherently political (Mullis, 2015). This wide-ranging, engaged, eclectic range of studies is parallel to what we should expect in information systems studies.

Thus, we can see that the practice and research of information systems is really the practice and research of dance—whether the formal dance of an organizational and transactional context or the free-flowing abandoned dance of social computing. I would argue that information systems is not a science and never has been. It is rather a humanity that resonates with human creativity, with the human state, and with human relationships and contexts. To study information systems is to study the complex interactions and

networks that bind together complex societies and that enable economic activity both on a personal and global scale. To develop information systems is to engage with the creative arts. To practice information systems is to engage with human relationships, with the power and politics that enable people to develop cities (McBride, 2013), and with the conduct of communities, societies, and states.

By overemphasizing quantification, the IS discipline short-changes itself. The discipline must question its underlying philosophy of determinism. The idea that information systems is a science, which Dennis and Valacich (2014) repeat in referring to replications as advancing science and calling for information systems colleagues to join a quest for scientific advancement encourages a myopic view of a living, dynamic discipline.

Information systems are complex emergent phenomena that cannot be reduced or described in simple scientific formula. Imagine the inadequacy of reducing a dance to a description of a set of mechanical movements, and yet that it exactly what many do in information systems research.

Unless the information systems academic community grasps this point, the IS discipline will continue to atrophy and shrink into a husk of TAM studies and introspective debates about the significance of minute statistical variation.

6 Epilogue

The problem I present in this paper is not new. In 1997, Stowell and Mingers edited a book entitled *Information Systems: An Emerging Discipline* in which a range of authors reflected on the state of information systems. Probert (1997) critiqued the essentialist, reductionist, and epiphenomenalist fallacies that still plague the discipline. Angell (1997) highlighted the significance of uncertainty and the centrality of power and control, areas that attract little attention from information systems researchers.

Less than ten years later, King and Lyytinen (2006) gathered papers and commentaries to chart the continuing crisis in the information systems discipline. In their contribution to the debate, Hirschheim and Klein (2006) attribute the crisis in the discipline to a fragmentation, which returns our discussion to Lui et al.'s (2016) analysis that suggests the discipline has converged on technology adoption, TAM, and positivist statistical studies. It is this apparent defragmentation, years on in 2018, that leads us into a new sea of stagnation, a lack of insight, and irrelevancy. In our desperation to establish ourselves as a discipline, we have sacrificed the creativity and diversity that should characterize the study of complex human phenomena for the monotone regularity of surveys and statistical methods. Driven by the need for legitimacy and acceptance, we have adopted the vocabulary and mindset of the physical sciences, something which is singularly inappropriate for the multi-dimensional study of the complex art that is information systems.

Information systems research has stagnated and requires nothing less than a remobilization. This remobilization requires the IS discipline to reject scientism and to stop viewing information systems as a science. It requires the discipline to reposition itself as a social humanity. It requires storytelling, a diversification of modes of expression, a renewed engagement with practices, a widening of the means of dissemination, an explosion of creativity, and of the development of new concepts and new approaches. It requires a serious engagement with philosophy and history and an open and free discussion of philosophical positions. Most of all, I would suggest, it requires an articulation of the political dimension of information systems and an engagement with the power structures that information systems underpin.

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